Business Analyst Workbook

~Fifth Edition

IIBA® Endorsed Education Provider

Center Of Excellence for Professional Development

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An ISO 9001:2015 Certified

Center of Excellence for Professional Development

Continuous learning and Improvement

PREFACE

This workbook is created for the sole benefit of the participants in the workshop.

It gives a clear understanding about all the contents dealt in the work shop and will help the participants to practice on their own.

The whole idea of coming up with a work book is to provide the students with comprehensive and well researched data.

Much of the data that is presented in this workbook is documented by the in house real time expert after an intensive research on the subject combining with own vast and real time experience. However, certain data is extracted from different external sources, and views of certain other experts have been taken in to consideration while compiling the data, purely with the intention of facilitating the participants with the right information. The data is presented in the same format as extracted so as not to lose its originality and the student gets the actual benefit out of it.

We take this opportunity to thank all the people who directly or indirectly participated in shaping up this workbook.

We have taken utmost care while preparing this workbook, there may be a possibility of creeping up of certain mistakes, which may have escaped our notice. In case of discovery of any mistake, please bring it to our notice, it is highly appreciated.

COEPD LMS have collection of real time documents, Prep Exams, Online Nurturing process support of working on Capstone projects and live projects along with provision of applying for latest BA openings. Participant can login and reap the benefits.

Your feedback and reviews on this workbook are much obliged and Welcome. Please send your reviews or comments to Helpdesk@coepd.com

Venkat

About the Author

Mr. Venkat R P is a man with a mission, and his mission is

"to know every individual's professional requirement and help them in reaching their true potential".

He is a highly experienced Corporate Strategy Implementation Consultant, who brings in his immense knowledge to the advantage of many corporate and professionals. He is a Certified-on Business Analysis (cd1262191) from BCS, The Chartered Institute for IT and has Certification o`n Enterprise Architect TOGAF 9 (93649) from The Open Group.

In his career spanning over 22 years, he has made significant contribution to the success of projects in BFSI, Retail, Process and Services, Solutions, Product Development. He has been a corporate trainer for more than 15 years.

He has done Masters in Computer Application (MCA). He is experienced in Software Design and Development (OO Concepts), solving business problems in BFSI, Retail and Supply Chain Management domain and had worked on projects for clients primarily in UK, Canada, USA and India. He has an expertise in leading teams, Project Management, Task Estimation and Delegation, Trainings, GUI Design, Database Design, Coding, Performance Tuning and Resource Optimization.

Mr. Venkat started his journey as a programmer, charted new career heights by getting into senior management positions. He served as senior business analyst and project manager many times during his career, commendably owning the complete responsibility of managing new business units. His leadership skills are widely appreciated. He also trained large number of professionals from organizations like Satyam, Royal Bank of Scotland, Volkswagen, Avenir, DST World Wide Services and many others.

It is his passion for trainings and spreading his knowledge lead him to design the Result oriented Business Analyst (BA) course. What makes his way of training more effective than most of his contemporaries is his way of teaching. He developed a training process involving lot of case studies, role plays and other fun activities which helps each individual attending the training to grasp the knowledge to the fullest.

He is a member of the following Professional Bodies.

- *IIBA (International Institute of Business Analysis), Corporate-COEPD -ID- 177511*
- *ISTD (Indian Society for Training and Development) : R-1445/2013*
- *BCS (British Computer Society) ID: 990561452*
- *Association of Enterprise Architects (AEA) ID :33243879*

Welcome to BA Workshop

Before we start the workshop, please do the following

1. Keep your mobile in silent or vibration Mode.
2. It is essential that we need your undivided attention in the Workshop.
3. Please write the purpose of your attending this workshop
   (it can be getting a Job as BA or Knowledge enhancement)

4. Decide on a Target Date by which you have to get a offer letter as BA or achieving point 3.

5. To achieve your goal, what will be your plan of action?

6. Points 3, 4 and 5 should be referred daily morning at least once and for every 3 hours in the workshop. This will serve as a motivation factor for you and will remind you of your goal.

Important Note

To get the best out of the training and retain the subject in our memory,
Please revise the topics as below...
First revision- within 1 week
Second revision- within 15 days
Third revision- within 1 month.
Thereafter 1 revision for every 1 month.

ALL THE BEST

About COEPD (Center of Excellence for Professional Development)

a. When it started

COEPD (Centre of Excellence for Professional Development) established in 2008 (Idea initiative: 9th October 2008 - Dussehra).

b. How it started

After looking failures of projects due to lack of skilled Business Analysts in Projects, we have decided to groom more professionals in that Area. The Passion towards Training and to make individuals successful has made us initiate COEPD

c. What it delivers

- BA Classroom Trainings at our Training Facilities
- BA Nurturing Process at our Training Facilities / Online
- BA Mentoring Process in Online mode
- BA Internship Program at our Training Facilities
- BA Online Training
- BA Placements Assistance in INDIA
- BA Corporate Trainings

d. Where it Delivers

Globally through Online BA Trainings and
Classroom Trainings in Hyderabad, Pune, Bangalore, Chennai and Delhi

e. Achievements & Recognitions (As on 31st Oct 2023)

- Company's strength around 100 Associates spread across metro cities including Hyderabad, Bangalore, and Pune.
- Conducted 1,900+ batches with over 11,000+ Success Stories (Corporates, R&D Institutes, B-Schools and Individuals)
- Knowledge Partner for Business schools (Lotus Business School and more).
- Corporate Training Partners for Volkswagen, Reliance India, Avenir, DST World Wide Services and more.
- IIBA EEP - Endorsed Education Provider.
- 10 most promising online tutorial providers by Silicon India.
- An ISO 9001:2015 Certified Company.
- Authorized Training Partner (ATP) and
  Accredited Examination Centre (AEC) for
  International Certification Body - Ivy Global Academy.

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1. Introduction

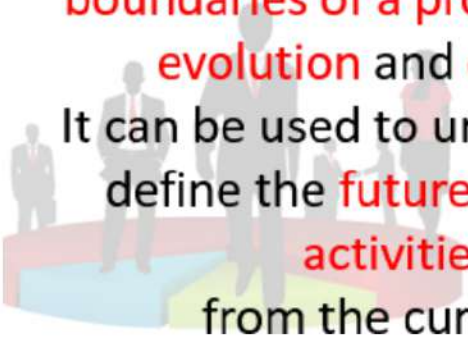
1.1. What is a Business Analysis?

What is Business Analysis

Business analysis is the practice of enabling change in an enterprise by defining needs and recommending solutions that deliver value to stakeholders.

Business analysis enables an enterprise to articulate needs and the rationale for change, and to design and describe solutions that can deliver value.

Business analysis is performed on a variety of initiatives within an enterprise.
Initiatives may be strategic, tactical, or operational.
Business analysis may be performed within the boundaries of a project or throughout enterprise evolution and continuous improvement.
It can be used to understand the current state, to define the future state, and to determine the activities required to move from the current to the future state.



1.2.Who is a Business Analyst?

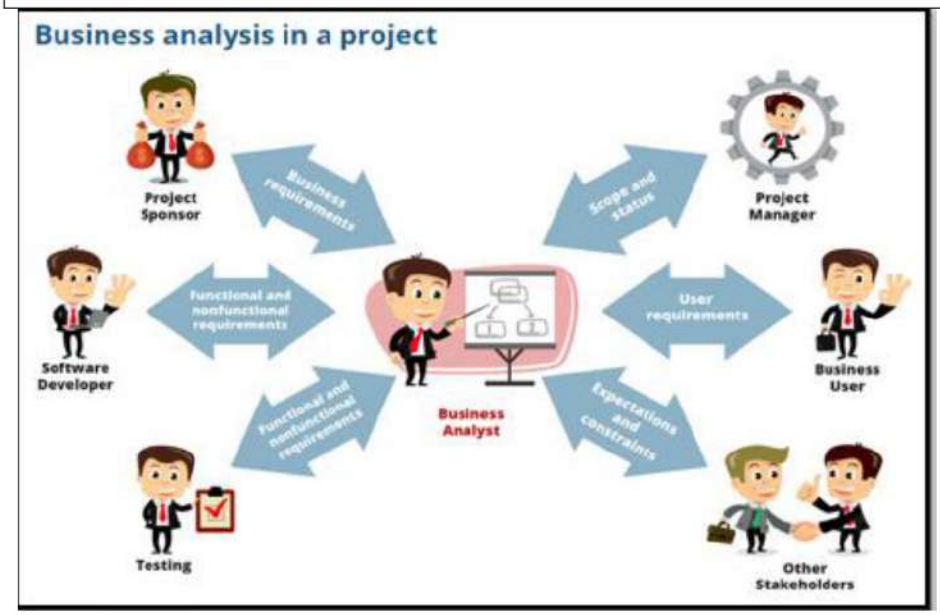
A business analyst works along with the technical team and acts as a liaison between stakeholders of Client and the technical Team. He is the face of the Technical team to the Client and all Client Communications will happen through a Business Analyst. He/ She will elicit, analyze, communicate and validate requirements for changes to business processes, policies and information systems in the existing business proves of the Client. The business analyst understands business problems and opportunities in the context of the requirements and recommends solutions that enable the organization to achieve its goals.

Who is a Business Analyst

A business analyst is any person who performs business analysis tasks, *no matter their job title or organizational role.* *Business* analysts are responsible for discovering, synthesizing, and analyzing information from a variety of sources within an enterprise, including tools, processes, documentation, and stakeholders.

The business analyst is responsible for eliciting the actual needs of stakeholders, which frequently involves investigating and clarifying their expressed desires in order to determine underlying issues and causes.

Flash Card - 1



Prime Responsibilities of a Business Analyst

- Client Interactions
- Ownership of Requirements
- Process (Re) engineering

Role of a Business Analyst in Project

Business Analyst will do the following in a Project

- Gather Requirements using Elicitation techniques
- Documents the Requirements using industry standards
- Models the Requirements using UML
- Communicates the Requirements to the Technical Team
- Tracks the Requirements during Development Stage
- Handle Change Requests
- Facilitates UAT (User Acceptance Testing)

3C – Correct ,Complete and Consistent
IEEE - Institute of Electrical and Electronics Engineers.
CMMi - Capability Maturity Model Integration (CMMI) is a process improvement training and appraisal program and service administered and marketed by Carnegie Mellon University (CMU) and required by many DoD and U.S. Government contracts, especially in software development.

Flash Card – 2

1.3.What is Requirement?

A requirement is basically the need of the Client. This Need or Requirement will transform into a Solution while taking various shapes and forms as it progresses from each stage of SDLC.
Requirements serve as the foundation of systems or system components. A requirement can be thought of as something that is demanded or obligatory; a property that is essential for the system to perform its functions. Requirements vary in intent and in kinds of properties. They can be functions, constraints, or other elements that must be present to meet the needs of the intended stakeholders. Requirements can be described as a condition or capability a customer needs to solve a problem or achieve an objective. For clarification purposes, a descriptor should always precede requirements; for example, business requirements, user requirements, functional requirements.

Flash Card - 3

1.3.1. Types of Requirements

1. Business Requirements
2. Stakeholder Requirements
3. Solution Requirements
    a. Functional Requirements
    b. Non-functional Requirements
4. Transition Requirements

Business Requirements are higher-level statements of the goals, objectives, or needs of the enterprise. They describe the reasons why a project has been initiated, the objectives that the project will achieve, and the metrics that will be used to measure its success. Business requirements describe needs of the organization as a whole, and not groups or stakeholders within it. They are developed and defined through enterprise analysis.

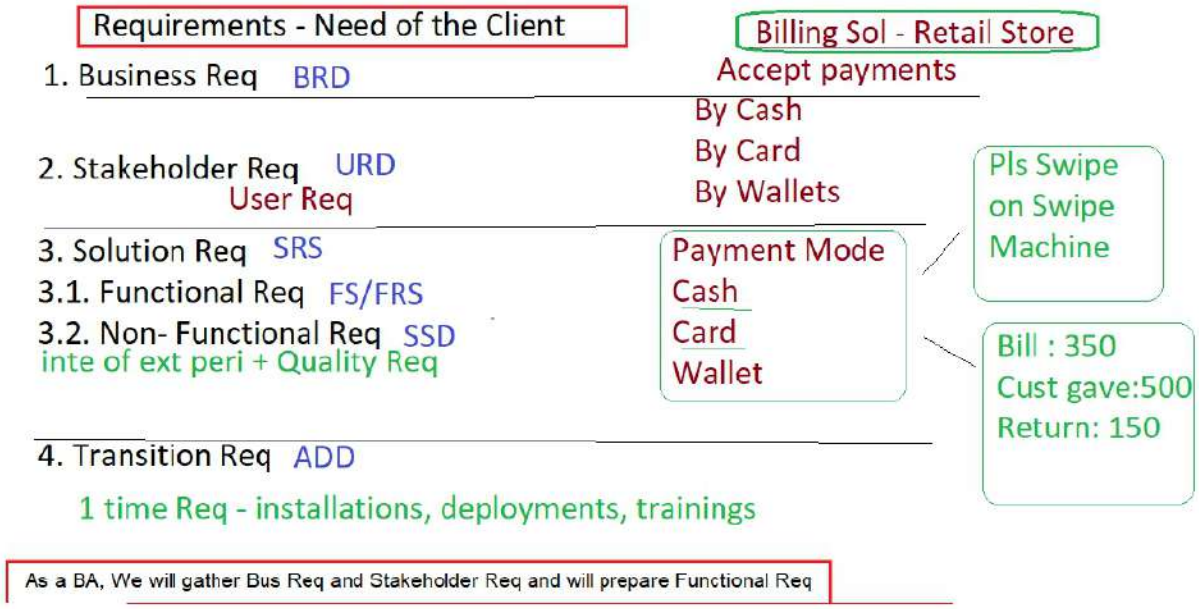
Stakeholder Requirements are statements of the needs of a particular stakeholder or class of stakeholders. They describe the needs that a given stakeholder has and how that stakeholder will interact with a solution. Stakeholder requirements serve as a bridge between business requirements and the various classes of solution requirements. They are developed and defined through requirements analysis.

Solution Requirements describe the characteristics of a solution that meet business requirements and stakeholder requirements. They are developed and defined through requirements analysis. They are frequently divided into sub-categories, particularly when the requirements describe a software solution:

Functional Requirements describe the behavior and information that the solution will manage. They describe capabilities the system will be able to perform in terms of behaviors or operations—specific information technology application actions or responses.

Non-functional Requirements capture conditions that do not directly relate to the behavior or functionality of the solution, but rather describe environmental conditions under which the solution must remain effective or qualities that the systems must have. They are also known as quality or supplementary requirements. These can include requirements related to capacity, speed, security, availability and the information architecture and presentation of the user interface.

Transition Requirements describe capabilities that the solution must have in order to facilitate transition from the current state of the enterprise to a desired future state, but that will not be needed once that transition is complete. They are differentiated from other requirements types because they are always temporary in nature and because they cannot be developed until both an existing and new solution are defined. They typically cover data conversion from existing systems, skill gaps that must be addressed, and other related changes to reach the desired future state. They are developed and defined through solution assessment and validation.



Case Study on requirements

OP consultation n Billing Project

This Hospital has 10 Departments in OP consultation
All depts works from 9am till 12noon and 4pm till 8pm - 7days/week
Each dept will have min 4 doctors for consultation
Any patient can request for appointment with any doctor.
For each appointment, doctor slot of 10 mins will be booked.
Doctors prescribe medicines and tests
Medicines are available in Pharmacy
Tests are done at lab
All consultation, medicine, tests bills are payable at respective counters.

Please identify Business Requirements and Functional Requirements

First Analysis

Please Convert all NUMBERS to Variables

This Hospital have multiple Depts ... As of Now - 10 Depts - May increase or decrease in future
Depts Works in Slots - As of Now - we have 2 Slots 9am to 12 noon , 4pm to 8pm ,
Slots are mapped with day of a week or day of a Month
New Slots may be added or Old Slots may be deleted
Dept will have minimum number of Doctors - As of Now it is 4 - May increase or decrease in future

Doctor appointment will be for 10 min -
Here we have to allot 6 patients for an Hour

Requirements Identification

Business Req

BR001-Patient should be able to book an appointment with the Doctor for a given Slot

BR002-Doctor should be able to enter his/her availability for Consultation to the Slots

BR003-Reception should be able to Collect Consultation fees from the patients

BR004- Pharmacy should be able to give prescribed medicines and collect the medicine costs

BR005-Lab Incharges should be able to conduct lab test precribed and should be able to give lab reports and collect lab test charges.

Functional Req
System perspective

FR0001 - Patient registration process

FR0002 - Doctor should be enrolled with the hospital

FR0003 - Doctor should be giving his availability to the slots

Functional Requirements Vs Non-Functional Requirements

	Functional Requirements	Non-Functional Requirements
Objective	What the Product Does?	How the Product works
Focus	on User Requirement	User Expectations
Documentation	Captured in Use Case	Captured in Quality Attribute
Essentiality	Mandatory	Not Mandatory, but desirable
End Result	Define Product Features	Define Product Properties
Origin Type	Usually Defined by User	Usually defined by developers or other Technical Experts
Types	External interface, Authentication, Authorization Levels, Business Rules	Usability, Reliability, Scalability, Performance

1.4.Bond between Requirement and BA

The BA always ensure that the Client Requirements are properly gathered or collected, communicates the same to the Technical Team in UML language which is more understood to them. He communicates to Client in Business language. BA nurtures these requirements into an IT Solution with the help of the Technical Team. Generally the technical Team will be headed by the Project Manager (PM). PM takes care about the technical aspects of the Project, Team management and delivery of the project within Time frames. BA will be in continuous track of the Client Requirements through all the different stages of Project development Life Cycle. He helps the technical team to understand the Requirements clearly and participates in UAT along with Client. In short, we can say that "BA takes the ownership of the Client Requirements".

1.5.Who is stakeholder?

A "stakeholder" is any person or a group of Persons or an organization that is directly or indirectly effected or impacted by the proposed IT Solution.

Flash Card - 4

1 PROJECT STAKEHOLDERS

People inside your organization who provide knowledge and expertise necessary to necessary to quantify technical and business constraints

- Business Analyst
- Project Manager
- Development team (Sr. Software Engineer, Software Eng, Project Engineer)
- Quality Assurance
- Testing
- Operations (networks, training)-> Environment
- Business/Subject Expert
- Business Data Modeler
- Future Ideas Specialist
- Current Automation Specialist
- Usability Expert
- System Architect
- Marketing Specialist
- Sales Specialist
- Technology Expert
- Standards Specialist
- Testing Specialist
- Organizational Architect
- Aesthetics Specialist
- Graphics Specialist

2. BUSINESS STAKEHOLDERS

- Project Manager
- Business Owner(On Paper)
- Business Sponsor (Agreement Sign/Amount)
- Executive Sponsor/ owner (Executes)
- Operation Team
- SPOC – Single Point of Contact
- Process Experts /Owners/SME
- SME- Subject Matter Expert
- Ambassador Users
- End Users

3. 3rd PARTY STAKEHOLDERS

External Consultants

People outside your organization who provide knowledge and expertise necessary to quantify technical and business constraints

- Auditors
- Focus Group

- Security Specialist
- Environmental Specialist
- Safety Specialist
- Outsource
- Cultural Specialist
- Legal Specialist
- Packaging Designer
- Manufacturer
- Negotiator
- Public Opinion
- COTS Supplier
- Inspector

Negative Stakeholders :People or organizations who do not want your project to succeed

- Competitor
- Hacker
- Political Party
- Pressure Group
- Public Opinion

As per *BABOK® Guide*, the generic list of stakeholders includes the following roles:

- business analyst,
- customer,
- domain subject matter expert,
- end user,
- implementation subject matter expert,
- operational support,
- project manager,
- regulator,
- sponsor,
- supplier, and
- tester.

1.6.What is Business Process Modeling?

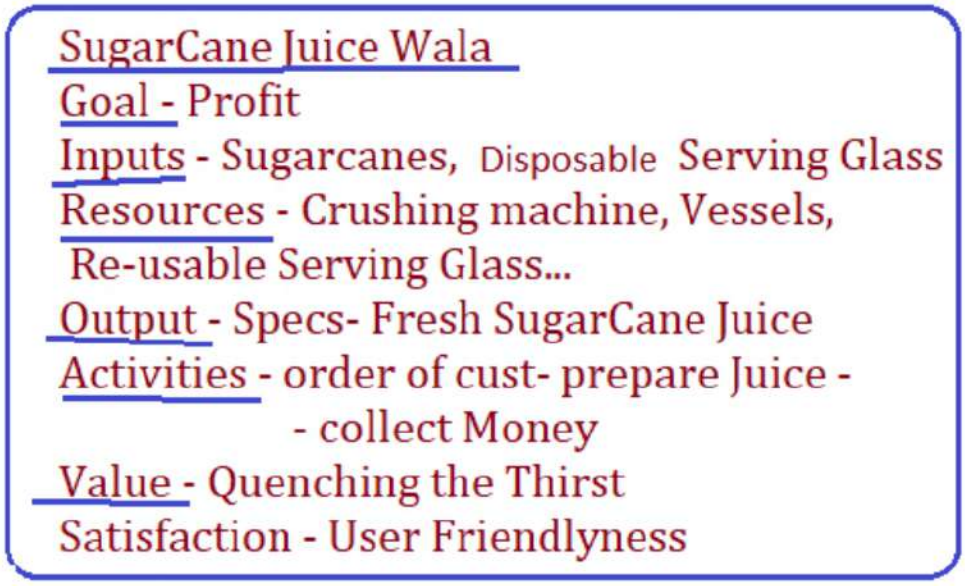
A business process:

1. Has a Goal
2. Has specific inputs
3. Has specific outputs
4. Uses resources
5. Has a number of activities that are performed in some order
6. Creates value of some kind for the customer. The customer may be internal or external.

Flash Card - 5

A business process is a collection of activities designed to produce a specific output for a particular customer or market. It implies a strong emphasis on how the work is done within an organization, in contrast to a product's focus on what. A process is thus a specific ordering of work activities across time and place, with a beginning, an end, and clearly defined inputs and outputs: a structure for action.

BPM- Example 1



ATM BPM

BPM - ATM

Goal - Support Process

Inputs - Data on Card, Transaction type inputs, relevant Transaction data inputs

Resources - ATM, CARD, Environment

Output - Based on the Transaction inputs

Activities - Depends on the Transaction selected

Value - Anytime, Nearby

Tips for BPM

Always consider the base service for simplicity

Only value created is from end user (customer) perspective,

rest all (Goal, inputs, Resources, Output, activities) are from business owner perspective

Other Case Studies

Please work on BPM for below

Case studies

1. Oyo app
2. Ola app
3. Swiggy app
4. Dunzo app
5. Amazon
6. Any one bank mobile app
7. PayTM app
8. Whatsapp
9. Irctc app
10. Bookmyshow

1.7.BA Completeness - 8 Skill Areas

1. BA Directives
2. BA Competencies
3. SDLC
4. Technical Skills OOA, UML
5. Functional Skills – BPM, Domain model
6. Requirements Engineering
7. Tools & Documents
8. BA Strategy

Flash Card - 6

2. BA Directives

2.1.IT Companies overview

Types of IT Companies

Product Development IT Companies	Application Development IT Companies
Microsoft , Oracle, IBM, SAP, CRM	Infosys, TCS, Wipro, Tech-Mahindra
IT Company will have the concept and they invest time and money to build the product	Client will have a requirement and will engage an IT Company to develop an IT application
IT Company initiates the development	Client initiates the development
IT Company is the owner of the developed Product	Client is the owner of the developed application
IT Company will sell the same product to multiple Clients or Customers	Client will be the only customer for this application
Customizations are done if required for each customer	
Installation will be done at the Clients place	Deployment will be done at the Clients place
Business Analyst Role	
Understand the product features	Understand the Client Industry
Understand the product Domain	Understand the Client requirements domain
Understand where this product fits in the Domain	
Understand the Client's requirement	
Understand what customizations are required for this product to fit in the Client's requirements	

Business Analyst (BA) Vs Research Analyst (RA)

1. BA will have a finite set of stakeholders, whereas RA does not have
2. BA will get requirements from the stakeholders, whereas RA will do market research to get the requirements
3. BA will analyze the requirements and work on them, whereas RA will do innovative thinking and have to come up with creative ideas to finalize the requirements.

Types of Development Units

If a Client has a Software Solution Requirement, then there are 3 options to consider

1. Select an existing Product and customize it
2. Give the requirement to an IT Company for Development from Scratch
3. Client may have an extension of IT Development Wing –For example Royal Bank of Scotland. Here the role of Business Analyst will be a SME (Subject Matter Expert) or Process Expert.

BA REPORTING

If BA is working in a single project, He will be reporting to the PM

If BA is working in multiple projects, then he will be reporting to Sr. BA and will be updating the status and coordinating with the concerning PM about that concerning project.

How project gets initiated

Need of a Client is realized in 2 ways

1. Client realizes his need – Process re-engineering
2. Third party will make the Client realize

Lets discuss the pre-project Activity.
When the Client realizes that there is a need for a Software application in their process, then the Client will do an initial analysis on the required features of the Software Application and will prepare the Requirements Document. This Document is released open to all Potential Software Companies as "Request for Proposal (RFP)". The RFP is a document in which Business need appear. "Request for Information (RFI)" is a form that is attached to RFP or released as a separate form. In this form IT Companies fill in the information that the Client is interested to know. All Potential interested Software Companies will reply with filled in RFI.

Now the Client conducts a **Pre-Bid Conference** to clarify the Queries of the participating Software developing Companies about the Required Software Application. After the pre-Bid Conference, The Client releases "Request for Quotation (RFQ)" document to these interested Potential Software Companies to bid.
After receiving Quotations from the interested Software Development Companies, the Client will do **Technical Verification** to know the Technical capabilities of the Bided Software Companies. The short Listed companies after the technical verification, now will have to undergo a **financial Verification**. Those Companies who have passed this phase also, will stand a chance for the Project allocation.
Now the Client may follow their own logic process (Rate Negotiations, their previous experiences with the IT Company or IT Company's previous Clients feedback) in awarding the project to the development Company.
Project will be awarded to the IT Company by issuing **SOW (Statement of Work).**

Flash Card – 7, 8

2.2.1 Basic Knowledge on Projects BA proportion in Projects

- 15% of the SDLC / total Project time should be allocated to the BA (2 months time in 1 year project)
- 12% to 16% of Team Size should be BAs (2 BAs in 12,13 members Team, 4 BAs in 24,25 Members Team)

2.2.2 Project Sizes

- Small Projects up to 500 Man-Hours
- Medium Projects- 500 – 1000 Man-Hours
- Large Projects - Above 1000 Man-Hours

2.2.3 Project Types

- Fixed Bid Projects – Budget and Time will be fixed
- Billing Projects- Resources working in the project will be billed to the Client on Hourly Basis. Example
  - PM - $120/Hr,
  - Sol Architect -$150/Hr,
  - Programmers - $50/Hr ,
  - Sr Programmers - $80/Hr,
  - Network Engineer - $80/Hr,
  - DBA - $80/Hr ... so on

2.2.4 Project Milestones

Weekly we will track progress of the project. The unit of time frame allotted will in weeks.

2.2.5 Reasons for Project Failure

- Improper requirement gathering
- Continuous change in requirements
- Lack of user involvement

- Lack of executive support
- Unrealistic expectations
- Improper planning

2.2.6 Working in a Project

- Important Mails are followed up by a phone call
- All Mails should be Acknowledged
- All project mails will be copied to the Project Manager
- Decisions will be taken by Project Manager and Business Analyst should follow them
- If any Resources are involved in discussion of a mail, then copy that mail to that Resource as well

As a BA, we are responsible to update the progress of the project to responsible stakeholders and concerning Documents .

2.2.7 Quality Audits during Project progress

There will be internal as well as external Audits conducted during the project progress as a part of the Quality Assurance procedure that may belong to any Standards that the IT Company may follow.

2.2.8 Scope Creep

If any project cannot be completed within Budget and Time Constraints, we say that Scope creeps.

2.2.9 Project Budget for Team Outing, Meeting Clients, onsite visits

PM will have budget for team outings, meeting Clients over dinner, onsite visits. BA should request PM for budget allotment for meeting Clients.

2.2.10 Servers information

Development Server – IT Company
UAT Server -- Client
Production Server -- Client
Go – Live
Once a Project is initiated, then some space for documentation and some for coding will be allotted by the Network Engineer. If a Resource is selected in the project, then access to these spaces will be given to that resource after approval from Project Manager.

2.2.11 Timesheets

Resources will have to fill in their timesheets everyday for 8 hrs work activity. They may be required to justify what is their contribution in that particular day. These Timesheets will be sent to Client by the Account Manager and upon approval, Billing will be released to the IT Company.

2.2.12 Gantt Charts

Project Managers generally plan their projects by using Gantt Charts. Software used may be MPP. This is very much similar to Excel Sheet, wherein in columns you will find Weeks and in rows , the resources...

2.2.13 Documents Naming Standards

All Documents will be named using some standards
like[ProjectID][DocumentType]V[x]D[y]. ext
Example: PQ786BRDV1D2.docx
PQ786BRD1.2.docx

2.2.14 5W 1 H – Tool of a BA

If we need extract consistent Requirements then probe in these directions like Where, why, what, who, when and How. 5W 1H is considered as tool of a BA.

2.2.15 IT Company - Standards

Some of the standards that IT Companies adopt are

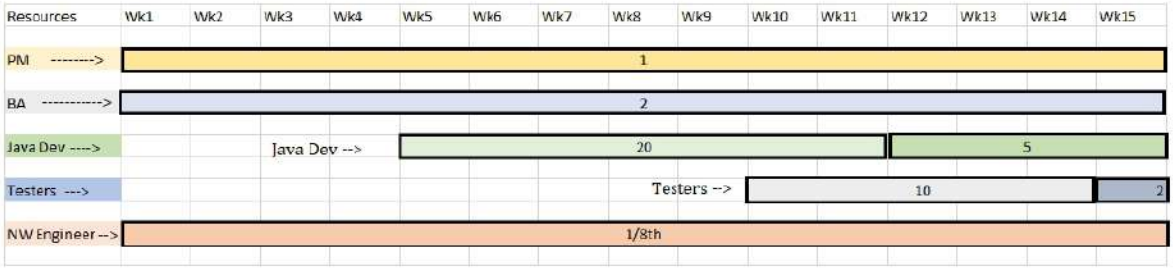
- CMMi levels
- ISO Standards
- Six Sigma

2.2.16 Project Owner

Project Manager is the owner of the project . PM will take ownership of the project Budget as well.

Gantt Chart - MPP

SDLC
WBS - Work Breakdown Structure



2.3 Risk Analysis and Management

An uncertain event or condition which can have impact on either cost, time, scope or quality
Risk Analysis is done to determine if the proposed project carries more risk than the organization's capacity to support

Risk Identification
It is the process to identify the business, financial, technological and operational risks

Risk Assessment
It is the process to identify the probability of occurrence of each identified risk. BA s have been given tasks to arrive at a consensus for each identified risk item.

Risk response planning
This includes the planning that reduces the probability of occurrence of risk. the response planning helps in determining the conditions against which the required actions can be taken. It helps the organization to deal with risk. This planning includes

- Acceptance
- Transfer
- Avoidance
- Mitigation

Risk Avoidance
It is the process of not performing risk causing activities. Risk Avoidance is defined as being idle during the occurrence of risks and doing nothing to take advantage of the new opportunity.

Risk Rating
Each identified risk is rated before moving it to rectification process. This process is called Risk ratings. The overall risk ratings are calculated in terms of cost, time, Quality of the solution

RISK – Change in Requirements - Requirements are inherent to Change
Always requirements are prone to change

Stakeholders are not trained to share requirements with the development team, Business Analyst is trained to gather/elicit requirements from the Stakeholders.

OP consultation n Billing Project

This Hospital has 10 Departments in OP consultation
All depts works from 9am till 12noon and 4pm till 8pm - 7days/week
Each dept will have min 4 doctors for consultation
Any patient can request for appointment with any doctor.
For each appointment, doctor slot of 10 mins will be booked.
Doctors prescribe medicines and tests
Medicines are available in Pharmacy
Tests are done at lab
All consultation, medicine, tests bills are payable at respective counters.

Risks
BA Risks

Project Domain
Experience of BA
Gather Req - understanding
Document Req - properly - not complete
Model Req - UML
Comm Req - Right Audience
Good Team Mgmt Skills
Change in Req
Track Req

Process Risks
Project Risks
OP Consultation n Billing Project

Doctor appointment is fixed and the Doctor did not turn up that day...
then????

Patient made payment and payment not reflecting in the appointment ...
then???

Patient did not come at the given appointment then..???

Situation 1 :

Your IT Company got a project from the Client. The Client has 10 divisions and you have gathered Requirements. After sorting the Requirements, you have observed that 4 divisions have common requirements. 85% are different requirements and 15% are common requirements. 4DivisionalManagers are very much stubborn not to have a common design features. How do you handle them as a BA to make them all agree to the same design?

Situation 2 :

A project was received 9 months ago from Motorola(Client); the duration of the project is 12 months, which is now in testing phase. At that time there are two players Motorola and Nokia in the mobile market. Exactly at that time, Nokia released a mobile in the market which belongs to the same segment. Nokia's mobile has 100 more features than our present Motorola Mobile model. Motorola contributes to 85% revenue to the IT Company. Meanwhile, Client called to give 200 more requirements which should be included in the same application without any extension on Budget or time. As a BA, how will you take on this?

2.4 Thumb Rules

Rule : office starts at 10 a.m. Thumb Rule : Reach office at least 15 min before (9:45 a.m.)

2.4.1 Solve Client Problem only by our IT Solution

As a Business Analyst, we should not probe into the reasons of the Business failure and advise solutions to come out of it, instead we should concentrate more on providing the Client with an IT Solution by considering the information available with the Client in different forms., through which the Client will solve his problem.

2.4.2 Be like a lotus in the mud

"The one who wanders independent in the world, free from opinions and viewpoints, does not grasp them and enter into disputations and arguments. As the lotus rises on its stalk unsoiled by the mud and the water, so the wise one speaks of peace and is unstained by the opinions of the world."
Buddha Saying. BA shines by making the development Team to deliver the right Solution on time to Client. This can be done by bringing Clarity in Requirements and communicating the same, in understandable format, to the Development Team. He should be influenced by the Client views or the development Team views, his concentration should lie in molding the requirements to bring out a perfect IT Solution.

2.4.3 Never take tensions but pass on the tensions

As a Business Analyst, you should not take tensions. All that comes from the Client is in reference only to the project. The Client never intends to say anything personal, since a Business Analyst is the only point of contact to the Client, the Client tends to shell out all his concerns on this contact. Business Analyst should be invincible to any of the Clients comments as it may affect the rest of the projects that he is working on.

2.4.4 Requirements hurried – Project buried

Do not haste while gathering the requirements, giving in to due stress levied upon you by your Manager. Project success majorly depends on the key requirements. The basic idea of gathering the requirements is to realize the organizational goals. So it is very important to understand the business process and it's requirements but not on the individual requirements. We have to document everything that we have gathered from the Client. Identify the right stakeholders, who are going to use the proposed IT Solution. Gather requirements in Detail enough. Try to understand business Goals and Objectives and not requirements alone. Document everything you find useful to the project. Involve users – the actual users. See them at work. Look for the unhappy path. Get behind the scenes. Observe them how they work when something unusual happens in the process. Pull out those documents. Always try to build a new system-don't copy the old one. See the reports and the folks who use them

2.4.5 Never criticize any stakeholder – appreciate them even for their small efforts

As a Business Analyst, you have to manage good public relationships along with Professional relationships with all associates. To be recognized as a reliable and trust worthy Associate of the organization, you should never speak ill of any stakeholder to any stakeholder. If people start trusting you, then your contribution will be easy.

Flash Card - 9

2.5 Dos and Don'ts as BA

- Never say NO to Client
- There is NO word called as "BY DEFAULT"
- Never imagine anything in terms of GUI
- Question the existence of existence / question everything in the world

ex: what client gives is not always correct
Consult an SME for Clarifications in Requirements
Every Problem of Client is unique. No two problems of different Client are same . May be the approach, technology, place of use, local laws may be varied to make them (Problems) to be different.
Go to Client with a plain mind with no assumptions. Listen carefully and completely until Client is done and then you can ask your Queries. Please do not interrupt the Client , when he/ She is giving you the problem. Maximum Try to extract the leads to Solution from the Client itself. Never try to give Solutions to Client straight away with your previous experience and assumptions. Try to concentrate on the important and truly required Requirements. Don't be washed away by add on Functionalities or don't imagine solutions on Screen basis.

Flash Card - 10

2.6 Challenging Areas of BA

Lack of training

Ans - BA is very new to Industry
Team members – responsibility
This BA training will help us in contributing in the project in the right way

Obtaining sign-off on requirements

Ans -Any Company – Two Categories
1-> Resources who actually work - 40%
2-> Resources who act that they are working – 60%
Conduct walkthrough meetings -

Change Management – with respect to cost and timelines

Ans Project of 1 year – 30 CR
3 rd month – 30 CR – 31st CR – scope creep
Right from 1st CR – start your awareness camp

Coordination between developers and testers

Ans Developers – Code – Client pay – Bread earners – hero – King
Testers – correct code – King makers
Bug Life cycle -

Conducting Meetings

Ans IT Company runs on a consulting mode
Java project – 25 java Dev → 20th week – PM will pay the java Vertical for these 25 java Dev
16 testers → 35th Week - PM will pay the testing Vertical for these 16 testers
1 resource – 1 lakh per month – earn 3 lakhs
Projects – completed -ongoing – upcoming –

Making sure status reporting is effective

Ans Every week or fortnight – status report – client
Many challenges – project will be delayed
As a team – responsibility

Driving clients for UAT completion

Ans Client have seen the application for very time during UAT
Application layout after Design – Be in touch UAT

People Management (coordinating with different people and different teams)

Ans
-
-
-

Overall making sure project health is in good shape and delivered as per the time-lines without any issues.

Ans
-
-
-

Flash Card - 11

3 Business Analyst Competencies

Flash Card - 10

3.1 Business Communication

3w Rule of Communication
What
Who
When

Types of Business Communications
Verbal and Non-Verbal

Verbal
Oral Communication
Written Communication

Non-Verbal
Facial Expressions
Gestures
Eye Gaze
Appearance

3.2 Supplier Management

Risk response planning

Planning includes following Actions
Acceptance
Avoidance
Transfer
Mitigation

Contracts types
Time and Materials
Fixed Price Delivery
Risk and Reward

3.3 Leadership

Is about doing right things

Qualities
Lead by example
Visionary
Team Player
Teacher
Inspire
Coach
Motivate
Mentor
Open minded to accept new ideas
Create a Strong Team

3.4 Conflict Management

Are results of Changes
Improves in Communication, personal and professional growth

Thomas –kilmann Technique
X Axis – Co-operation , Y Axis – Assertiveness

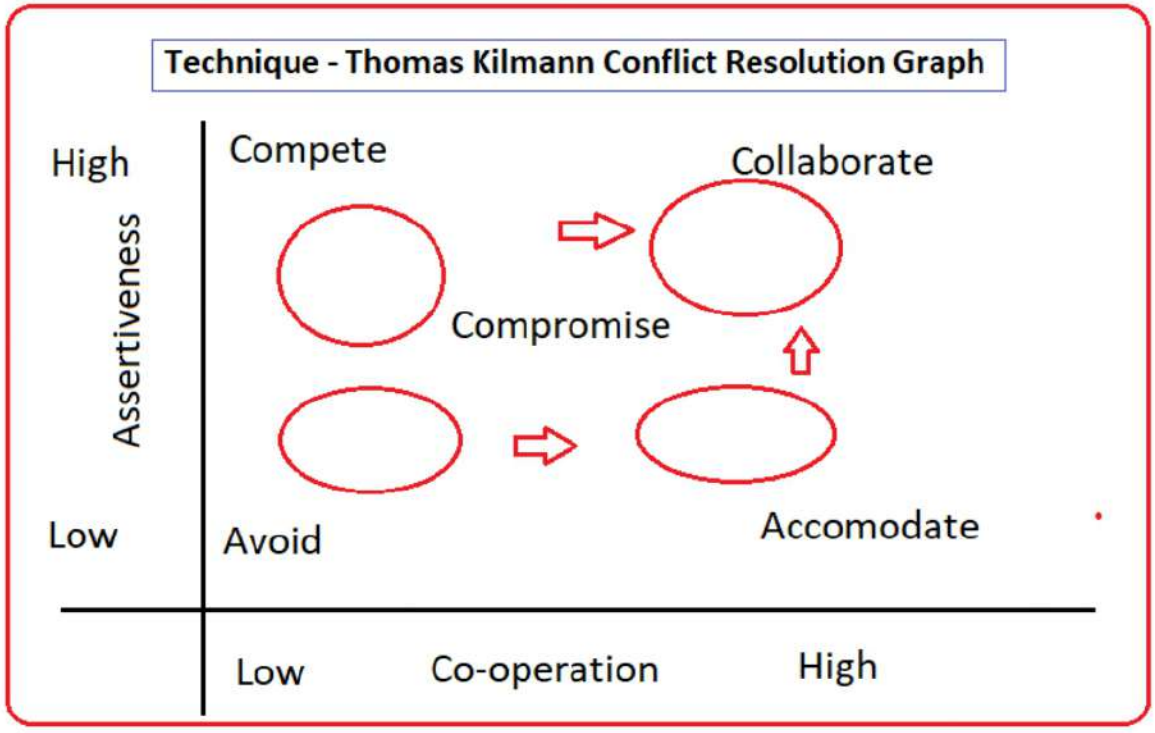
5 options of Conflict Management
Competing
Avoiding
Accommodating
Collaborating
Comprising

Managing Conflicts
Conflicts require high level of energy for resolution
Managing Conflicts is all about maintaining the relations
Habits are limiting factors in managing the conflicts
Before engaging in Conflicts, think about expected Outcome

5 Steps to Conflict Management
Identify the conflict
Discuss the details
Agree with the root problem

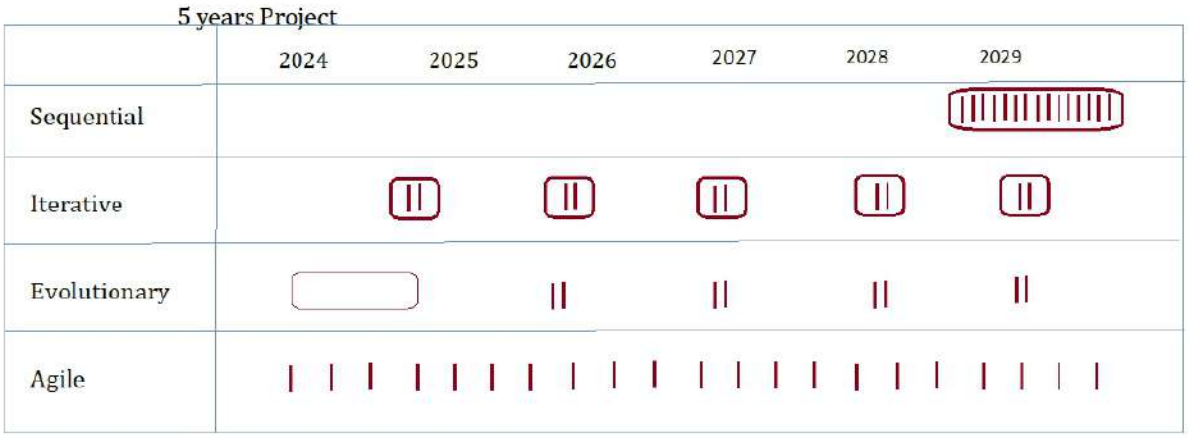
Check for the every possible Solution for the conflict Negotiate The Solution to avoid the future Conflicts

BA Competencies -1



4 SDLC Methodologies and Models

Sequential – waterfall
Iterative – RUP (Rational Unified Process)
Evolutionary – Spiral
Agile - Scrum



Flash Card - 12

4.1 Sequential – waterfall

This is the most common and classic of life cycle models, also referred to as a linear-sequential life cycle model. It is very simple to understand and use. In a waterfall model, each phase must be completed in its entirety before the next phase can begin. At the end of each phase, a review takes place to determine if the project is on the right path and whether or not to continue or discard the project.

Stages of Waterfall Model	Resources	Artifacts
Requirements gathering	BA, PM	BRD
Requirements Analysis	BA, PM Tech Team – Sol Arch, NW Arch, DB Arch	FS/ FRS, SSD, SRS RTM
Design	Tech Team – Sol Arch, NW Arch, DB Arch, GUI Designer	HDD / ADD Solution Document
Development – coding	Programmers Developers	LDD /CDD Application
Testing	Testers	Test Documents Application with less Errors
Unit, Component, System, System Integration, UAT		
PROCESS - Configuration Management - PM		
Deployment & Implementation	Release Engineers	

Deployment – moving Code from Development Environment to Production
Implementation – running the code for the very first time in Production
After Implementation, maintenance stage starts and Support Team will take care.

Req Analysis

BA	- prepare Functional Req	- FS/FRS
Tech Team	- prepare Non- Functional Req	- SSD
BA	- add FS and SSD to form SRS	
BA	- take Signoff from Client on SRS	
BA	- prepare RTM referring SRS	

Programmers Vs Developers
Programmers - Only Technology
Developers - Both Technology n Domain

Test Documents
Test Strategy
Test Plan
Test Schedule
Test Cases

ADD Vs Solution Doc
ADD - Design in a single flow - Text Book
Solution Doc - Same Design organised as individual Req and Solution - Guide

Flash Card – 13, 14- V Model

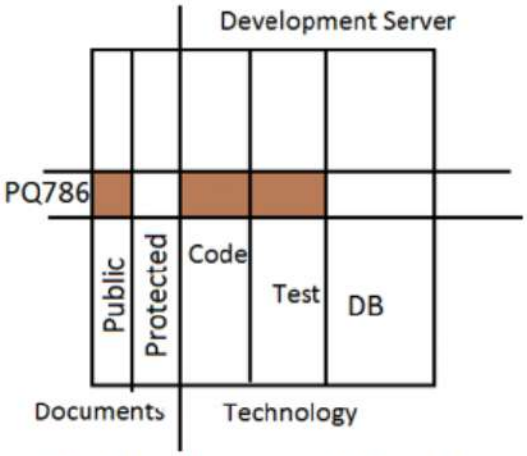
Advantages

- Simple and easy to use.
- Easy to manage due to the rigidity of the model – each phase has specific deliverables and a review process.
- Phases are processed and completed one at a time.
- Works well for smaller projects where requirements are very well understood.

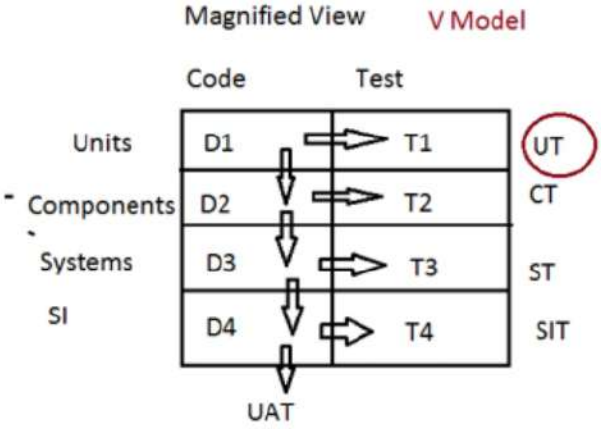
Disadvantages

- Adjusting scope during the life cycle can kill a project
- No working software is produced until late during the life cycle.
- High amounts of risk and uncertainty.
- Poor model for complex and object-oriented projects.
- Poor model for long and ongoing projects.
- Poor model where requirements are at a moderate to high risk of changing.

Practical – V Model

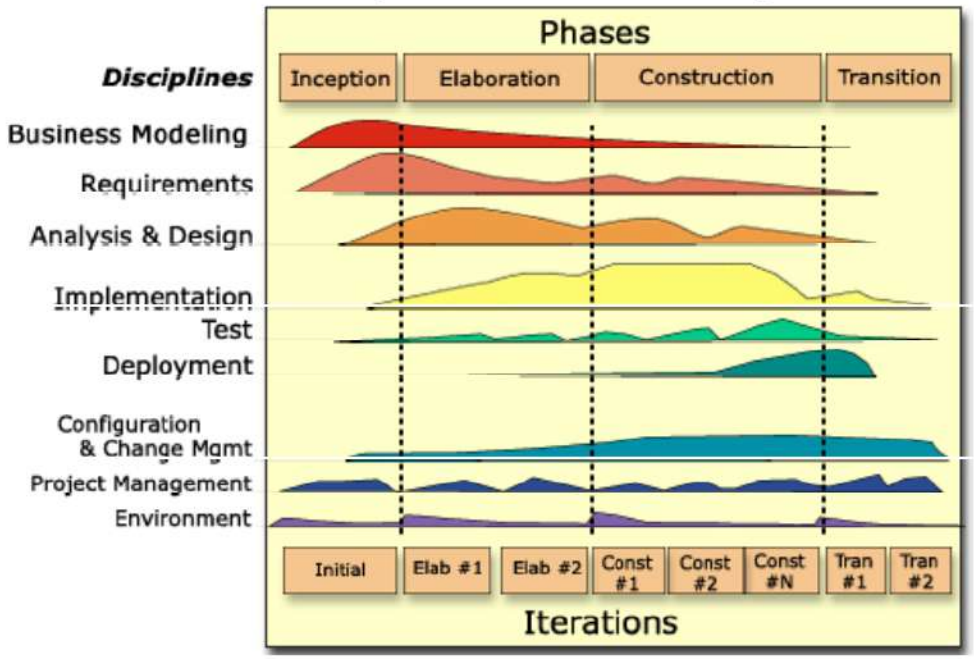


If BA joins the project PQ786- Then BA will access to Public Documents Area and Code n Test Areas



Small pieces of code which are executable - UNITS

4.2 Iterative – RUP (Rational Unified Process)



The Rational Unified Process (RUP) is an iterative software development process framework created by the Rational Software Corporation, which was acquired by IBM in February 2003.

RUP is based on a set of building blocks, or content elements, describing what is to be produced, the necessary skills required and the step-by-step explanation describing how specific development goals are to be achieved.

The main building blocks, or content elements, are the following:

Roles (who) – A Role defines a set of related skills, competencies and responsibilities.

Work Products (what) – A Work Product represents something resulting from a task, including all the documents and models produced while working through the process.

Tasks (how) – A Task describes a unit of work assigned to a Role that provides a meaningful result.

Within each iteration, the tasks are categorized into nine disciplines:

Six "engineering disciplines"

Business Modeling
Requirements
Analysis and Design
Implementation
Test
Deployment

Three supporting disciplines

Configuration and Change Management
Project Management
Environment

Four Project Life cycle Phases

Inception: agreement among the team and customer as to what will be built

Elaboration: agreement within the team as to the architecture and design needed to deliver the agreed system behavior

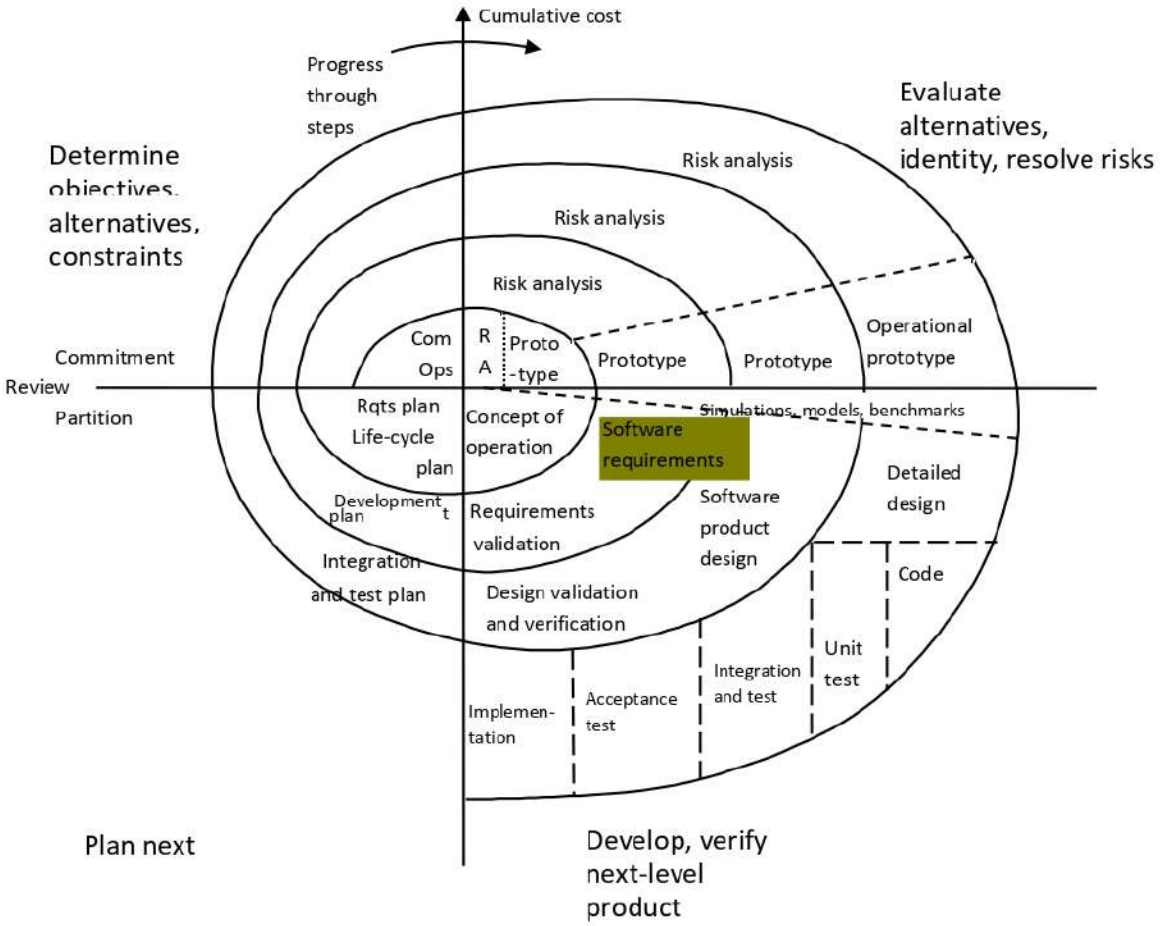
Construction: the iterative implementation of a fully functional system

Transition: delivery, defect correction, and tuning to ensure customer acceptance

Six best practices

- Develop iteratively, with risk as the primary iteration driver
- Manage requirements
- Employ a component-based architecture
- Model software visually
- Continuously verify quality
- Control changes

4.3 Evolutionary – Spiral



The spiral model gives more emphases placed on risk analysis. The spiral model has four phases: Planning, Risk Analysis, Engineering and Evaluation. A software project repeatedly passes through these phases in iterations (called Spirals in this model). The baseline spiral, starting in the planning phase, requirements are gathered and risk is assessed. Each subsequent spirals builds on the baseline spiral. Requirements are gathered during the planning phase. In the risk analysis phase, a process is undertaken to identify risk and alternate solutions. A prototype is produced at the end of the risk analysis phase.
Software is produced in the engineering phase, along with testing at the end of the phase. The evaluation phase allows the customer to evaluate the output of the project to date before the project continues to the next spiral. In the spiral model, the angular component represents progress, and the radius of the spiral represents cost.

Advantages

a. High amount of risk analysis.
b. Good for large and mission-critical projects.
c. Software is produced early in the software life cycle.

Disadvantages

a. Can be a costly model to use.
b. Risk analysis requires highly specific expertise.
c. Project's success is highly dependent on the risk analysis phase.
d. Doesn't work well for smaller projects.

4.4 Agile - Scrum

Agile Manifesto

Four main Values

Individuals and interactions over processes and tools
Working software over comprehensive documentation
Customer collaboration over contract negotiation
Responding to change over following a plan

Twelve Principles of Agile Software

1. Satisfy the customer through early and continuous delivery of valuable software.
2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
4. Business people and developers must work together daily throughout the project.
5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
7. Working software is the primary measure of progress.
8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
9. Continuous attention to technical excellence and good design enhances agility.
10. Simplicity--the art of maximizing the amount of work not done--is essential.
11. The best architectures, requirements, and designs emerge from self-organizing teams.
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

SCRUM can be implemented either at the beginning of the project or when you sense that project is falling behind schedule. This model exercises full Admin Power

Scrum Team: Project resources are grouped as Scrum teams which comprises of BAs, Developers, Testers. Each Team size will on average be 7-8.
Product Owner: He will decide what needs to be in the product and will be responsible for how the product has to be. He will regularly interact with customers and BAs. This role may be played by BA or any person who worked for end users for a long time or customer himself.
Scrum Master: He will monitor the performance of the team within the sprint. Team will raise all their issues to scrum master and he will run to look for answers. This role can be played by any person in team normally BA's plays this role.
Product burndown: It shows how much work was left to do at the beginning of each sprint.
Sprint: This is the period that team decides to deliver their objective. Normally a sprint period will be for 2 weeks but may extend to 4 weeks

Meetings:
Sprint Planning Meeting -This happens at the beginning of each sprint and team decides on what they will be delivering in the sprint.
Daily Scrum Meeting - This happens each day where team will just answer 3 questions:
1) What did u do today?
2) what will u do tomorrow?
3) Is there any impediments that is slowing or stopping u ?
Sprint Review Meeting - This happens at the end of the sprint where team will demo the completed stories to product owner and get it cleared.
Sprint Retrospective Meeting - This happens at the end of the sprint where team will answer these 3 questions:
1)What went well in the sprint?
2) what did not go well?
3) What are the required areas of improvements in next sprint?

Product Back log : all Stories- all requirements

Burn down chart
A burn down chart is a graphical view of the remaining work left versus the time in an iteration. A project backlog or hours can be expressed on the vertical axis, while time is indicated on the horizontal axis. A burn down chart is often used to determine when work will be completed on a project or an iteration.

Epic
An epic is a set of related user stories. They are also considered a "really big user story."

Iteration
An iteration is an iterative development concept that establishes a short time frame to deliver a set of software features or user stories. Each iteration includes typical waterfall activities such as analysis, design, development, and testing, yet they are time boxed within a one to four week window. At the end of an iteration, the progress is reviewed with the business customer, and recommended changes can be incorporated into future iterations.
Planning Poker
Planning Poker is an estimation game created by Mike Cohn of Mountain Goat Software. Planning Poker is used to estimate individual user stories as a team activity. The team gathers and reviews user stories one at a time. As stories are presented, the team discusses the user story and provides an estimate of the work from their own deck of cards. All estimates are presented and discussed until the team arrives at a consensus.
Release
A release is a set of working software delivered to the business customer resulting from a set of iterations. During release planning, teams will review a product backlog to organize user stories into the specific releases and iterations that deliver a functional product to the business customer.

Scrum

Scrum is an iterative development methodology used to manage software projects. In scrum-based projects, there isn't a specific project manager directing project team tasks; the team is self-directed, with co-located team members relying on communication over documentation for effective project delivery.

Sprint

A sprint is a scrum-based agile methodology concept that is similar to an iteration. A sprint is time boxed to deliver a specific set of user stories and produce working features within a set time period. During sprint planning, the business customer or product owner specifies the user story priority, and the development team commits to the scope for a given sprint. During a sprint, user stories can be removed from the sprint scope, but new stories cannot be added; this allows project teams to focus on the goals of the sprint and deliver rapidly.

Story points

A story point is a relative estimation method used to determine the size of user stories so teams can determine how much work can be done during an iteration. Story points can be expressed in a simple Fibonacci sequence, t-shirt sizes, or a relative number. By adding up the number of user stories and associated story points, the project team can establish its velocity for future iteration planning.

BA's Role in Agile Scrum:

To Start with, Once a project is kicked off, BA does the requirement Planning, then conducts various requirement gathering sessions and analyses the requirement.

Finally the requirement is listed as 'FEATURE LIST'. This Feature list is drafted by BA and discussed with Product Owner. This feature list will have all enhancements and existing features (If it is a migration project).

From the Feature List, BA identifies the Epic and breaks them as Themes and then to User Stories.

User Stories will have below Information:

As a *<User>* I Want to *<What is the Purpose>* So that *<What you gain by this story>*

eg:

As a *Customer* I want to *Login to the net banking site* So that *I can perform banking activities*

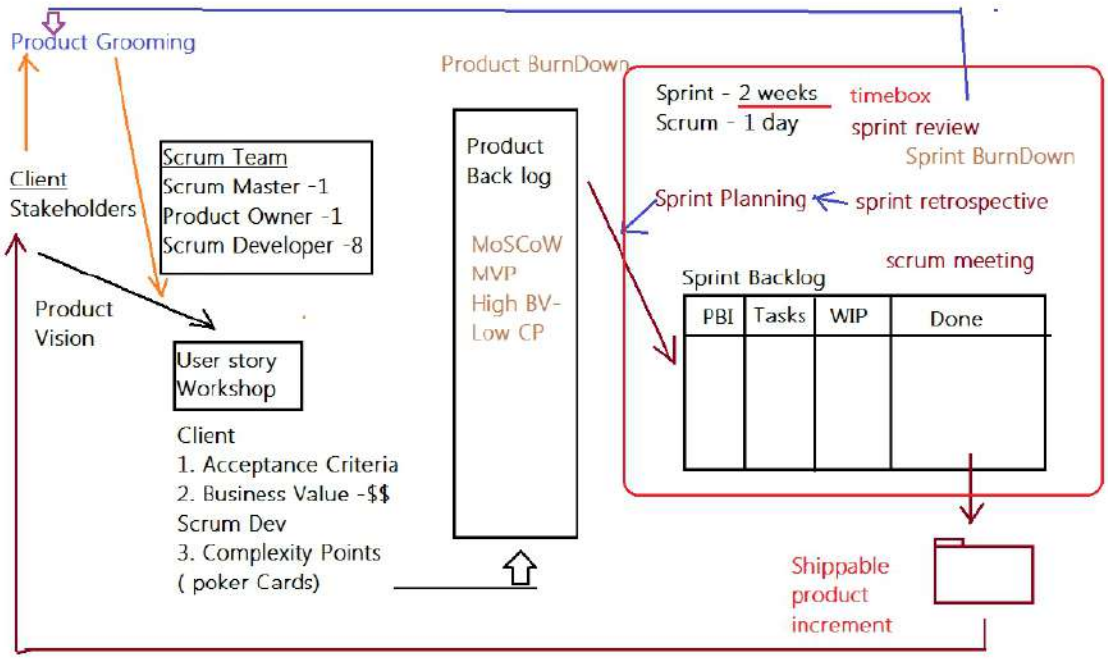
Acceptance Criteria: - This area will have mandatory information that are needed in this story "

Then BA brief the story to development team and regularly supports the team for development.

BA also does the Integration Testing and System Testing to ensure the system performs as desired

Scrum

Sprint



E-Cart Project

Scrum project
e-Cart
1. Login
2. Product Catalog
3. Add to Cart
4. Payment
5. Delivery Tracker
6. Customer Satisfaction

eg:

Backside of the Userstory or postit note - Responsible stakeholders will write Acceptance Criteria

User Stories will have below Information:

As a
<User>
I Want to
<What is the Purpose>
So that
<What you gain by this story>

US	Module	Priority
As a *Customer* I want to *Login to the net banking site* So that *I can perform banking activities*		
BV:	CP:	

Users
1. Business Owners
2. Admin
3. Customer
4. Vendors

minimum 3 Userstories in each feature and send it

User -Stories

"As an Admin ,
i Want the login screen to display the right error messages in case of failure ,
So that the end user gets to know the accurate reason for failure and also helps during addressing the issue."

"As a Customer
I want an option to view Product calatlog
so that
I can choose from available options"

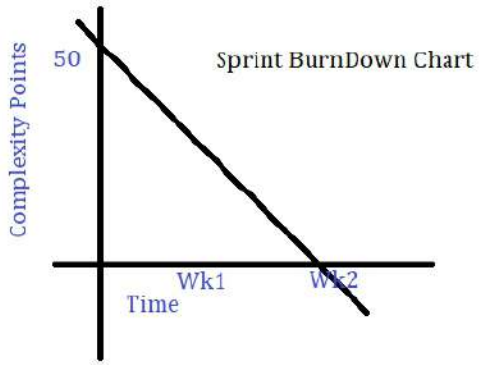
"As a Business Owner
I want to capture Customer feedback
so that
I can measure the customer satisfaction of the product/service"

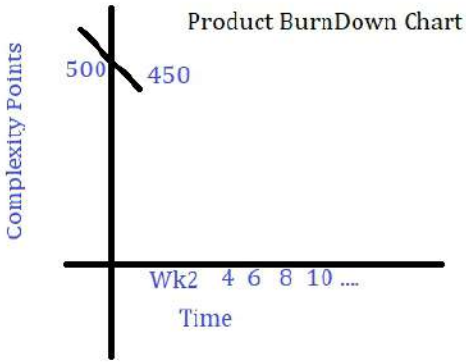
"As a Vendor
I want to place my products in the catalog
so that customer can buy my product"

Please write atleast 100 user stories following the syntax

Acceptance Criteria
will be written by responsible stakeholders on the backside of the user story - (take Use case Spec as base)

Burn- Down Charts





Task – Unit of work done by 1 Scrum Developer in 1 Scrum Day
8 Developers – 10 Working Days (2 Weeks)
1 Day – All Meeting n Miscellaneous Works – Take out – remaining 9 Working days
8 Developers – 9 Working Days
Tasks – 8*9 =72 Tasks
Divide n User stories to 72 Tasks
Note : These calculations may vary from Company to company & Project to Project

Daily – 10 am - Each Developer will pick one Task from Tasks Column – Write his name on the Task – Keep that Task in WIP Column (Work in Progress).
Go back to his seat and work on that Task.
Daily – 7 pm – Developers will attend
Daily Standup Meeting or Scrum Meeting
3 Questions to answer
1) What did u do today?
2) what will u do tomorrow?
3) Is there any impediments that is slowing or stopping u ?

Sprint Backlog

PBI	Tasks	WIP	Done

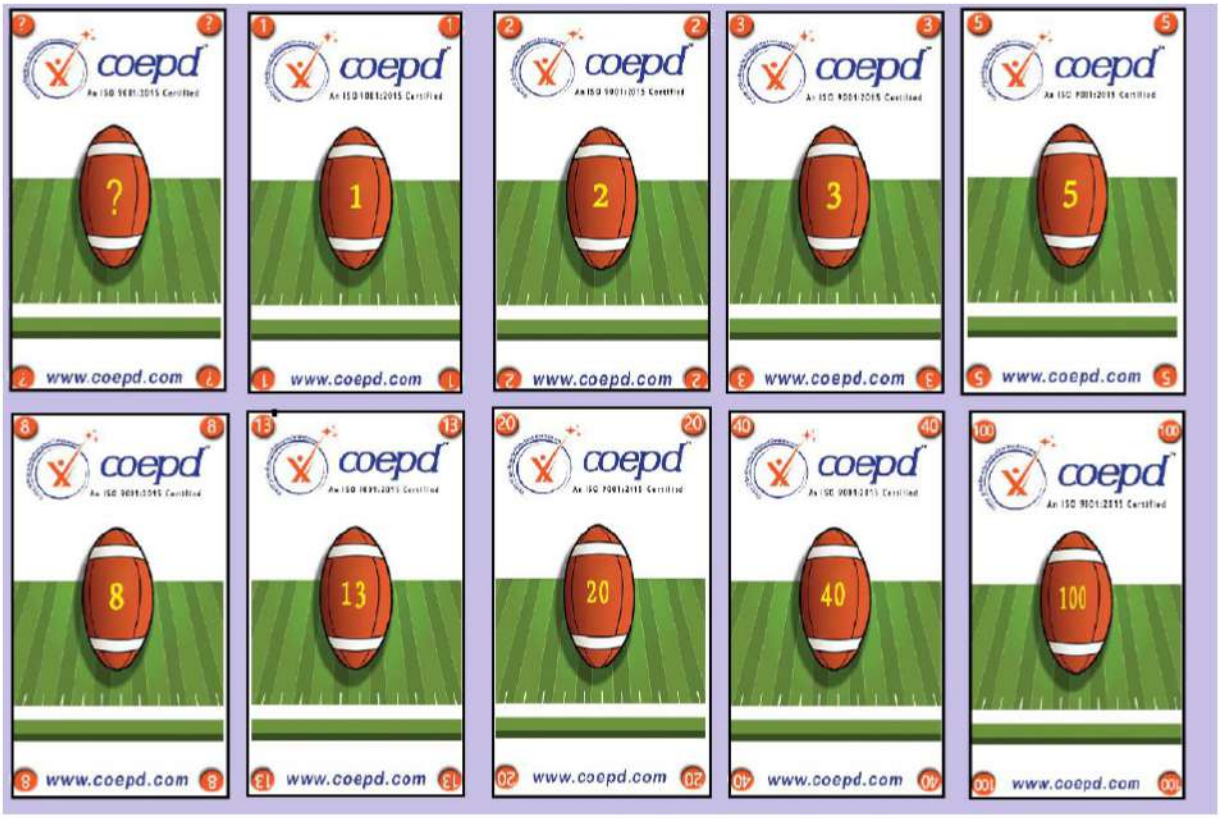
Once the Task is completed, Developer will move that Task from WIP Column to Done Column

Currency Notes -

Estimating BV – Business Value

	Currency Notes	10	20	50	100	200	500	
	Invested 20 Lakhs each in this e-Cart project - Business Owners							
	BV - Business Value is NOT the cost of investment, NOT the cost of development and NOT the complexity of achieving - How important is this feature for you as a Business Owner							
	Name	Login	Product Catalog	Add to Cart	Payment	Delivery Tracker	Customer Satisfaction	
1	Business Owner 1	100	20	10	500	50	200	880
2	Business Owner 2	200	100	10	50	20	500	880
3	Business Owner 3 and so... on	10	50	20	100	200	500	880
	TOTAL	780	820	120	2300	650	3200	
	RANKING	4	3	6	2	5	1	
		50	100	10	200	20	500	

Poker Cards



Estimating Complexity Points

	Complexity Points - Story Points - Poker Cards -							
	Scrum Developer	How much efforts are required to develop this feature						
		? 1 2 3 5 8 13 20 40 100 BIG				200	max value - 100	
		fabnocii series - with minimum Cards you can express max values					Total value cannot exceed 200	
	Name	Login	Product Catalog	Add to Cart	Payment	Delivery Tracker	Customer Satisfaction	Total points
1	Rashmi Scrum Developer 1	20	60	20	40	20	40	200
2	Rohit Rao Scrum Developer 2	10	60	10	20	20	80	200
3	Krishna Scrum Developer 3	10	100	10	10	20	50	200
4	saikumar Scrum Developer 4	40	100	7	40	8	5	200
5	Venkatesh Scrum Developer 5	10	100	10	20	10	50	200
6	Gopael Krishna Scrum Developer 6	40	60	30	20	20	30	200

Role of Product Owner

Product owner: -

He is responsible for

- product vision
- requirement questions
- considers stakeholder interest
- decides whether to
  - accept
  - reject product increment
  - continue or discontinue the development
  - whether to ship the product or not.

Role of Scrum Master

Scrum Master: -

He will facilitate the scrum process by

- resolving issues
- creating an environment for team self organization
- capturing empirical data to adjust forecast

Note:

Scrum master will not have any management authority over team.

Role of Scrum Developer

Scrum development Team: -

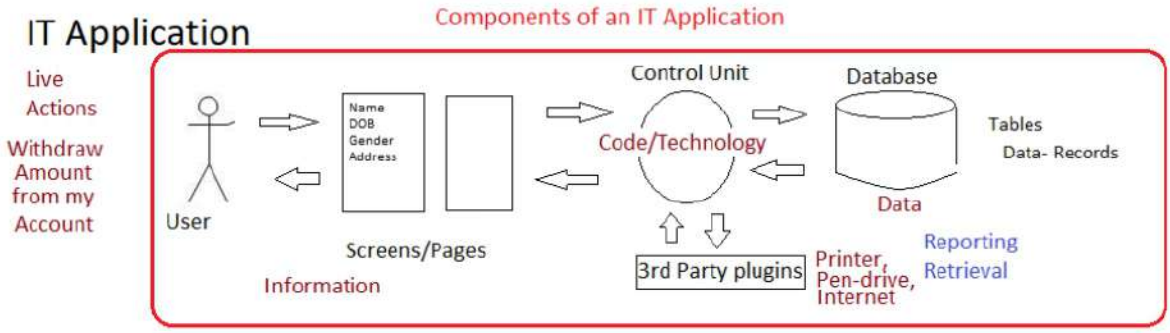
It is a self organized cross functional team

Negotiates

- commitments with product owner
- one sprint at a time
- how to reach commitments.

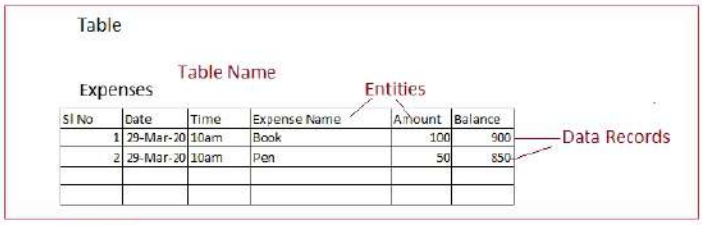
5 Technical Skills (OOA and UML)

5.1 Basics of an IT Application



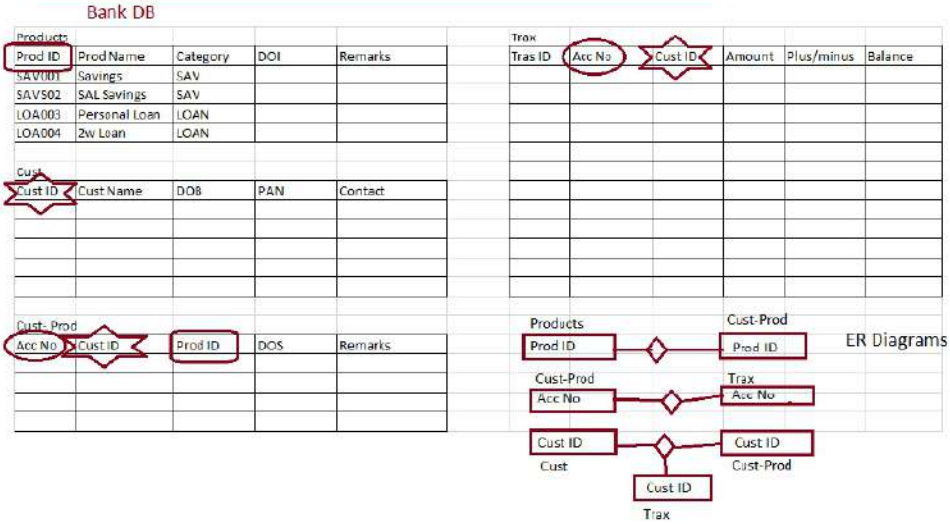
Functionality of an IT Application
= Business Logic achieved by technology or Code + Data in the Database

5.2 Basics of Databases



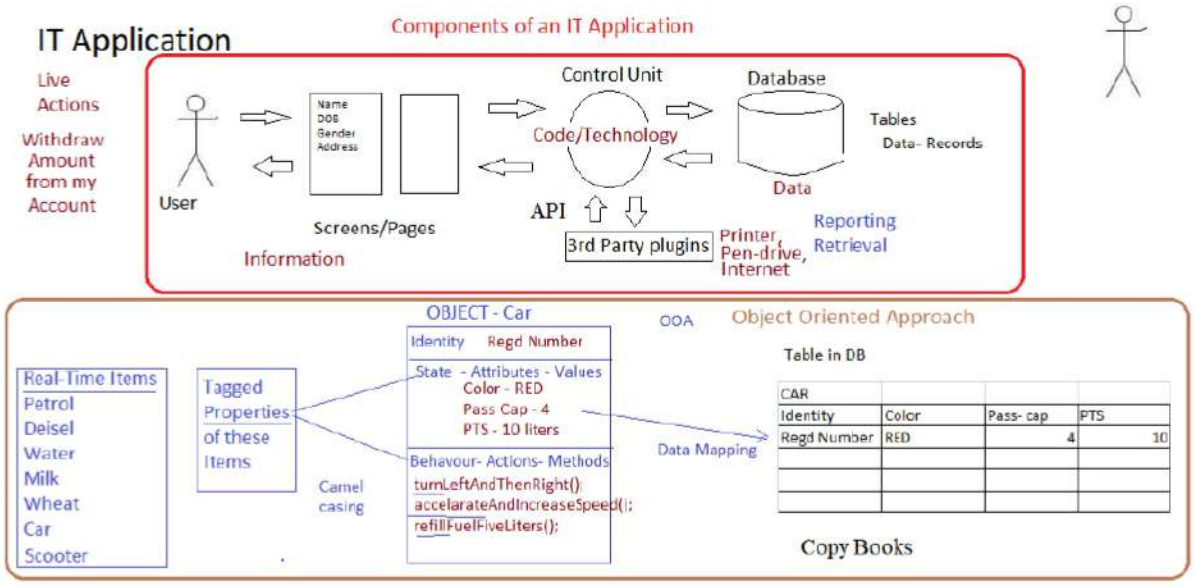
All Tables + Entities = DB Schema

DB Schema + ER Diagrams = DB Design



5.3 Learning OOA

IT Applications are built to support other verticals or domains like banking, insurance, retail, oil and gas etc. Basically what an IT application does is Any ACTION is captured as data and stored in the database as a record and this data is used for various purposes like reporting , finding summary , building bricks... etc. ACTION can be cash deposit in an account at bank or taking an appointment with doctor through receptionist or transporting petrol , tar, diesel, milk, water, sea food, pulses, perishable goods like paneer, curd, fruits and vegetables.



Flash Card - 15

5.3.1 Object

An object is an instance of a class (a category). You and I, for example, are instances of the Person class. An object has structure. That is, it has attributes (properties) and behavior. An object's behavior consists of the operations it carries out. Attributes and operations taken together are called features.

State and Behavior-**Properties**

My Bike is green in Color.

Bike – Object

Color – Attribute

Green – Attribute value

Identity

Identity is the brand name or that identifies that object uniquely

Eg :Maruti or Number plate of the car

Behavior -**Operations**

The action performed by the Object

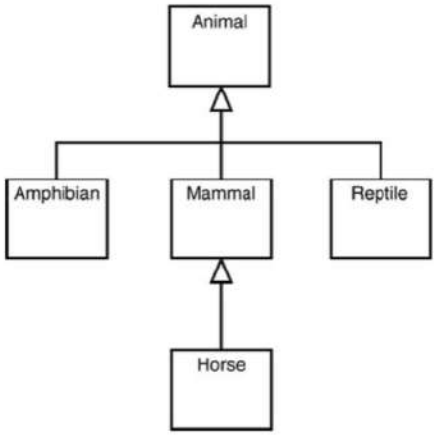
Start(); stop(); move();

Identity – Regd Number
State – Attributes - Attribute values Color - Red Passenger Capacity – 4 Fuel – Diesel Wheels – 4

Behavior– Actions – Methods – Camel casing
turnRightAndThenSecondLeft();
slowDownAndStop();
accelerateAndIncreaseSpeed();

5.3.2 Class

Collection of similar Objects is a Class
Object can be an instance of the Class.
Types of Classes
Super Class
Parent Class
Generalized Class
Specialized Class
Sub Class
Child Class



Class
State
Behavior

Class

5.3.3 Component

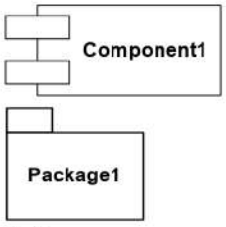
Collection of Classes is Component. The component diagram's main icon is a rectangle that has two rectangles overlaid on its left side.

5.3.4 Package

Collection of Components which are not reusable in nature

5.3.5 Subsystems

Collection of Components which are reusable in nature



Note:
Product Development Companies work on Subsystems and
Application Development Companies work on Packages

5.4 Implementing OOA

Flash Card - 16

5.4.1 Abstraction

Abstraction means, simply, to filter out an object's properties and operations until just the ones you need are left. Knowing what to include in a model and what to leave out—is the most critical skill for a modeler. **Considering what is required, ignoring what is not required**

Pareto Principle - 80-20 Principle or 20-80 Principle

MVP - Minimum Viable Product

Gold Plating - Gold plating is the practice of making changes to a project that are outside of the original agreed-upon scope. Gold plating takes time. The practice is very similar to feature creep, which involves enhancements tacked onto a project at the request of the client. In the case of gold plating, though, developers may add polish or features that weren't asked for, with the intention of adding value and impressing the client. Gold plating is generally seen as a poor practice.

5.4.2 Encapsulation

It uses information hiding technique to hide the complex internal structure or working .
Refer that File Name is used to save a file in our System. But The System saves the file with some other hexa-decimal format. These details are hidden to us(readers). This hiding technique is known as encapsulation. **Information and Complexity hiding Technique**

5.4.3 Inheritance

Child Class inheriting the properties of Parent Class

5.4.4 Polymorphism

Single Instruction- Multiple operations (different operations with different context)

Sometimes an operation has the same name in different classes. For example, you can open a door, you can open a window, and you can open a newspaper, a present, a bank account, or a conversation. In each case you're performing a different operation. In object-orientation each class "knows" how that operation is supposed to take place. This is called polymorphism
Consider That we are shopping and we are using a Credit Card. Any Bank Credit or Debit Card will be swiped on a single machine irrespective of the Bank. But internally the data will be sent to the concerning Bank or Financial institution for Clearance. Using the single swiping machine for multiple Cards is known as Polymorphism.

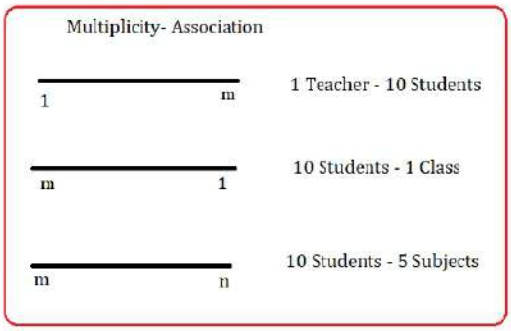
ASCII - American Standard Code for Information Interchange, is a character-encoding scheme (the IANA prefers the name US-ASCII). ASCII codes represent text in computers, communications equipment, and other devices that use text.

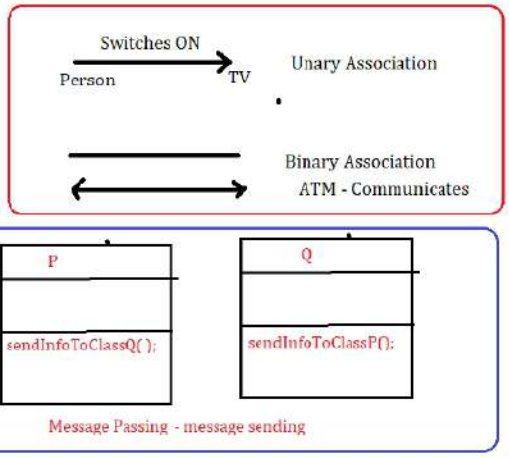
5.4.5 Relationships

Relationships exist between either between Classes or Between Objects, But not between a Class and an Object

There are four types of relationships

1. Association
2. Generalization
3. Aggregation
4. Composition





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1. **Association** - 'has ' a relationship.

a. **Unary** – One way - when you turn on your TV - The "turn-on" association is unidirectional (one-way),

b. **Binary** - Both ways - "is married to," are bidirectional

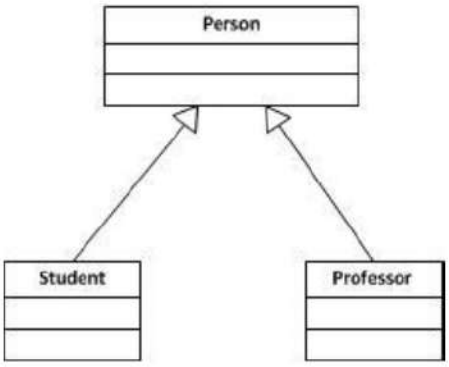
c. **Multiplicity** is an important aspect of associations among objects. It tells the number of objects in one class that relate to a single object of the associated class.

d. **Reflexive** - Sometimes, a class is in an association with itself. Referred to as a reflexive association, this can happen when a class has objects that play a variety of roles. For example, a Car Occupant can be either a driver or a passenger.

Qualified Associations : When an association's multiplicity is one-to-many, a particular challenge often arises: lookup. When an object from one class has to choose a particular object from another in order to fulfill a role in an association, the first class has to rely on a specific attribute to select the correct object. That attribute is typically an identifier, such as an ID number. For example, a hotel's reservation list has many reservations .When you make a reservation at a hotel, the hotel assigns you a confirmation number. This ID information is called a Qualifier.

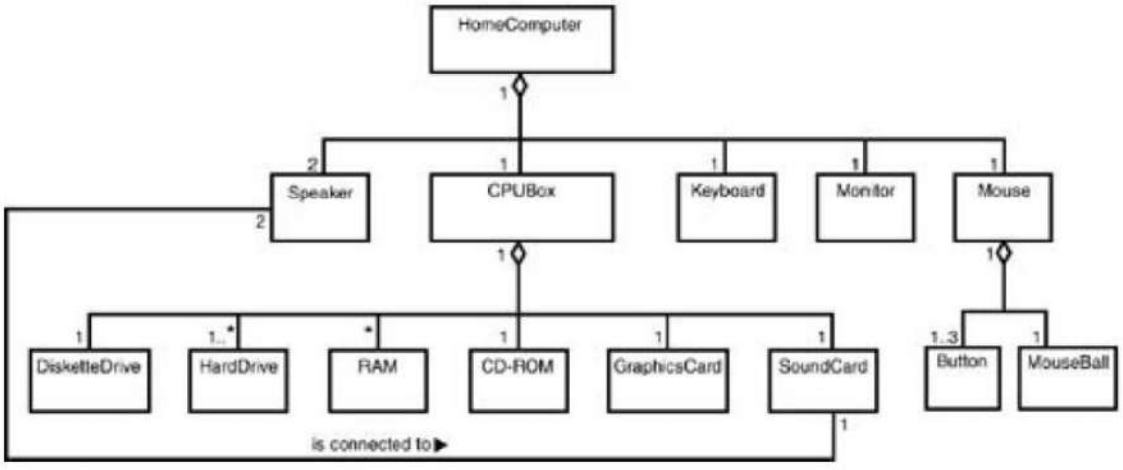
2. Generalization

This is a relationship that exists between generalized class and Specialized Class.



3. Aggregation

It is the 'parts' and its 'whole' relationship. The 'Part' remains even if the 'whole' dies.
Eg: home computer system is an aggregation that consists of a CPU box, a keyboard, a mouse, a Monitor, a CD-ROM drive, one or more hard drives, a modem, a disk drive, a printer, and Possibly some speakers. Along with the drives, the CPU box holds RAM, a graphics card, and a sound card (and probably some other items)

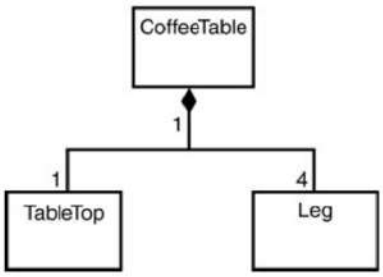


4. Composition

It is the 'parts' and it's 'whole' relationship. The 'Part' also dies along with the 'whole'.

A composite is a strong type of aggregation. Each component in a composite can belong to

Just one whole. The components of a coffee table—the tabletop and the legs—make up a Composite. The symbol for a composite is the same as the symbol for an aggregation except The diamond is filled



5.4.6 Message sending

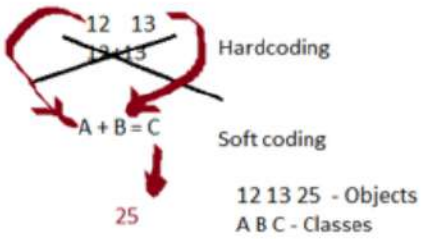
Objects work together in a system. They do this by sending messages to one another. One object sends another a message—a request to perform an operation and the receiving object performs that operation. Messages are sent by methods. Method Names are represented by Camel Casing. Camel Casing means Initial word will be all small alphabets and from second word onwards beginning alphabet is Capital and the rest are small.

```
turnRightAndStop();
applyBreaksAndSlowDown();
```

Classes are basic building blocks of Code .

Hard coding should be avoided, and soft coding should be encouraged

we will write code using Classes - try passing objects through Classes and achieve Functionality



Hard Coding → Writing the code with numeric values

Soft Coding -→ writing the code using variables.

Hard coding should be avoided, and soft coding should be encouraged

Example --- if a client has ten department – IT Team should understand that Client has n Departments (NOT TEN) and this n can vary from time to time

Flash Card - 18

5.5 Learning UML

Unified Modeling Language (UML) : The industry-standard language for specifying, visualizing, constructing, and documenting software systems. It simplifies software design, and communication about the design.

Dynamic Diagrams model TIME and Static Diagrams do not model TIME

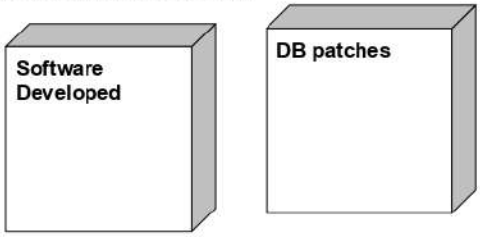
Static - 5 diagrams

Use Case
Class
Component
Package
Deployment

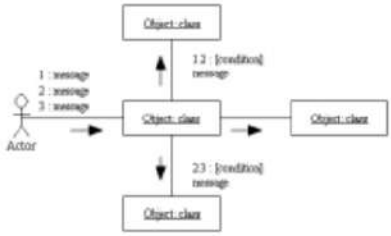
Dynamic – 4 diagrams

Sequence
Activity
State chart
Collaboration

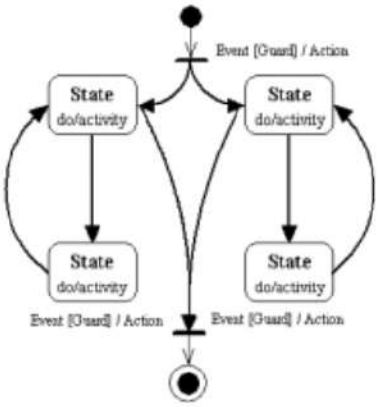
Deployment Diagram



Collaboration Diagram



State chart Diagram



Mostly used Diagrams by BA

Use Case Diagram and Activity Diagram
Sometimes (rarely) Sequence Diagram and State Chart Diagram

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5.6 Use Case Diagram

This is a high level diagram and mother of all diagrams. The main focus of this diagram will be on "how external Interfaces" (End Users, support Systems, Special Databases and internet connectivity to third party) will be interacting with the proposed IT System. This interaction will be initiating Distinct Business function called an Use Case and is shown with an ellipse symbol.

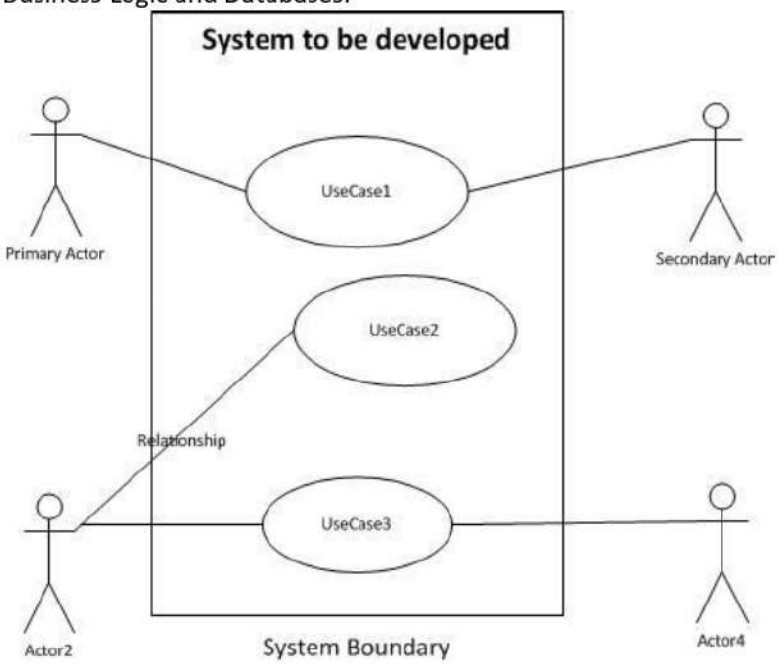
Use Case Diagrams (UCDs) can be used to describe the functionality of a system in a horizontal way. That is, rather than merely representing the details of individual features of your system, UCDs can be used to show all of its available functionality. It is important to note, though, the UCDs are fundamentally different from sequence diagrams or flow charts because they do not make any attempt to represent the order or number of times that the systems actions and sub-actions should be executed.

You should use UCDs to represent the functionality of your system from a top-down perspective UCDs represents only the positive flow. You should NOT use UCDs to represent exception behavior (when errors happen) or try to illustrate the sequence of steps that must be performed in order to complete a task.

Flash Card - 20

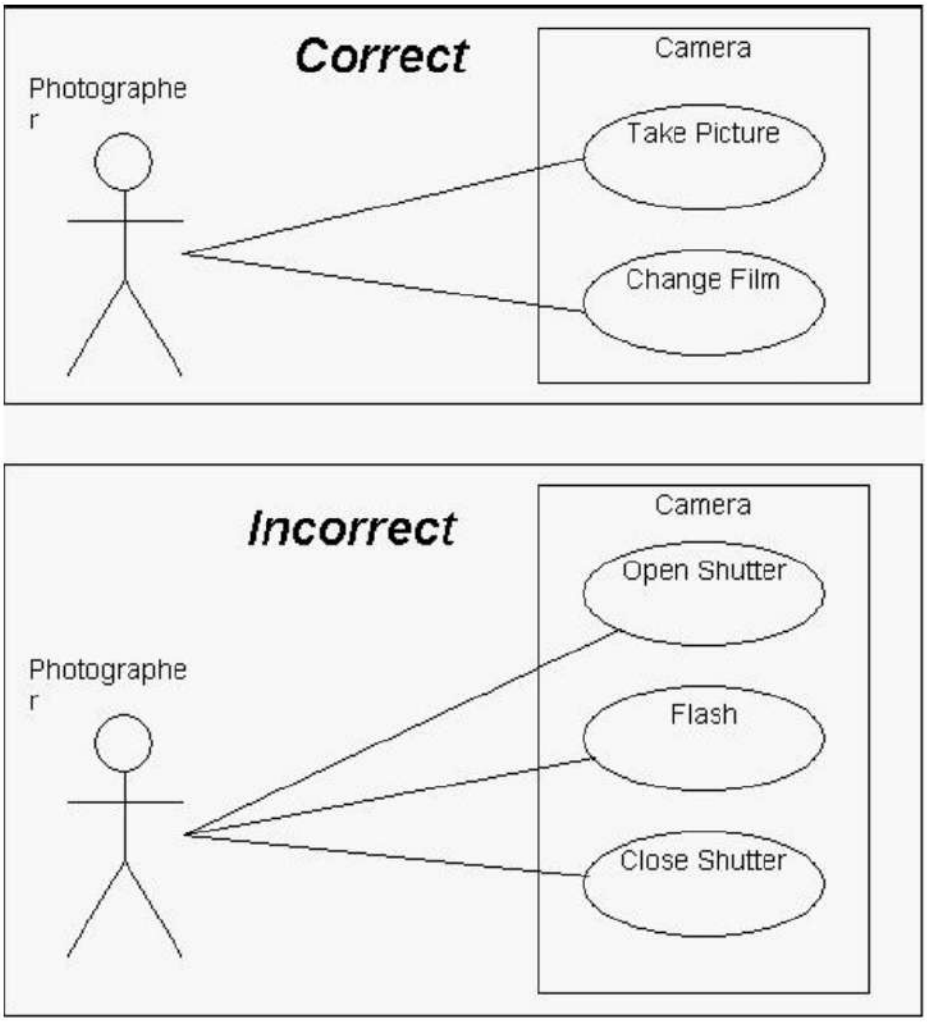
UCDs have only 4 major elements:
The actors that the system you are describing interacts with,
The system itself, (the rectangular Box)
the use cases, or services, that the system knows how to perform, and
the lines that represent relationships between these elements.

The System in UCDs represent the System as a whole which includes the entire Architecture, Screens, Business Logic and Databases.



5.6.1 Actor

1. Actor is a living or non-level Thing
2. Actor is represented by a noun.
3. Actor always stay away from the system boundary
4. Primary actor initiates the system to work and System depends on Secondary actor for information
5. All reusable actors should be placed towards the right side of the system boundary



Essential Use Cases– makes sense and completeness to the end user
Supporting Use Cases – makes sense and supports Essential Use case

Use cases are Verbs and are unique

Actors are Nouns

Flash Card - 20

5.6.2 Learning use case Diagrams Step-1: (Basic)

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5.6.3 Learning use case Diagrams Step-2: (Generalization)

5.6.4 Learning use case Diagrams Step3(Include)

5.6.5 Learning use case Diagrams Step 4: (Extend)

5.6.6 Learning use case Diagrams Step 5: (Automation)

Generalization - is a kind of

Generalization - [Parent Class exist through one (or more) of Child Classes]

Direction of Arrow – based on dependency[Not information flow]

Compulsory – Include [Parent Class is NOT complete without Child Classes]

Optional - Extend [Parent Class exist without Child Classes]

5.6.7 How to draw Use Case Diagram from a Case study

1. We model only the Functional Requirements in a Use Case Diagram and We **do NOT** model Technical information and Labels in Use Case diagrams, which includes
   - Names of the systems (laptops, Desktops, Workstations),
   - Architectures (2 Tier, 3 Tier, n Tier, Client Server),
   - Databases Names (DB2, SQL Server, My SQL)
   - Networks (LAN, WAN, Internet),
   - Brand Names (HP, Lenova, Wipro, Sony),
   - Technology Names (Java, .Net, Mainframes)

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2. Differentiate information against Actions
3. Write all sequence of Actions
4. Try to find out which actor is performing the above action
5. Try to identify Essential Use cases and Supporting Use Cases
6. Try to identify some modules with respect to functionality or usage.
7. Try to draw the relationships appropriately between the identified Actors and Use cases

Caution: We do not model the development Efforts in a Use Case Diagram, We only model the use case Diagram on How the system will behave after the System is developed.

You cannot model Database of the system as a Separate Actor (Secondary Actor)

5.7 Use Case Description Document

Every Use case will have it's own use case Description Document or Use case Specification

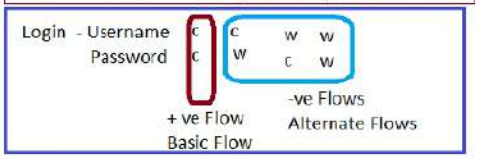
1. Use case Name
2. Use case Description
3. Actors
   a. Primary Actors
   b. Secondary actors
4. Basic Flow
5. ALTERNATE FLOW
6. Exceptional flows
7. Pre- Conditions
8. Post- conditions
9. Assumptions
10. Constraints
11. Dependencies
12. Inputs and Outputs –
13. Business Rules
14. Miscellaneous Information

Flash Card -22

Only Positive Flow /Basic Flow is modeled in a Use case Diagram

Login will have username n password and we will have 4 options . the option where both username n password are correct --- it is basic flow or positive flow ... rest are all alternate flows.

if Understanding is a contraint,
we need not model include, extend n generalisation



in Use case Diagram, we model only the +ve Flow or Basic Flow

Each Use case is supported by 1 Document - Use Case Spec or Use Case Description Document

Sample Use Case Spec

Use Case spec - login
Description - Username Password
Actors - prof, Stud.

Pre-conditions - 1. Active internet connection 2. Browser comptable
Post - Conditions - Home Page of Actor should be displayed
Basic Flow - Username n Password are correct
Alternate Flow
1. Password is wrong
2. Username is wrong
3. U n P are wrong
Exceptional Flow :
1. Forgot Password
2. Fogot Username
Assumptions - Users have basic computer knowledge, English
Constraints - Usernames cannot be names
Dependencies - User should exist - Registration process
Input-Outputs - Inputs - Username n Password
output - error code or status flag
Business Rules - Username - valid n unique email id
password - 1 cap,1 small, 1 num, 1 special - last 5 passwords cannot be repeated, password 8 to 16 char
Mis info : Interactive design, browser compatable

An example of a completed use-case specification for the Withdraw Cash use-case for an Automated Teller Machine.

1 Brief Description

This use case describes how the Bank Customer uses the ATM to withdraw money to his/her bank account.

2 Actors

2.1 Bank Customer
2.2 Bank

3 Preconditions

There is an active network connection to the Bank.
The ATM has cash available.

4 Basic Flow of Events

1. The use case begins when Bank Customer inserts their Bank Card.
2. Use Case: Validate User is performed.
3. The ATM displays the different alternatives that are available on this unit. [See Supporting Requirement SR-xxx for list of alternatives]. In this case the Bank Customer always selects "Withdraw Cash".
4. The ATM prompts for an account. See Supporting Requirement SR-yyy for account types that shall be supported.
5. The Bank Customer selects an account.
6. The ATM prompts for an amount.
7. The Bank Customer enters an amount.
8. Card ID, PIN, amount and account is sent to Bank as a transaction. The Bank Consortium replies with a go/no go reply telling if the transaction is ok.
9. Then money is dispensed.
10. The Bank Card is returned.
11. The receipt is printed.
12 The use case ends successfully.

5 Alternative Flows

5.1 Invalid User

If in step 2 of the basic flow Bank Customer the use case: Validate User does not complete successfully, then
1. The use case ends with a failure condition

5.2 Wrong account

If in step 8 of the basic flow the account selected by the Bank Customer is not associated with this bank card, then
1. The ATM shall display the message "Invalid Account – please try again".
2. The use case resumes at step 4.

5.3 Wrong amount

If in step 7 in the basic flow, the Bank Customer enters an amount that can't be 'created' with the kind of in the ATM (See Special Requirement WC-1 for valid amounts), then
1. The ATM shall display the message indicating that the amount must be a multiple of the bills on hand, and ask the Bank Customer to reenter the amount.
2. The use case resumes at step 7.

5.4 Amount Exceeds Withdrawal Limit

If in step 7 in the basic flow, the Bank Customer enters an amount that exceeds the withdrawal limit (See Special Requirement WC-2 for maximum amount), then
1. the ATM shall display a warning message, and ask the Bank Customer to reenter the amount
2. The use case resumes at step 7

5.5 Amount Exceeds Daily Withdrawal Limit

If in step 8 in the basic flow, the Bank response indicates the daily withdrawal limit has been exceeded (this is determined by the Bank and depends upon the specific account), then
1. The ATM shall display a warning message, and ask the Bank Customer to reenter the amount.
2. The use case resumes at step 7.

5.6 Insufficient Cash

If in step 7 in the basic flow, the Bank Customer enters an amount that exceeds the amount of cash available in the ATM, then
1. The ATM will display a warning message, and ask the Bank Customer to reenter the amount.
2. The use case resumes at step 7.

5.7 No Response from Bank

If in step 8 of the basic there is no response from the Bank within 3 seconds, then

1. The ATM will re-try, up to three times.
2. If there is still no response from the Bank, the ATM shall display the message "Network unavailable – try again later".
3. The ATM shall return the card.
4. The ATM shall indicate that it is "Closed".
5. The use case ends with a failure condition.

5.8 Money Not Removed

If in step 9 of the basic flow the money is not removed from the machine within 15 seconds, then

1. the ATM shall issue a warning sound and display the message "Please remove cash".
2. If there is still no response from the Bank Customer within 15 seconds the ATM will re-tract the money and note the failure in the log.
3. the use case end with a failure condition.

5.9 Quit

If at point prior to step 8 in the basic flow the Bank Customer selects Quit, then

1. The ATM shall print a receipt indicating the transaction was cancelled.
2. The ATM shall return the card.
3. The use case ends.

6 Key Scenarios

6.1 No Response from Bank

7 Post-conditions

7.1 Successful Completion

The user has received their cash and the internal logs have been updated.

7.2 Failure Condition

The logs have been updated accordingly.

8 Special Requirements

[SpReq:WC-1] The ATM shall dispense cash in multiples of $20.

[SpReq2:WC-2] The maximum individual withdrawal is $500.

[SpReq:WC-1] The ATM shall keep a log, including date and time, of all complete and incomplete transactions with the Bank.

5.8 Deriving Test Cases out of Use-cases

Use- case Diagram

Use- Cases

Use-case Description Document

In Use-case Description Document, we have Basic Flow, Alternate Flow and Exception Flows. From these Flows, we can identify the scenarios. For each scenario, identify at least 3 to 5 sets of valid test data.

This data is sufficient to frame a Test Case.

Testing Notes

Unit testing : by developer

Black box testing : Functional and module level.

Ad hoc testing : Random testing..no particular pocess.

White box testing : Very detailed..into the code.

Exploratory : ad hoc testing with some purpose/ goal.

Front end : for web based applications.

Back end : database level

Regression: Testing again and again the same application.

UAT : User acceptance testing

Integration : testing the interaction of 2 or more than 2 modules at a time.

System testing : Testing all the modules together.

Test Case Document

Test Case will have the following data

Test Case Id	PQ786TS003	Test Case Name	Search Query
Project ID	PQ786	Project Name	Online Flight Reservation
PM ID	4869	PM Name	Raman V
Test Strategy ID	PQ786TS001	Tester Id	
Test Plan ID	PQ786TP001	Tester Name	
Test Schedule ID	PQ786TS001	Date of Test	

Scenario : Explanation about Project and that particular Case Example: Online Flight Reservation System .... In that Search for Flight... we have to 8 inputs... 6 compulsory and 2 optional.... Then press **Search** Button.... And after that results are displayed in a tabular way ...
Link to that page:

	Set 1	Set 2	Set 3	Set 4	Set 5
Input Data	1 Pune 2 Chennai 3 10 Dec YY 4 1 way 5 2 passengers 6 Economy 7 window 8 Veg	1 Hyderabad 2 Chennai 3 13 MAR YY 42 way 51 passengers 6Business 7Asle 8Non-Veg	1Nagpur 2Mumbai 3 17May YY 4 1 way 5 2 passengers 6 Economy 7 window 8 Veg	1Delhi 2 Chennai 320 July YY 42 way 51 passengers 6 Economy 7Asle 8 Veg	1 Pune 2Delhi 325SepYY 4 1 way 5 2 passengers 6 Economy 7 window 8Non- Veg
Expected Behavior	Eg: 10 flights should come for above data				
Actual Behavior					
Comments					
Result Pass/Fail					

Case Study –Hospital Management System

Every hospital big or small keeps the records of its patients including the registration details of the patient and the fee payments. The entry of patients is determined whether s/he has arrived in emergency, OPD or for a routine check-up. The patient who gets admitted is provided with a room according to his/her choice. The patient is allotted a doctor according to his illness. The doctor may refer the patient to another doctor with expertise of the illness. On discharge, the patient is required to settle the bills sent by the accounts department of the hospital.

The hospital also keeps the record of the doctors visiting the hospital, plus the permanent employees of the hospital. Each doctor has a few days associated with his/her visit to the hospital and also the timings when s/he is available in the hospital.

The employees draw their salary from the accounts department. The hospital maintains the record of the inventory of the hospital including the equipment and the medicines, blood bank, etc. A limit for inventory is maintained for every item. When the limit is reached, an order for the purchase of the concerned item is placed. The database is updated after the supplier supplies the product.

Case Study on Online Flight Reservation System

Passenger can do the following

1. Search a Flight
2. Book a Ticket
3. Cancel Ticket

Flight Information is supported by Centralized Flight DB.

Case Study on Online Flight Reservation System – Version 2

Passenger can Search a Flight, Book a Ticket, Cancel Ticket through this portal. Flight Information is supported by Centralized Flight DB. For searching a flight, following information is mandatory. From Location, To Location, Date/Time, 1way /2 way, Number of passengers, Class (Economy/Business Class). And optional info for search a flight is Seat preferences and food preferences. And For booking a Ticket, following information is compulsory. Flight Details, Passenger Details, Payment and confirming the Ticket. Payment can be done through Card or Net Banking or Coupons. Card payment is supported by FCH – Financial Clearing House, Net Banking is supported by that Bank Online Banking services and Coupons payment is supported by that Coupons Organization. Confirming Tickets can be done through Printout or SMS or email. Printout is supported by the Printer, SMS by online SMS gateway and email is supported by Mail Server.

Case1: After searching for a flight and before you book a ticket – Login is compulsory

Case 2: While booking a Ticket you will get bonus points and using bonus points, we can book a ticket.

Case Study on Course Registration

As the head of information system for Wylie College, you are tasked with developing a new Student Registration System. The College would like a new Client Server System to replace its much older system developed around mainframe technology. The new system will allow students to register for courses and view report cards from personal computers attached to the campus LAN. Professors will be able to access the system to sign up to teach courses as well as record grades.

Due to a decrease in federal funding, the college cannot afford to replace the entire system at once. The college will keep the existing courses catalog database where all the course information is maintained. This database is Ingres Relational Database running on DEC VAX. Fortunately the college has invested in an Open SQL interface that allows access to this database from college's Unix servers. The legacy system performance is rather poor so that the new system must ensure that access to the data on the legacy system occurs in a timely manner. The new system will access course information from the legacy database but will not update it. The registrar's office will continue to maintain course information through another system.

At the beginning of each semester, students may request a course catalog containing a list of course offerings to the semester. Information about each course, such as professor, department and prerequisites, will be included to help students make informed decisions.

The new system will allow students to select courses for the coming semester. Course Offerings will have a maximum of ten students and a minimum of three students. A course offering with fewer than three students will be cancelled. For each semester, there is a period of time that students can change their schedule. Students must be able to access the system during this time to add or drop courses. Once the Registration Process is completed for a student, the registration system sends information to the billing system so that the student can be billed for the semester. If a course fills up during the actual registration process, the student must be notified of the change before submitting the schedule for processing.

At the end of the semester, the student will be able to access the system to view an electronic report card. Since student grades are sensitive, the system must employ extra security measures to prevent unauthorized access.

Professors must be able to access the on-line system to indicate which course they will be teaching. They will also need to see which students signed up for the courses for the students in each class.

5.9 Understanding how a Software Application Works

5.9.1 An Overview

Take an example of a restaurant and see how it functions...

5.9.2 Two Tier Architecture

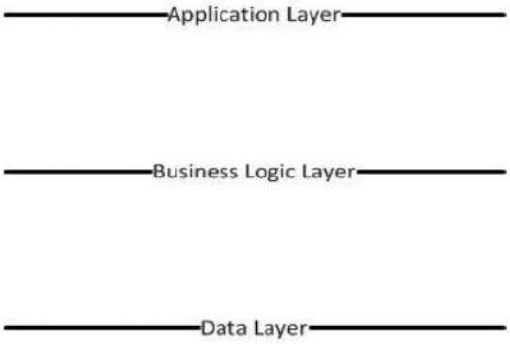
Frond End and Back end
Back end – Databases
DB Vs DBMS
Types of DBMS

- Relational
- Networking
- Hierarchical

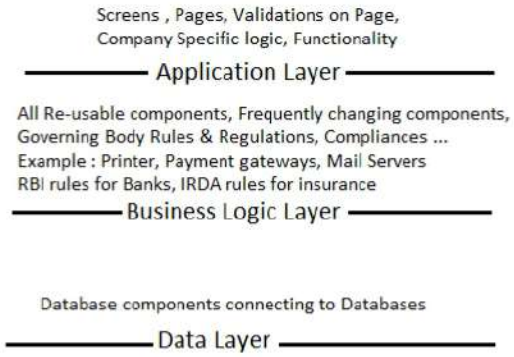
What is Database Design
DB Schema
ER Diagram

5.9.3 Three Tier Architecture

1. Application Layer
2. Business Logic Layer
3. Data layer



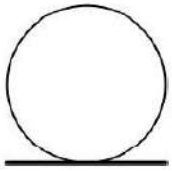
GUI – Graphical User Interfaces like Screens and Pages , Validations on pages, Organization specific business logic will be on the Application Layer
All reusable components (logic pertaining to industry) , Frequently changing Components, Governing Body rules and regulations, Compliances should go to middle layer Ex: Printer, Payment Gateways, mail Servers, RBI rules for banks, IRDA rules for Insurance, etc.,
Data Base Components connecting to databases will be at the Data Layer.



5.9.4 MVC Architecture

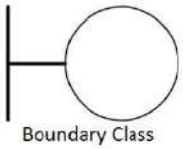
To identify Classes from use case Diagram, We apply MVC rules on each use case to derive Classes.

1) Model: The model class knows about all the data that need to be displayed. It is model who is aware about all the operations that can be applied to transform that class. It only represents the data of an application. The model represents enterprise data and the business rules that govern access to and updates of this data. This represents Database(Tables in DB). All Model Classes are represented as Entity Classes.



Entity Class , Data base classes , Persistent class(Back end designers)

2)View : The view represents the presentation of the application. The view class refers to the model. It uses the query methods of the model to obtain the contents and renders it. The view is not dependent on the application logic. It remains same if there is any modification in the business logic.View Class is the data required by the query. View Class is represented as Boundary Class or Form Class.

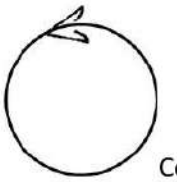


Boundary Class (or) FORM Class

Actor speaks to system and vice-versa through boundary

Authenticating information between boundary and Entity class

3) Controller: Whenever the user sends a request for something then it always go through the controller. The controller is responsible for intercepting the requests from view and passes it to the model for the appropriate action. After the action has been taken on the data, the controller is responsible for directing the appropriate view to the user. In GUIs, the views and the controllers often work very closely together.



Controller Class or Transient Class (Given to Front end designers)

Controller class is working based on the user's command .Understands the command / request given by user through boundary /Form Class

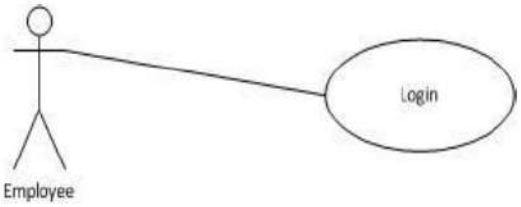
MVC Architecture Rules

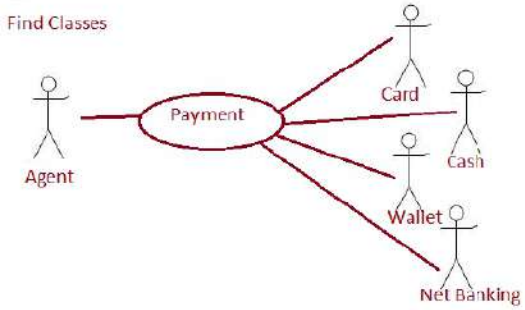
1. Combination of One Actor and an use case results in one Boundary class
2. Combination of Two Actors and an use case results in two Boundary classes
3. Combination of Three Actors and an use case results in Three Boundary classes and so on....
   Note: only one primary actor is to be considered with a use case.
4. Use case will result in a controller class
5. Each Actor will result in one entity class

Flash Card – 24

Let us take an example where an Employee is logging into his system

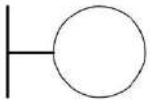
Use Case is





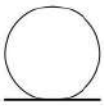
Flash Card - 25

Applying MVC Rules we get the Classes as

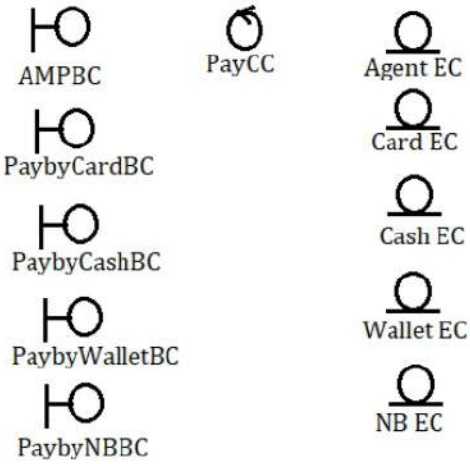


EmpLogin Boundary Class

Login Controller Class



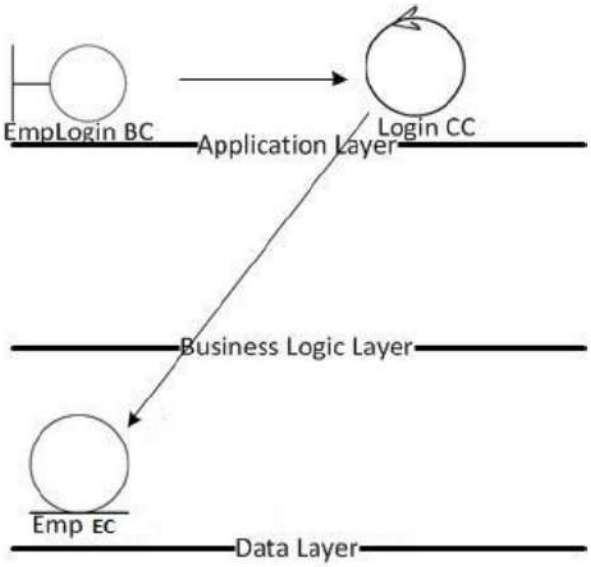
Employee Entity Class



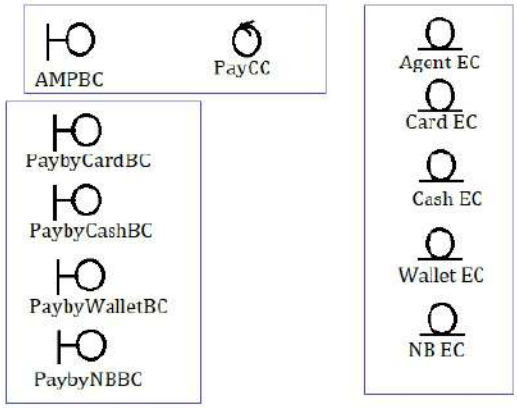
Guidelines to place identified MVC Classes in a 3 Tier Architecture

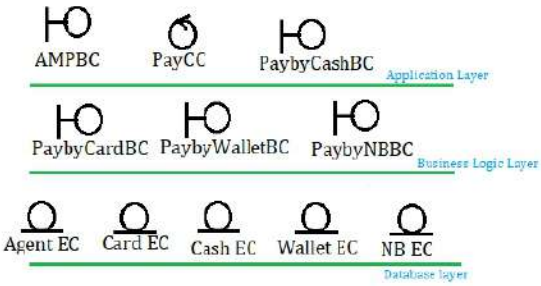
1. Place all Entity Classes in DB Layer
2. Place Primary Actor associated Boundary Class in Application Layer
3. Place Controller Class in Application Layer
4. If governing Body influence or Reusability is there with any of remaining Boundary Classes , place them in Business Logic Layer else place them in Application Layer.

Let us place the Discovered Classes into this 3 tier Architecture

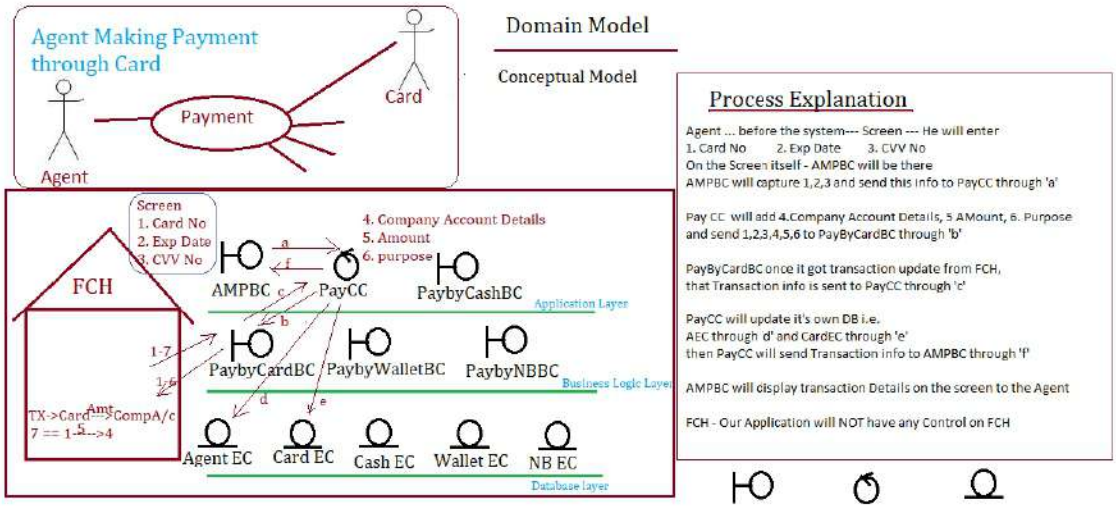


Note:
Transient Classes – Boundary Classes and Controller Classes
Persistence Classes - Entity Classes





5.10 Domain Model , Conceptual Model, DFD, Data Model



Conceptual Model

Conceptual Model

Agent Making Payment
Card, NB, Wallet, Cash

all possibilities of doing these transactions
Frequency
Volumes
Value
Geographical distribution

Entire Information together
we call it as **Conceptual Model**

Data Model

Data is there at each class
AMPBC - 1,2,3 -a
Pay CC - 1,2,3, -a
Pay CC - 1,2,3,4,5,6 -b
PaybyCard BC - 1,2,3,4,5,6 - b
PaybyCard BC - 1,2,3,4,5,6,7 - c
Pay CC - 1,2,3,4,5,6,7 - c

Data Flow Diagram - DFD

Data which is being flowing from one Class to another Class

a- AMPBC - PayCC --> 1,2,3
b- PayCC - PayByCardBC --> 1,2,3,4,5,6
c- PayByCardBC -PayCC --> 1,2,3,4,5,6,7

5.11 Sequence Diagram

The sequence diagram is used primarily to show the interactions between classes in the sequential order in which those interactions occur. A sequence diagram can map a scenarios described by a use case in step by step detail to define how classes collaborate to achieve your application's goals.

UML sequence diagrams are used to represent or model the flow of messages, events and actions between the classes or components of a system. Time is represented in the vertical direction showing the sequence of interactions of the header elements, which are displayed horizontally at the top of the diagram.

Sequence Diagrams are used primarily to design, document and validate the architecture, interfaces and logic of the system by describing the sequence of actions that need to be performed to complete a task or scenario. UML sequence diagrams are useful design tools because they provide a dynamic view of the system behavior which can be difficult to extract from static diagrams or specifications.

One of the primary uses of sequence diagrams is in the transition from requirements expressed as use cases to the next and more formal level of refinement. Use cases are often refined into one or more sequence diagrams. In addition to their use in designing new systems, sequence diagrams can be used to document how classes in an existing ("legacy") system currently interact. This documentation is very useful when transitioning a system to another person or organization.

The Sequence Diagram which will be discussed will be formed by the Classes that are discovered (Boundary Classes, Controller Classes and Entity Classes) from MVC Architecture and then mapped on to the 3 Tier Architecture.

Lifeline: Lifeline indicates the life of an class (here the Class)

Camel Casing: entire first word will be in lowercase and subsequent words first letter should be in Upper Case . There will be no gap in between words. Example: getEmpId(); turnLeftAndSlowDown();

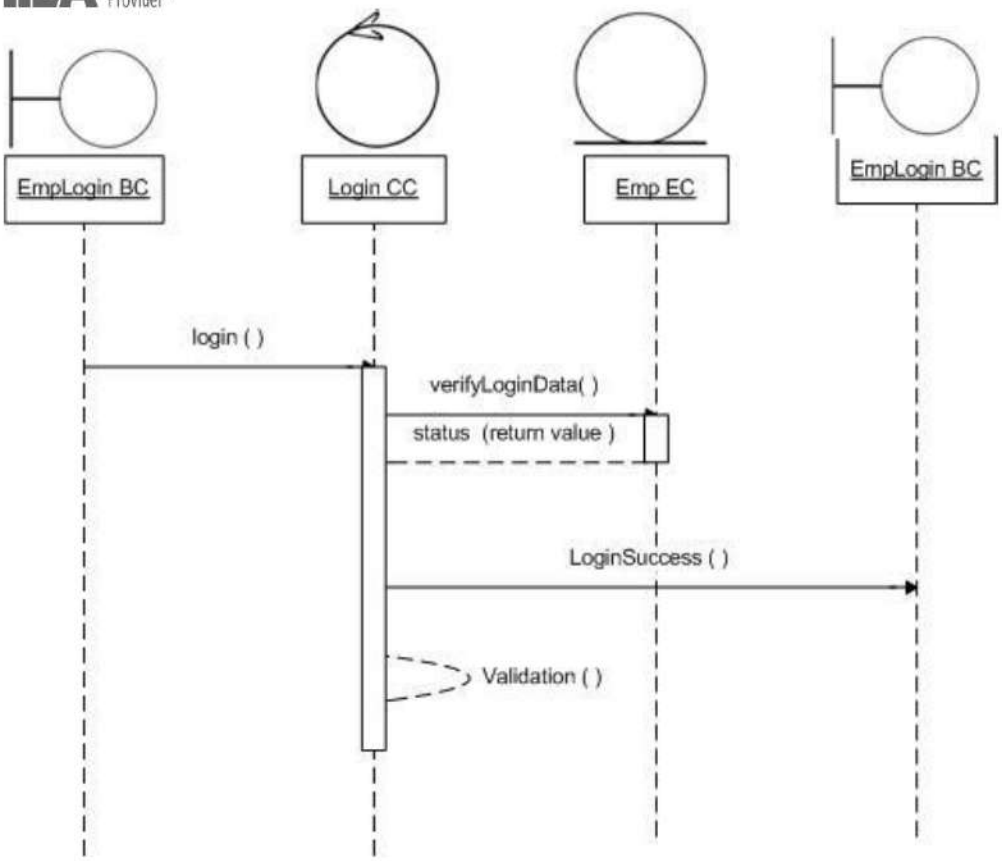
Return message: This will always flow towards the Controller; this is just a message and NOT a method.

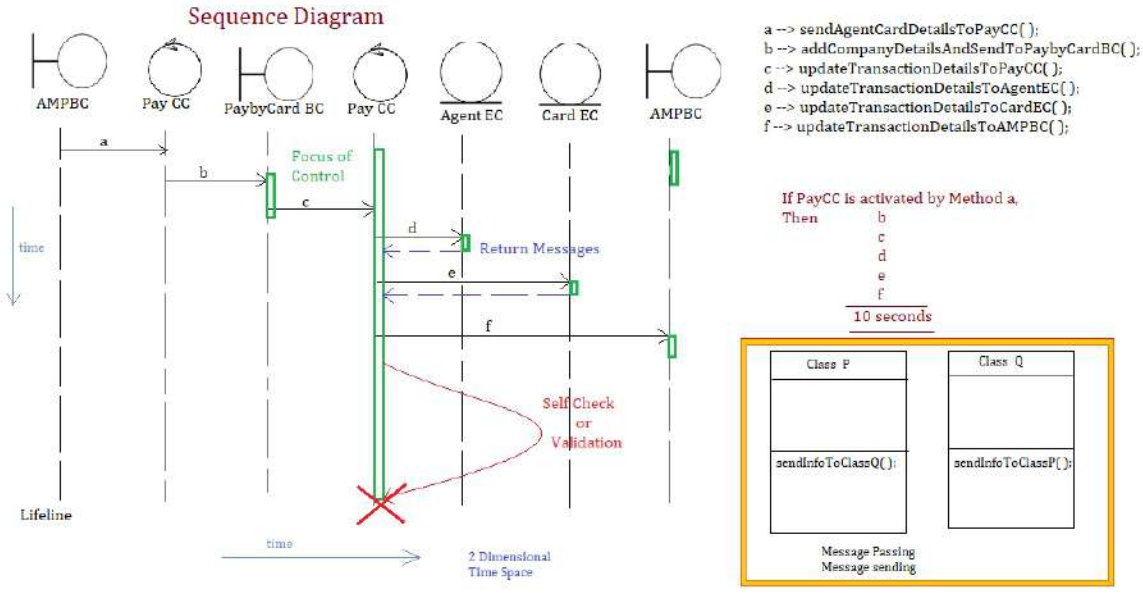
Note: Method always flows in timeline. Never Method will flow backward in timeline.

Focus of Control: It shows the life of method.

Following is the sequence diagram for an Employee login.
Initially the Employee opens the Screen where he needs to login
Then on the Screen, he/ She will enter user name and password.
Here one Boundary Class **EmpLogin BC** will take care of this action and pass on the information to Controller Class **Login CC** . Login CC will perform the following

- Initiate methods getEmpId (), getPwsd() and will receive responses getPswd (return Value).
- It performs self Validation.
- It send LoginSuccess() to the EmpLogin BC





Sequence Diagram can also be drawn in many variations
➢ by using Objects (and Actors) instead of Classes ➢ Single dimension Time space – where there is no need to model same classes/objects multiple times

5.12 Activity Diagram

Activity diagrams are one of the five diagrams in the UML for modeling the dynamic aspects of system. An activity diagram is essentially a flowchart, showing flow of control from activity to activity. Speaks of all the activities which are happening in the system **through system perspective** but NOT actor perspective.

An Activity diagram is drawn to model how the system should function in order to achieve Business Logic, Business Functionality and Business Objectives.

Activity diagrams are typically used for business process modeling, for modeling the logic captured by a single use case or usage scenario, or for modeling the detailed logic of a business rule. In many ways UML activity diagrams are the object-oriented equivalent of flow charts, Process Flow diagrams, Flow document, Activity chart, Control flow graph and data flow diagrams (DFDs) from structured development.

Activity diagram is UML behavior diagram which shows flow of control or object flow with emphasis on the sequence and conditions of the flow. The actions coordinated by activity models can be initiated because other actions finish executing, because objects and data become available, or because some events external to the flow occur.

Flash Card - 26

Activity diagram is basically a flow chart to represent the flow form one activity to another activity. The activity can be described as an operation of the system. So the control flow is drawn from one operation to another. Activity diagrams are not only used for visualizing dynamic nature of a system but they are also used to construct the executable system by using forward and reverse engineering techniques. The only missing thing in activity diagram is the message part.

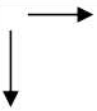
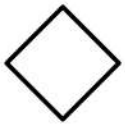
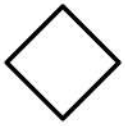
Differences between Flow Chart and Activity Diagram

(i) Flow chart models the entire business process whereas Activity Diagrams models where the system is involved.

Flow Chart – Business Process	Activity Diagram – System is involved
1. Photographer visits the property 2. Photographer clicks pics of the property 3. Photographer uploads pics in the portal	1. Accept Property Pics from the Photographer

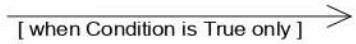
5.12.1 Activity Diagram – Drawing Elements

Activity diagrams may include the following elements:

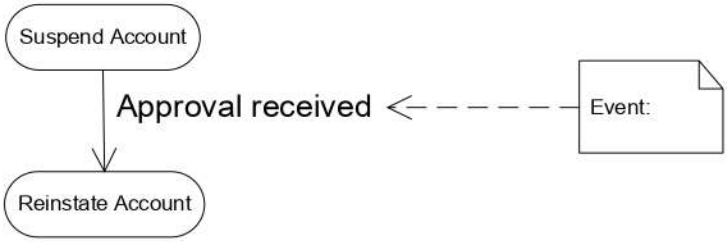
Sl No	Symbol	Name	Description & Example
1.		**Initial Node** **Start Node**	Indicates where the workflow begins.
2.		**Control flow**	An arrow showing the direction of the workflow. Generally, control flows from top to bottom and from left to right.
3.		**Final node** **End Node**	Indicate that the workflow is completed
4.		Stop Node	When a deadlock happens and no more we can progress in that workflow. Example three times PIN tried wrong in an ATM
5.		**Activity**	Indicates a step in the process. It is a unit of work done by the system or a consistent state achieved by the system It has 1 input and 1 output
6.		**Decision Box**	A diamond symbol, indicating a choice. Workflow will proceed along one of a number of possible paths, according to the guard conditions. It has 1 input and multiple outputs
7.	[Guard condition] Figure 1	Guard Condition	A condition attached to a control flow. When the guard condition is true, workflow may flow along the control flow. Guard conditions are usually attached to control flows that come out of a decision symbol. (However, they can also be used without the decision symbol.) A guard is shown within square brackets.
8.	Figure 2	Event	A trigger attached to a control flow. An event must occur for the flow to move along the control flow. Declaring something as an event has a stronger implication than a calling it a guard. Event is externally triggered or it can be a consistent point of a defined time frame.
9.		Connector	A connector has multiple inputs and multiple outputs. Practically we use connectors for 1- many and many-1.
10.		Continuation Node	If Activity is big and is spanning pages . We give continuity from one page through another page by using Continuation Nodes. It can also be used to connect extreme left to right sides in a page or for reusability of a particular flow

11.	Figure 3	**Branch And Merge**	Between a Branch n Merge, we can have n number of paths. For the control to pass from branch to merge at least 1 path should execute. The condition between the paths will be "OR"
12.	Figure 4	**Fork and join**	Between a Fork n Join, we can have n number of paths. For the to pass from Fork to Join all the paths should execute. The condition between the paths will be "AND"
13.	Figure 5	**Nested loop Activity**	This is an activity wherein this activity may contain a series of activities internally.

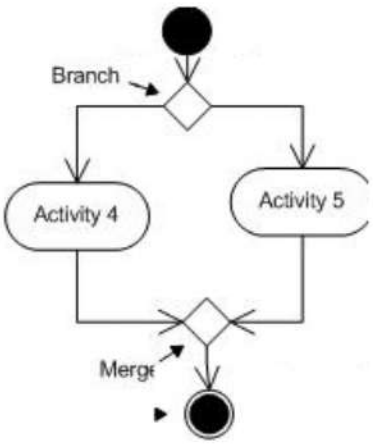
Guard condition: Figure 1



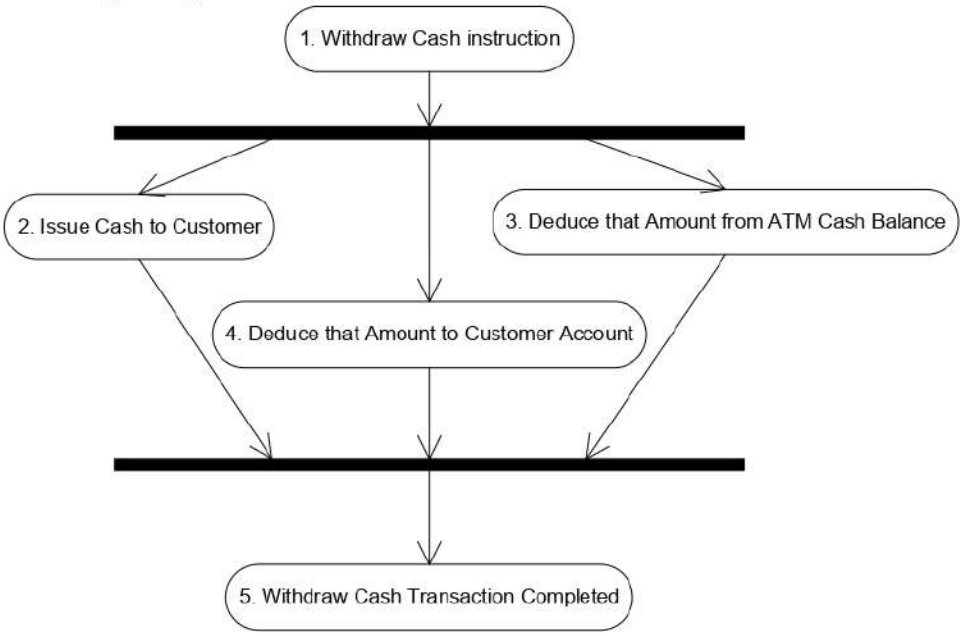
Event: Figure 2



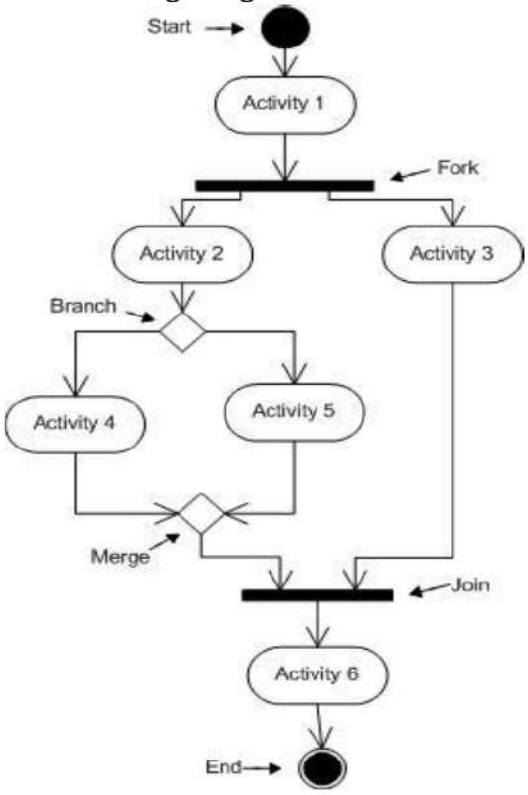
Branch n Merge – Figure 3



Fork and join: Figure 4



Branch n Merge – Figure 3



Understanding Activity Diagram Components

Activity diagrams are mainly used as a flow chart which consists of activities performed by the system. But activity diagram are not exactly a flow chart as they have some additional capabilities. These additional capabilities include branching, parallel flow, swimlane etc.

Before drawing an activity diagram we must have a clear understanding about the elements used in activity diagram. The main element of an activity diagram is the activity itself. An activity is a function performed by the system. After identifying the activities we need to understand how they are associated with constraints and conditions.

So before drawing an activity diagram we should identify the following Components:

Activities, Conditions, Events

Once the above mentioned parameters are identified we need to make a mental layout of the entire flow. This mental layout is then transformed into an activity diagram.

Whereas interaction diagrams emphasize the flow of control from object to object, activity diagrams emphasize the flow of control from activity to activity. An activity is an ongoing non-atomic execution within a state machine. Activities ultimately result in some action, which is made up of executable atomic computations that result in a change in state of the system or the return of a value.

Activity diagrams are not only important for modeling the dynamic aspects of a system, but also for constructing executable systems through forward and reverse engineering.

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5.12.2 How to Draw an Activity Diagram from a case study

1. We model only the Functional Requirements in an Activity Diagram and We **do NOT** model technical information and Labels in Activity diagrams, which includes
   - Names of the systems (laptops, Desktops, Workstations),
   - Architectures (2 Tier, 3 Tier, n Tier, Client Server),
   - Databases Names (DB2, SQL Server, My SQL)
   - Networks (LAN, WAN, Internet),
   - Brand Names (HP, Lenova, Wipro, Sony),
   - Technology Names (Java, .Net, Mainframes)
2. Identify list of Activities A1, A2, … , list of Conditions C1, C2,… and list of Events E1,E2,…
3. An Activity is a unit of Work done by the system or the consistent state achieved by the System.
4. Conditions are where < => symbols comes and don't confuse sequence Activities with Conditions.
   - Sequence Activities example :
     - ✓ You write an Exam and you get Results. This is NOT a Condition.
   - Conditions Example :
     - ✓ Marks scored < 35 → Fail (< less than)
     - ✓ Marks scored >= 60 →First Class (>= greater than or equal to)
5. Events are **System Events**. Events are externally triggered or **a consistent point of a specified time**.
   - Like office starts at 10am, you went by 10:40am, then late will be triggered on you.
   - Any time frame involved with any Activity, should be considered to be an Event.
6. Write all Activities, Conditions, Events from **System Perspective only.**
7. Try to find out which Activity is the first activity by applying Bubble sort and then the second activity and then third activity like that …
8. Understand where Decision Box comes, Guard Conditions, Events and where Branch and Merge & Fork n Join comes and also any Continuation Nodes
9. With appropriate mind layout and using relevant drawing elements, draw the diagram

Caution: We do not model the development Efforts in an Activity Diagram, We only model the Activity Diagram on How the system will behave after the System is developed.

5.12.3 Swimlanes

Swimlanes divide activity diagrams into sections. Each swimlane is separated from adjacent swimlanes by vertical, solid lines on both sides.

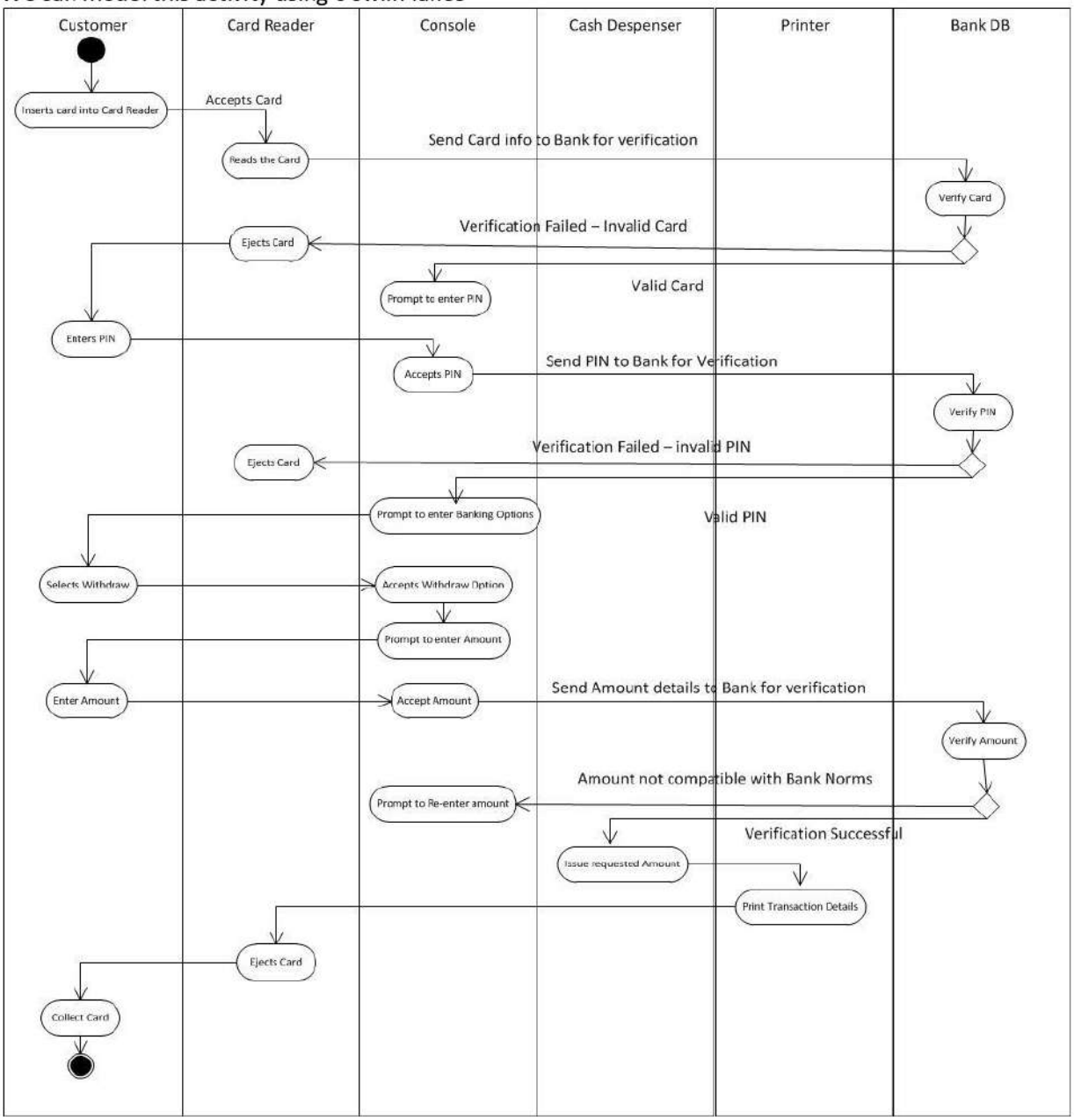
These are the features of swimlanes:

- Each action is assigned to one swimlane.
- Activity flows can cross lanes.
- Swimlanes do not change ownership hierarchy.
- Swimlane association (representing field population) to a class (only) can be created by dragging the class from the browser to the Swimlane name compartment.
- The relative ordering of swimlanes has no semantic significance.
- There is no significance to the routing of an activity flow path.
- Parts representing internal behavior can be specified on swimlanes.
- Order Swimlanes in a Logical Manner.
- Apply Swim Lanes To Linear Processes. A good rule of thumb is that swimlanes are best applied to linear processes.
- Have Less Than eight Swimlanes.

Lets take an example of ATM.
Activity: Customer interacts with ATM for withdrawing Cash from his Account.
ATM will internally use the following hardware Components along with Bank DB.

- A Card Reader - a magnetic stripe reader for reading an ATM card,
- A Customer Console (keyboard and display) for interaction with the customer,
- A Dispenser for cash ,
- A Printer for printing customer receipts

We can model this activity using 6 swim lanes



Kindly note that

Important Points about Activity Diagrams

1. Activity Diagrams are drawn to simplify Complexity

2. Activity Diagrams can be drawn at any level
* Project wise, module wise, department wise, functionality wise, use case wise

3. Activity Diagrams can be drawn based on frequency
* Setup, 1 Time, Annual, Half-yearly, Quarterly, Monthly, Weekly, Daily, Predefined Frequency and Ad-hoc basis - specific to an initiative

1 time - When you join a company - only 1 employee record will be put
when you open an account with bank
Annual - Company Turnover, Profits Calculations, IT Returns filing
Half yearly - promotion of student from one semester to another
Quarterly - variable pay Calculations - Targets achieving
Monthly - Salary Calculations, Payroll
Weekly - Timesheets submission, Contribution Verify, Status Calls
Daily - Attendance capture, Bank Transactions like withdraw, deposits, transfers
Predefined Frequency - Friendship day
Ad-hoc basis - specific to an initiative - We have offers running for a specific period

4. We can draw multiple Activity diagrams for a single Case study where as it will be only one Use case diagram.

5. If we are drawing multiple Activity Diagrams for a single case study
Every Diagram should have a heading-based points 2and 3

We can draw multiple Activity diagrams for a single Case-study where as it will be only one Use case diagram

6 Requirements Engineering

6.1 Business Requirements Initiation (Gathering Stage)

Stakeholder Analysis
Apply Requirement Elicitation Techniques
Sort the requirements -
Prioritize Requirements
Validating Requirements

6.1.1 Stakeholder Analysis

- Identify Stakeholders
- Stakeholders Listing Document
- Stakeholders Summary
- RASCI Matrix – Responsible, Accountable, Supporting, Consulted, Informed

6.1.2 Requirement Elicitation Techniques

Requirements Elicitation is the process of digging out the information from the stakeholders
Requirements Elicitation serves the foundation in documenting the requirements

Brainstorming - **Flash Card 28**

Flash Card – 28

Brainstorming can be done either individually or in groups. The ideas collected can then be reviewed / analyzed and where relevant included within the system requirements. Ideas can come from what users / stakeholders have seen (eg at software exhibitions), or experienced elsewhere (eg before they joined the present organisation).

Advantages: Can come up with very innovative ideas and requirements. It can be an efficient way for users / stakeholders to define their requirements.

Disadvantages: People can't easily brainstorm ideas when required to do so. Some people find brainstorming much harder than others.

Brainstorming can be an effective way to generate lots of ideas on a specific issue and then determine which idea – or ideas – is the best solution. Brainstorming is most effective with groups of 8-12 people and should be performed in a relaxed environment.

It is utilized in requirements elicitation to gather good number of ideas from a group of people. Usually brainstorming is used in identifying all possible solutions to problems and simplifies the detail of opportunities. It casts a broad net, determining various discreet possibilities. Prioritization of such possibilities is vital to locate needles in haystack.

1 Prepare for Brainstorming

• Develop a clear and concise definition of the area of interest.
• Determine a time limit for the group to generate ideas, the larger the group, the more time required.
• Decide who will be included in the session and their role – participant or facilitator. Aim for participants (ideally 6 to 8) who represent a range of background and experience with the topic.
• Establish criteria for evaluating and rating the ideas.

2 Conduct Brainstorming session

• Share new ideas without any discussion, criticism or evaluation.
• Visibly record all ideas.
• Encourage participants to be creative, share exaggerated ideas, and build on the ideas of others.
• Don't limit the number of ideas as the goal is to elicit as many ideas as possible within the time period.

3 Wrap-up the brainstorming

• Once the time limit is reached, using the pre-determined evaluation criteria, discuss and evaluate the ideas.
• Create a condensed list of ideas, combine ideas where appropriate, and eliminate duplicates.
• Rate the ideas. There are many techniques that can be used to prioritize the ideas, e.g. multi voting.
• Distribute the final list of ideas to appropriate parties.

Prepare 3 Brainstorming sessions from your previous project. Put forth challenges you have faced in Brainstorming Sessions

Document Analysis Flash Card 29

You may have documentation about your current system which could provide some of the input for the new system requirements. Such documentation (if it exists) could include interface details, user manuals, and software vendor manuals.

Advantages: Could be a lot of information and easy to transfer to a new system requirements document.

Disadvantages: Existing documentation may often be old and out of date. Systems, interfaces, processes and reports may have changed out of all recognition. Care needs to taken, as it may not reflect what you need from a new system.

Document Analysis is an important gathering technique. Evaluating the documentation of a present system can assist when making AS-IS process documents and also when driving the gap analysis for scoping of the migration projects.

1. Prepare for Document Analysis:

• Evaluate which existing system and business documentation are relevant and appropriate to be studied.

2. Analyze the documents:

• Study the material and identify relevant business details.
• Document business details as well as questions for follow-up with subject matter experts.

3. Post Document Analysis wrap-up:

• Review and confirm the selected details with subject matter experts.
• Obtain answers to follow-up questions.

Document Analysis is one of the compulsory elicitation technique for any Project

Reverse Engineering Flash Card 29

In situations where the software for an existing system has little or outdated documentation and it is necessary to understand what the system actually does, reverse engineering is an elicitation technique that can extract implemented requirements from the software code.

There are two general categories of reverse engineering:

• **Black Box Reverse Engineering:** The system/product is studied without examining its internal structure.
• **White Box Reverse Engineering:** The inner workings of the system/product are studied.

Reverse Engineering is generally done for Migration Projects

Focus groups Flash Card 29

A focus group is a means to elicit ideas and attitudes about a specific product, service or opportunity in an interactive group environment. The participants share their impressions, preferences and needs, guided by a moderator.

A focus group typically has 6-12 attendees. It may be necessary to invite twice as many individuals in order to allow for no-shows. If many people need to participate, it may be necessary to run more than one focus group.

The topic of the focus group will influence who should be recruited. If the topic is a new product, it is likely that existing users (experts and novices) should be included. There are pros and cons that should be considered when using homogeneous vs. heterogeneous composition.

- Homogeneous – individuals with similar characteristics. Caution: Differing perspectives will not be shared. Possible solution: conduct separate sessions for different homogeneous groups.

- Heterogeneous – individuals with diverse backgrounds, perspectives. Caution: Individuals may self-censor if not comfortable with others' background resulting in lower quality of data collected.

Observation Flash Card 30

Observing, shadowing users or even doing part of their job, can provide information of existing processes, inputs and outputs.

Advantages: Useful if the user is not able to clearly explain what they do or their requirements for the new system. Can see ideas for improving processes or removing unnecessary activities from the new system.

Disadvantages: Relatively slow, focused on existing processes rather than the new system processes.

There are two basic approaches for the observation technique:

- **Passive / invisible**. In this approach, the business analyst observes the subject matter expert working through the business routine but does not ask questions. The business analyst writes notes about what he/she sees, but otherwise stays out of the way, as if he/she was invisible. The business analyst waits until the entire process has been completed before asking any questions. The business analyst should observe the business process multiple times to ensure he/she understands how the process works today and why it works the way it does.
- **Active / visible.** In this approach, while the business analyst observes the current process and takes notes he/she may dialog with the worker. When the business analyst has questions as to why something is being done as it is, he/she asks the questions right away, even if it breaks the routine of the person being observed. In this approach, the business analyst might even participate in the work to gain an immediate appreciation for how the current process works.

Workshop Flash Card 30

Workshops can comprise 6-10 or more users / stakeholders, working together to identify requirements. Workshops tend to be of a defined duration, rather than outcome and may need to be briefly repeated in order to clarify or obtain further details.

Advantages: Faster than group interviews for obtaining requirements, particularly for common or system wide requirements.

Disadvantages: More preparation is needed. Running or facilitating workshops requires more skill, with possibly an extra IT person recording details / requirements. It can be difficult to get conversation / requirements flowing, particularly at the start of the workshop.

A Requirements Workshop is a structured way to capture requirements. A workshop may be used to scope, discover, define, prioritize and reach closure on requirements for the target system. Well-run workshops are considered one of the most effective ways to deliver high quality requirements quickly. They promote trust, mutual understanding, and strong communications among the project stakeholders and project team and produce deliverables that structure and guide future analysis.

Process

1 Prepare for the Requirements Workshop

- Clarify the stake holder's needs, and the purpose of the workshop.
- Identify critical stakeholders who should participate in the workshop.
- Define the workshop's agenda.
- Determine what means will be used to document the output of the workshop.
- Schedule the sessions
- Arrange room logistics and equipment.
- Send materials in advance to prepare the attendees and increase productivity at the meeting.
- Conduct pre-workshop interviews with attendees.

2 Co Conduct/Run the Requirements Workshop

- Elicit, analyze and document requirements.
- Obtain consensus on conflicting views.
- Maintain focus by frequently validating the session's activities with the workshop's stated objectives.

The Facilitator has the responsibility to:

- Establish a professional and objective tone for the meeting.
- Enforce discipline, structure and ground rules for the meeting.
- Introduce the goals and agenda for the meeting.
- Manage the meeting and keep the team on track.
- Facilitate a process of decision making and build consensus, but avoid participating in the content of the discussion.
- Ensure that all stakeholders participate and have their input heard.
- Ask the right questions, analyze the information being provided at the session by the stakeholders, and follow-up with probing questions, if necessary. The Scribe's role is to document the business requirements in the format determined prior to the workshop.

3 Post Requirements Workshop wrap-up done by Facilitator

- Follow up on any open action items that were recorded at the workshop.
- Complete the documentation and distribute it to the workshop attendees and the sponsor.

JAD(Joint Application Development) -Requirements Workshop Flash Card 30

The Joint Application Development (JAD) technique is an extended, facilitated workshop. It involves collaboration between stakeholders and systems analysts to identify needs or requirements in a concentrated and focused effort.

Advantages : This technique allows for the simultaneous gathering and consolidating of

large amounts of information. This technique produces relatively large amounts of high-quality information in a short period of time. Discrepancies are resolved immediately with the aid of the facilitator. This technique provides a forum to explore multiple points of view regarding a topic.

Disadvantages: Requires significant planning and scheduling effort. Requires significant stakeholder commitment of time and effort. Requires trained and experienced personnel for facilitation and recording.

JAD Process Steps

Define Session: Define the purpose, scope, and objectives of the JAD session, selecting the JAD team, invite and obtain commitment to attend sessions from the appropriate stakeholders, and schedule the session. It is important to obtain management commitment to support the process and identify the appropriate stakeholders.

Research Product: Become more familiar with the product or service, gather preliminary information, obtaining any models.

Prepare: Prepare any visual aids, developing a realistic agenda, training the recorder, and preparing the meeting room.

Conduct Session: Follow agenda to gather and document the project needs and requirements. It is important to ensure all participants are given equal treatment during the process.

Draft the Documents: Prepare the formal documents. The information captured in the JAD session is further refined through analysis efforts, open questions or issues discovered through the sessions are resolved, and the final document is returned to stakeholders for review and validation.

Roles The JAD team is the very heart of the JAD process and the selection and inclusion of stakeholders are critical to the overall success of a JAD session. The team should consist of a mixture of skills from a variety of individuals. The participants may include Business Process Owners, Operations Managers, Client Representatives, Business Analysts, Business Managers, End Users, Data Administrators, Systems Analysts, System Designers, Business Analysts, Advisors Project leaders, Auditors, Security, Standards, Vendors, Quality Assurance, Contingency Planners, Production Planners, IT Specialists, Human Resource Representatives, and Trainers.

Interview **Flash Card 31**

Interviews of users and stakeholders are important in creating wonderful software. Without knowing the expectations and goal of the stakeholders and users, you are highly unlikely to satiate them. You also have to understand the perspective of every interviewee, in order to properly address and weigh their inputs. Like a good reporter, listening is a quality that assists an excellent analyst to gain better value through an interview as compared to an average analyst.

An interview is a systematic approach to elicit information from a person or group of people in an informal or formal setting by talking to the person - the interviewee, asking relevant questions and documenting the responses. (This section considers the business analyst in the role of interviewer.)

Advantages: Generally easy, because it can be done with minimal preparation. Interviews of individuals and small groups require less planning and scheduling effort than large workshops. Interviews of individuals and small groups require less stakeholder commitment than large workshops. Interviews provide an opportunity to explore or clarify topics in more detail.

Disadvantages: The questions used in the interview may reflect the interviewer's

preconceived ideas, which can influence the responses. For projects with a large number of stakeholders the interviews technique can be time-consuming and inefficient. Conflicts and inconsistencies between stakeholder information need to be resolved in additional interviews. This technique does not allow different stakeholders to hear and elaborate upon the information being relayed.

Prototyping Flash Card 31

Screen mockups can support the requirements gathering process when introduced at the right time, but if introduced too early they can become problematic. Here are a few key points that an analyst should remember.

1) Mockups are nice because they help the business representatives or clients visualize the functionality of the system. This can be a big advantage to help analysts and stakeholders identify problems early on. However, if introduced too soon in the process the natural tendency is for the business reps/clients to try and be screen designers. Instead of stating that the system shall support "x", they beginning saying that they need a dropdown to capture "y" and a button to do "z". The client is not a UI designer; in fact few business analysts truly are, so this can lead to a screen design which does not have an appropriate emphasis on usability. Similarly, specifying the controls needed on a screen detracts from the true requirements of the system and often results in an inadequate level of discussion around why a system must support certain functionality.

2) When requirements are captured in screen mockups with no supporting requirements list, it becomes impossible to know whether an early screen design decision was made because it supports a necessary requirement or if it was made for some other reason. How can the analyst and developers know whether they can eliminate or alter the screen feature without losing an important requirement. Questions like, "Do we really need to have the control on this screen, or can we capture the data at a later point in the process?" becomes unanswerable without going back to the original stakeholders. And, on complex projects no one stakeholder may be able to answer the question.

3) Screen mockups alone cannot capture the flow through the system. Often analysts will accompany screen mockups with a written description of what happens when certain buttons are clicked or when certain values are entered within a field or dropdown. These descriptions are helpful, but they fall short of describing the end to end processes that the system must support. Further document such as process flows or use cases are required, but often overlooked when too much emphasis is place on screen mockups during the requirements gathering process. While analysts and stakeholders who are involved in the screen mockup process may have a basic understanding of the processes supported, developers and testers will not.

Questionnaire (Survey) Flash Card 31

Questionnaires can be useful for obtaining limited system requirements details from users / stakeholders, who have a minor input or are geographically remote. The design of the questionnaire (whether off line or web based) and types of questions are important and can influence the answers, so care is needed.

Advantages: Can send to many hundreds of users at a low cost. Good for getting input from users who are a long distance away. Receive written replies which can be easier to work with and analyze, and save time typing.

Disadvantages: Questionnaires can be slow to create. You may not get a good response, as filling in questionnaires is often a low priority for many people. Recipients may feel 'left out' when they really wanted more input

6.1.3 Sort Requirements(Define Requirements)

Requirements Definition
It is the process in which scattered requirements are put together and redundancy is removed
The inter related requirements are linked

Key Tasks are
Define Stakeholder needs
Identify Business needs and divide them into functional and non functional requirements
Create group of similar requirements
Create supporting artifacts

6.1.4 Prioritize Requirements

Technique for queuing the requirements for the development process

Factors that influence
Importance, risk, cost, benefit, time and strategy
3 main actors
Customers
Developers
Business Owners

Techniques
100 Dollars Test
Top 10 requirements
Numerical Assignment -Mandatory, very important, rather important, not important, does not matter

MoSCoW
is a prioritization technique used in business analysis and software development to reach a common understanding with stakeholders on the importance they place on the delivery of each requirement - also known as MoSCoW prioritization or MoSCoW analysis

The MoSCoW method can help. MoSCoW stands for must, should, could and would:
M - Must have this requirement to meet the business needs.
S - Should have this requirement if possible, but project success does not rely on it.
C - Could have this requirement if it does not affect anything else in the project.
W - Would like to have this requirement later, but it **won't** be delivered this time.

Flash Card – 32

6.1.5 Validating Requirements

FURPS

FURPS is an acronym representing a model for classifying software quality attributes (functional & non-functional requirements):

Functionality - Feature set, Capabilities, Generality, Security
Usability - Human factors, Aesthetics, Consistency, Documentation
Reliability - Frequency/severity of failure, Recoverability, Predictability, Accuracy, Mean time to failure
Performance - Speed, Efficiency, Resource consumption, Throughput, Response time
Supportability - Testability, Extensibility, Adaptability, Maintainability, Compatibility, Configurability, Serviceability, Installability, Localizability, Portability

The model, developed at Hewlett-Packard, was first publicly elaborated by Grady and Caswell. FURPS+ is now widely used in the software industry. The + was later added to the model after various campaigns at HP to extend the acronym to emphasize various attributes.

CUCV

There are several qualities regarding a good requirement but the most outstanding ones include the:
Clarity – the requirement should be clear enough to be understood by its users.
Understandable – the requirements should be put in a manner easy to understand by users of all levels.
Consistent – the requirement should be such that it doesn't contradict itself, it is important noting that during system development, all users need to be consulted, including the managers as well as the junior staff, one would find that the managers would like a wider control of the system so as to monitor the junior staff to the date whereas the junior staff are objecting these view, hence a contradiction. When this issue is not considered carefully, usually through consultation or negotiation either the managers or junior staff may resent the system thus by this, once the users resent the system, obviously it will not be exploited to the maximum thus lowering the benefits the organization derives from it thus consistency must always be considered in the system development requirements.
Verifiable – The requirements of a given system should always be verifiable as in they should be put in a manner that can be checked across in future so as one can clearly identify whether the particular requirement has been met or not, it is usually advised that the requirements are put in a manner that during verification, the answer is either true or false and nothing vague as it is during this stage that legal action can be taken by the either the contractor or client if at all the answer is no and always with the law, matters of doubt are generally not recommended.

CAE

Complete
Accurate
Executable

APVU

Authorized
Prioritized
Verifiable
Unique

SMART

A well formed Requirement should comply with SMART
Specific
Measurable
Attainable
Realistic
Traceable / Time bound

Flash Card – 33

6.2 Business Requirements Management

6.2.1 Requirements Communications

Communications is one of the pillars in the process of project completion and helps in explaining the tasks and responsibilities to different stakeholders
BA s use different techniques to communicate the requirements like presentations, seminars, workshops, data models, graphs, images

Main Points
Easy to understand
3R Concept - right people right thing and right time

6.2.2 Requirements Management

Requirements Management is all about processing the elicited requirements to implement the most suited solution
It helps in linking the business goals and objectives to the actual solution that is constructed and delivered.

Key Points
Elicitation of Authentic sources
Validation
Defining the priorities
Version Control and Traceability

6.2.3 Requirements Organization

Is the process to define, prioritize and implement the same
Requirements are organized as per the vision of the enterprise
3 sections
Requirements Definition
Requirements Modeling
Requirements Verification

Requirements Modeling
Is the process of representing requirements via graphs, models, prototypes and diagrams

Criteria for Requirements Modeling
Must represent complete structure
Possible risks are defined
Should not show redundant information
Represented in an hierarchy
Fulfill the needs of wide range of audience for different backgrounds

Requirements Verification
Is the process of verifying the characteristics of the requirement?
It approves that the requirements can be implemented without any threat to Quality Standards
Main Stakeholders are Business Analysts, technical experts, domain experts, and customer representative

6.3 Business Solutions Evaluation and Implementation

6.3.1 Business Solutions

BA and SME, Solutions Architect will decide best solutions for requirements. Business Solutions are assessed with respect to market Space and Financial Status of organization

The selected solutions should ensure that they meet the agreements of the stakeholders, enhance the business values and do not contradict the organizational Structures

Activities by a BA

The technique to ensure that the implemented solution delivers value to the Organization . It helps in identifying the defects and issues raised while developing the solutions.
The output is compared with the acceptance criteria approved by business owners

Verification Vs Validation
Validation – If the solution is right for the product

Is the process to determine the credibility of the implemented solution
Evaluate the after effects of deployment on the current process
It helps in taking appropriate actions against the reported issues and in finding the reason behind occurrence of the issues

Tips to BA

6.3.5 Solution Implementation

Is the process to implement the approved solution
BA monitor the progress
It is also influenced by the decisions of the key staff members

Owners are communicated of the solution and agreed by conducting a brain storming session

6.3.2 Solution Assessment

Solution Assessment considers the tasks and activities performed by a BA to deliver Value to the organization

- Assess proposed Solutions
- Requirements Allocation
- Organizational readiness Assessment

6.3.3 Solution Validation

Verification – if the Solution delivered right product

Tips to BA
Focus on Strategic Alignment of the solution
Work with QA Team to check results
Raise the defects immediately to avoid raise in expenses
Analyze the alternate solutions for the business Continuity

6.3.4 Solution Evaluation

Have a good understanding on the business needs
Report and discuss the variations with responsible stakeholders
Evaluation is the continuous process and hence the coordination with the responsible teams are required

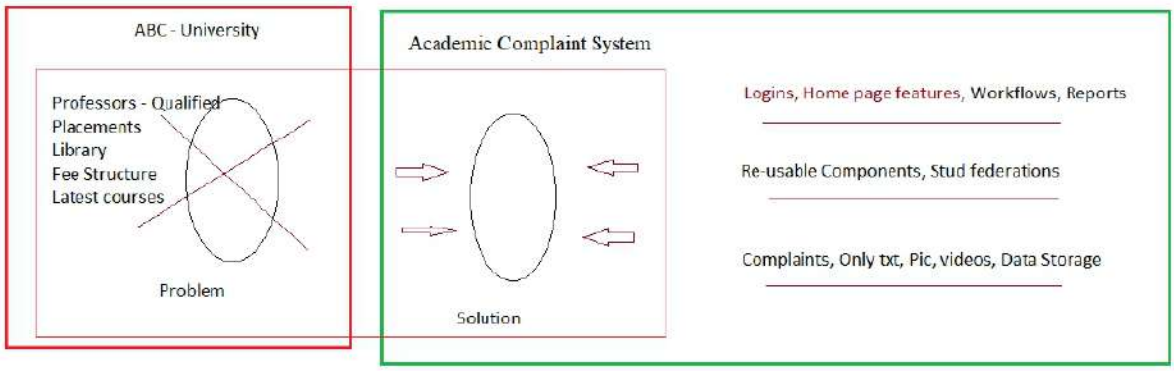
Tips to BA
Involve the key stakeholders to cascade the events
Be aware of the changes to discuss the details with stakeholders

Case study on renowned ABC University

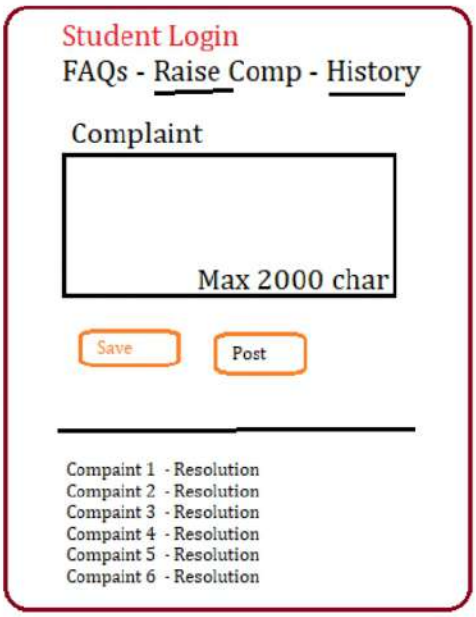
How to gather requirements from the Dean / Vice Chancellor

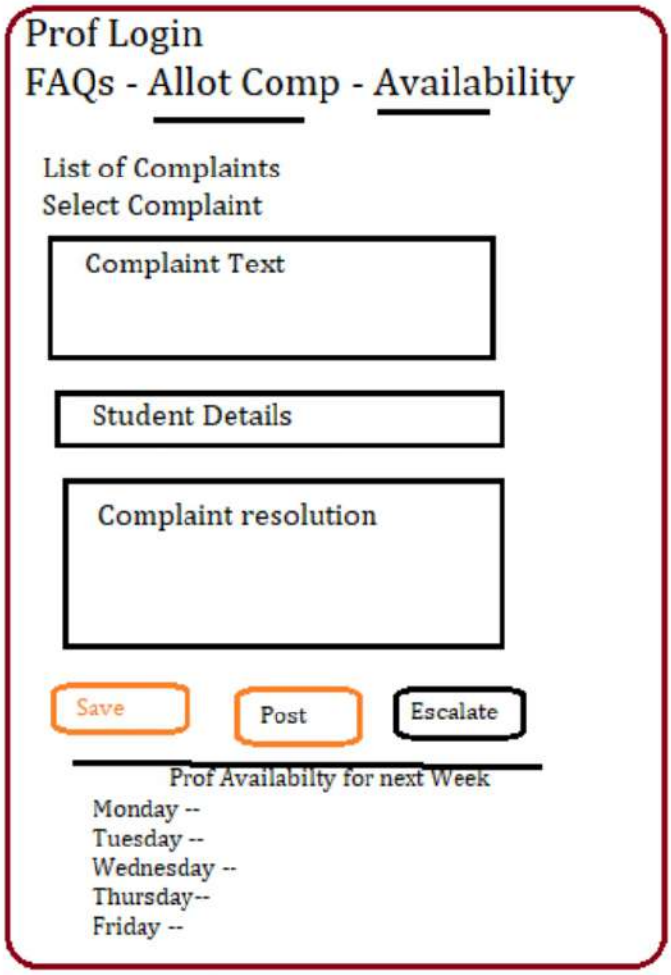
ABC University is a renowned educational body in US, where students from all over the world come for study. In the recent past they observed a downward trend in the number of enrollments (70,000 enrollments 3 years back and now it is 40,000). University observed that there is growing dissatisfaction amongst students and the reasons are beyond their perspective

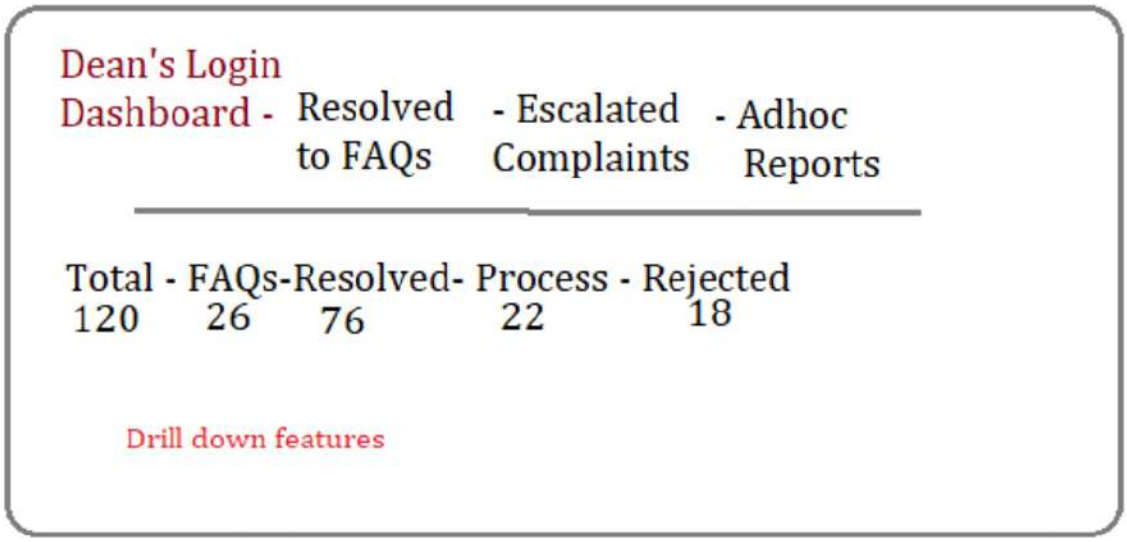
Now you are being called to provide an Academic Complaint system where in students can lodge complaints through the existing university portal and these complaints could be resolved. All the professors' act as mentors and the respective professors allocated to each complaint will interact with students and resolve the problem. End of the day the chief mentor should be able to query the system for no. of complaints resolved successfully to take strategic decisions for the betterment of the university.



Sample Workflow and sample page designs




Prof Login
FAQs - Allot Comp - Availability
List of Complaints
Select Complaint
Complaint Text
Student Details
Complaint resolution
Save
Post
Escalate
Prof Availabilty for next Week
Monday --
Tuesday --
Wednesday --
Thursday--
Friday --


Dean's Login
Dashboard - Resolved to FAQs - Escalated Complaints - Adhoc Reports
Total - FAQs-Resolved- Process - Rejected
120 26 76 22 18
Drill down features

Guidelines to Probe into Requirements

How to ask Questions

As a Business Analyst, kindly understand that we are trained to extract requirements from the Stakeholders and the Stakeholders are not Trained to share requirements with the Business Analyst.

1. While Asking Questions, we should probe into 5W 1H of that concept (Why, What, Who, Where, When and How) and confirm the Requirement is SMART before accepting it for development.
2. Understand and identify the right Stakeholders through RACI Matrix
3. Understand the base version of an IT Application – as discussed in OOA (about data and Objects)
4. Refer to 3 Tier Architecture.
    a. Application Layer – Questions can be
        i. How many Logins you require
        ii. How many Users will be using the system
        iii. How many users currently will use the application
        iv. Home page Features and Functionalities
        v. What reports you will require
        vi. Business Rules
        vii. Business requirements
        viii. Availability
        ix. Reliability
    b. Business Logic layer – Questions can be
        i. Reusable Components
        ii. Frequently Changing Components
        iii. Governing Body rules and regulations, Compliances
        iv. Third party Plug-ins like payment gateways, mail servers, Printer
    c. Database layer
        i. Database components
5. UML Diagrams
    a. Use case Diagram
    b. Use case Spec
    c. Activity Diagram
6. Models – (Design in BABok V3)
    a. Domain Model
    b. Conceptual Model
    c. Data Model
    d. DFD
    e. ER Diagram
7. Screens / Pages are consequence of Matured Functional Requirement. Please do not design screens and pages beforehand. Once the functional requirements are freezed, then we can go ahead to design Screens/Pages.

Any Information which you gather should fit into any of the sections of 3 Tier, UML, Models, & Page designs , otherwise it is just an information or a non-functional requirement.

Sign offs (Confirmations) should be taken on all Documents, Diagrams, SDLC Stages from responsible Stakeholders.

7 BA Strategy - Contribution of BA in Projects

7.1 Enterprise Analysis

Enterprise Analysis describes how business analysts identify a business need, refine and clarify the definition of that need, and define a solution scope that can feasibly be implemented by the business. This describes problem definition and analysis, business case development, feasibility studies, and the definition of solution scope.

SWOT Analysis

Flash Card – 34

SWOT is an acronym for Strengths, Weaknesses, Opportunities and Threats. It is a model used to understand influencing factors and how they may affect an initiative.

Conduct a brainstorming session to complete each section in the grid. Strengths and Weaknesses are factors internal to the organization, organizational unit, or solution, while Opportunities and Threats are external factors.

Strengths: Anything that the assessed group does well. May include experienced personnel, effective processes, IT systems, customer relationships, or any other internal factor that leads to success.

Weaknesses: Those things that the assessed group does poorly or not at all. Weaknesses are also internal.

Opportunities: External factors that the assessed group may be able to take advantage of. May include new markets, new technology, changes in the competitive marketplace, or other forces. Opportunities exist beyond the scope of control of the assessed group; the choice is whether or not to take advantage of one when it is identified.

Threats: External factors that can negatively affect the assessed group. They may include factors such as the entrance into the market of a new competitor, economic downturns, or other forces. Threats are also outside of the group's control.

Strengths

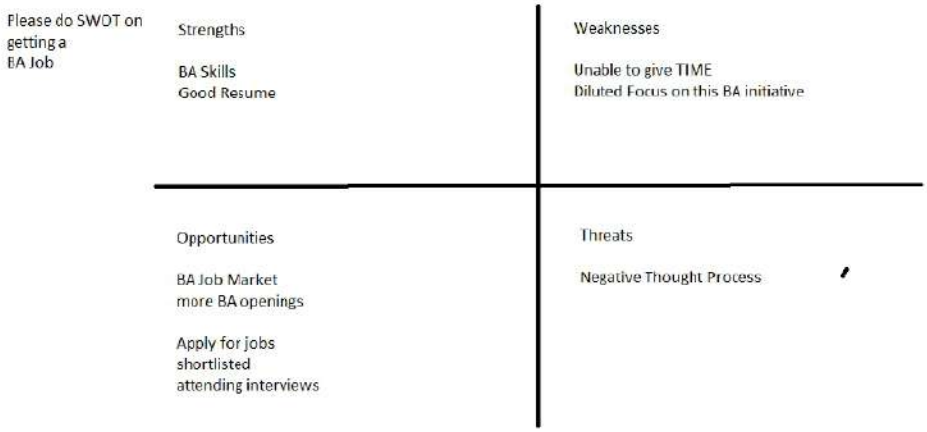
- Advantages of proposition?
- Capabilities?
- Competitive advantages?
- USP's (unique selling points)?
- Resources, assets, people?
- Experience, knowledge, data?
- Financial reserves, likely returns?
- Marketing - reach, distribution,awareness?
- Innovative aspects?
- Location and geographical?
- Price, value, quality?
- Accreditations, qualifications,certifications?
- Processes, systems, IT,communications?
- Cultural, attitudinal, behavioral?Management cover, succession?

Weaknesses

- Disadvantages of proposition?
- Gaps in capabilities?
- Lack of competitive strength?
- Reputation, presence and reach?
- Financials?
- Own known vulnerabilities?
- Timescales, deadlines andpressures?
- Cash flow, start-up cash-drain?
- Continuity, supply chainrobustness?
- Effects on core activities,distraction?
- Reliability of data, planpredictability?
- Morale, commitment, leadership?
- Accreditations, etc.?
- Processes and systems, etc.? Management cover, succession?

Opportunities
- Market developments?
- Competitors' vulnerabilities?
- Industry or lifestyle trends?
- Technology development andinnovation?
- Global influences?
- New markets, vertical,horizontal?
- Niche target markets?
- Geographical, export, import?
- New USP's?
- Tactics - surprise, majorcontracts, etc.?
- Business and productdevelopment?
- Information and research?
- Partnerships, agencies,distribution?
- Volumes, production, economies?
- Seasonal, weather, fashioninfluences?

Threats
- Political effects?
- Legislative effects?
- Environmental effects?
- IT developments?
- Competitor intentions - various?
- Market demand?
- New technologies, services,ideas?
- Vital contracts and partners?
- Sustaining internal capabilities?
- Obstacles faced?
- Insurmountable weaknesses?
- Loss of key staff?
- Sustainable financial backing?
- Economy - home, abroad?
- Seasonality, weather effects



GAP ANALYSIS

A comparison of the current state and desired future state of an organization in order to identify differences that need to be addressed.
GAP analysis is a process typically performed by Business Analysts and Project Managers for a
The delta or difference between the current process and the future prospects in known as GAP. GAP Analysis revolves around
Where are we?
Where do we want to be?

GAP analysis provides a foundation for measuring investment of time , money and company or a line of business within a larger organization. Gap analysis is an assessment tool used to find the deviation or gap between what exists versus what is needed or desired.

human resources required to achieve a particular outcome.
There is no formal method to conduct GAP Analysis. A simple excel sheet can be used for the purpose

Main Points
Good Understanding on the current process

All the business affecting factors must be well defined
No ambiguity in the requirements and future prospects
Adorn the gaps using graphs, Charts and images
Include the feedback from the stakeholders
Inform the involved parties about the identified gaps.

Different stages in GAP Stages

Review System
Develop Requirements
Comparison
Implications
Recommendations

Gap Analysis is one of the best procedures followed by any organization to improve the process and recognize the processes which needs improvement

Feasibility Study

Possibility of doing a project within some constraints like Technology, Budget and Time.

Idea - Can it be turned into technology?
Estimate the Solution Building cost
Prove that it can be done

For small, relatively straightforward efforts, the solution approach can be determined by the business analyst alone or with a small team of experts examining the approaches in an informal working session. For larger change initiatives requiring significant investment, a more formal feasibility study may assist with determining the most viable solution option.
A feasibility study is a preliminary analysis of solution alternatives or options to determine whether and how each option can provide an expected business benefit to meet the business need. A feasibility study may address either a business problem to be resolved or a business opportunity to be exploited. Formal feasibility studies use reliable data and apply statistics and market research to identify and analyze potential solution options.
The feasibility analysis is an integral part of formulating a major business transformation project, e.g., re-engineering a core business process and supporting technology, establishing a new line of business, increasing market share through acquisition, or developing a new product or service. Abbreviated studies may also be conducted for change initiatives requiring lower investments.

Root Cause Analysis

Flash Card – 35

What is a problem?
An event which hinders the smooth flow of the process is termed as an issue and the reoccurrence of the same event over a period of time is termed as problem
For the smooth functioning of the processes, it is necessary to mitigate the occurrence of the problem.
Finding workarounds for an issue is an immediate fix and helps in avoiding the business outages. Getting into the roots helps in removing the main cause of the defects.
Every issue comes with it's own background and has a different theory attached to it's occurrence.
The RCA helps in getting the exact reason of the problem. RCA should be performed as soon as the defect or variance is detected to avoid major problems in the future.
It's recommended to involve the stakeholders while conducting the RCA. Involving

Stakeholders helps in getting away from the fictionalization of the facts.

Technique – 5 Why

The five why is a question asking technique used to explore the effects underlying a particular problem.
This technique is used to get the root of what has caused the issue in a single instance. For each answer given, a further why is asked...
There is no format of framing the questions but how well the questions are framed definitely help in getting the pertinent cause of the problem.

Limitations

The tendency of investigators to stop at symptoms rather than going on to lower level root causes. Lack of knowledge of the people involved In finding the root cause.
Lack of support from the concerning team to find the answers to the questions framed
Sometimes results will have no orientation to the issue.
Tendency to isolate a single root cause.

Tabular Method – Technique

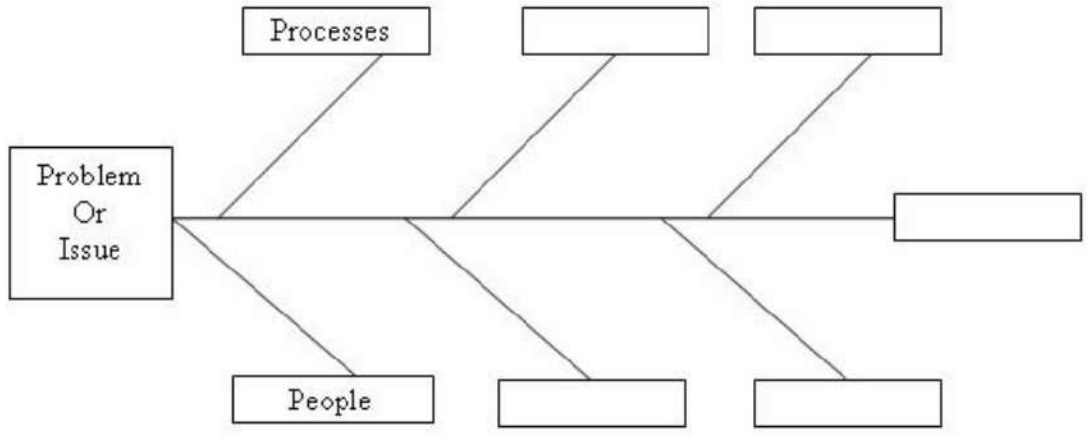
It is a process to prepare a checklist or table of actions related to the current running processes in any organization . In case of failure , the master check list is referred to find deviation. This process is limited for simple and direct actions.

Fishbone Diagram

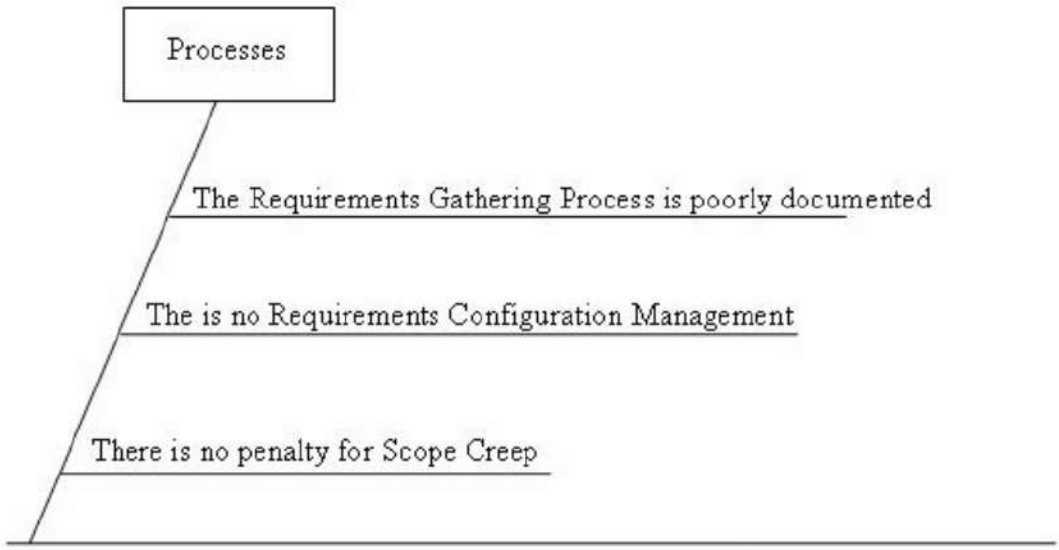
The Root Cause Analysis Process is also known as the "Ishikawa Diagram," the "Fishbone Diagram," and the "Cause-and-Effect Diagram." These tools make it possible to identify all of the roots (basic causes) in a retrospective approach, or, all of the potential effects (possible outcomes) in a prospective approach.

Ishikawa identified five (5) key areas which occur repeatedly in either type of analysis:

1. People
2. Processes
3. Machines
4. Materials
5. Environment



Fish bone diagram



Cause-and-Effect Diagram with Initial Level of Detail

Decision Analysis

The technique of making decisions during the uncertain, complex and difficult situations to root out the dilemma avoiding the unknown factors is termed as Decision Analysis.
This requires different mathematical and economical calculations before affirming the decision on any problem.
The BA s involved in the decision analysis follow business model or hierarchical approach to confirm the decisions on certain plans.

Factors

The individuals involved in the decision Analysis keep the tab on the financial and non-financial factors affecting the organization

The financial factors consider the organizations past and present performance to decide the next steps.

Financial Factors

Current situation of the organization in the market space
Overall profit margins in the previous Quarters and years
Breakeven of the resources in the organization
The net asset value of the bonds.

Non- Financial Factors

The incomplete, informal and uncertain information about the processes
The availability of the different options affecting the progress of current process

Strategy Analysis

Strategy is the direction and scope of an organization for the long term, which helps in getting profits for the business or units through it's implementation

Strategy helps in dealing with

- Goal and vision of the business
- Resources involved
- Environment

Effecting factors

External Environmental Analysis
Internal Environmental Analysis

External Environmental Analysis

There are different frameworks followed by the organizations to assess the external Environment Factors and to define the strategies pertinent to the current structure.
PESTLE Technique and Porter's Five force Model

PESTLE Technique

Is an external analysis designed to examine many external elements affecting a business and it's operations

- Political
- Economical
- Sociological
- Technological
- Legal
- Environmental

Porter's Five force Model

- Bargaining power of potential Customers
- Bargaining power of suppliers
- Availability and value of alternative services or products
- Threats of new Entrants
- Rivalry or Competition among the existing organization

Internal Environmental Analysis

The successful strategies depend on the capabilities of the organization to perform. The Internal Environmental Analysis answers following Questions.
Can an Organization Constantly work to fit in the changing conditions?
Can the resources be always innovative to mark the presence?

MOST Analysis Technique

MOST Analysis is the Internal Environmental Analysis Technique

- Mission
- Objectives
- Strategy
- Tactics

Enterprise Architecture Frameworks

Zachman Bigger organizations
POLDAT Smaller Organizations
TOGAF The Open Group Architecture Framework

Flash Card – 36

A variety of frameworks, tools and techniques are employed to create and maintain the Business Architecture. The value of a framework is that it provides compartments in which to place predefined architectural products or outputs, thus providing order and structure to the components. Examples of architectural frameworks include the following.

The Zachman Framework

	DATA *What*	FUNCTION *How*	NETWORK *Where*	PEOPLE *Who*	TIME *When*	MOTIVATION *Why*
Objective/Scope (contextual) *Role: Planner*	List of things important in the business	List of Business Processes	List of Business Locations	List of important Organizations	List of Events	List of Business Goal & Strategies
Enterprise Model (conceptual) *Role: Owner*	Conceptual Data/ Object Model	Business Process Model	Business Logistics System	Work Flow Model	Master Schedule	Business Plan
System Model (logical) *Role:Designer*	Logical Data Model	System Architecture Model	Distributed Systems Architecture	Human Interface Architecture	Processing Structure	Business Rule Model
Technology Model (physical) *Role:Builder*	Physical Data/Class Model	Technology Design Model	Technology Architecture	Presentation Architecture	Control Structure	Rule Design
Detailed Reprentation (out of context) *Role: Programmer*	Data Definition	Program	Network Architecture	Security Architecture	Timing Definition	Rule Speculation
Functioning Enterprise *Role: User*	Usable Data	Working Function	Usable Network	Functioning Organization	Implemented Schedule	Working Strategy

It is helpful to use a defined framework that provides a common structure and classification scheme for descriptive representations of an enterprise. One such framework that has been widely adopted by organizations both public and private is the Zachman Framework for Enterprise Architecture developed by John Zachman.
The framework provides common language and common structure for describing an enterprise. Without a unifying framework, the fundamental design of an organization may not result in an integrated, well functioning enterprise, which leads to redundancies, inefficiencies and integration issues. The Zachman Framework is both complex and comprehensive, and is presented in a six by six matrix format,
where: **The columns** represent the questions that must be answered to design a business entity:

- What (data and entities)

- How (process or function)
- Where (location and network)
- Who (people)
- When (time)
- Why (motivation).

Whereas, **the rows** of the framework describe the different perspectives of the enterprise:

- Scope
- Business Model
- System Model
- Technology Model
- Detailed Representations.
- Functioning Enterprise

The POLDAT Framework

Another, simpler structure that is often used in business process re-engineering projects is the POLDAT framework. This model develops documents, tables, matrices, graphs, models and organizes them in the following categories:

- **Process** – the business processes that flow value from the organization to the customer.
- **Organization** – the organizational entities that operate the business processes, including the management teams, staff positions, roles, competencies, knowledge and skills.
- **Location** – the location of the business units and other organizational entities, e.g., call centers, distribution centers, etc.
- **Data** – the data and information that is the "currency" of the organization, flowing through the processes to accomplish the business functions.
- **Applications** – the information technology (IT) applications that enable the business processes to operate efficiently and provide decision-support information to the management team.
- **Technology** – the enabling technology that supports the operation of the processes and applications.

Scope

Solution Scope Definition.

The solution is described in terms of the major features and functions that are to be included, and the interactions that the solution will have with people and systems outside of its scope. State in-scope and out-of-scope components of the solution. Describe the business units that will be involved, business processes to be improved or redesigned, process owners, and IT systems and other technology that will likely be affected.

Business Case

Flash Card – 37

Business case is prepared by Sr BAs, Solution Architects, Business Architects and Sr. Business Managers. Business Case will have following information

- Why is this project initiated?
- What are the current problems?
- With this project how many problems could be solved?
- What are the resources required?
- How much organizational change is required to adopt this technology?
- Time frame to recover ROI(return on investment)?
- How to identify stakeholders?

Once a Business Case is prepared, it is submitted to the management of IT Company. Management will analyze the facts and figures and considers the feasibility of the project. Management will call for an Investors meeting and explain to the investors about this project on how much investment is required, risk factors, how returns will come. If the investors show interest in investing in this project, then the IT Company will go ahead and accepts SOW from the Client.

Enterprise Analysis gives us the context of the project or the requirements.

Strategy Analysis (Previously known as Enterprise Analysis)

Analyse the current State
Define the Future State
Assess Risks
Define Change Strategy

Daily BA will do Strategy Analysis to drive everyday's BA Contribution

How to do SWOT Analysis on Oneself

1) List down all your Failures (minimum 15)
2) For each failure – write down minimum 10 points – what made you fail – start with the first point should be that you are 100% responsible for the failure –
3) For each failure – write down minimum 10 points –how did you recover from this failure –
4) Present day – this failure is about rehappen - same context and situation is happening – then with present mindset – how you are going to handle it now
5) From points 2,3,4 – we will get some 300+ statements.
6) Read each statement from point 5 and assess which segment it belong in SWOT and place it there
7) Summarize your SWOT and realize it. This is REAL YOU. Your character.
8) Once you realize yourself in the right way, now act accordingly so that You will minimize conflicts and maximize benefits

How to prepare UNIQUE answers to FAQ

SWOT YOU + BA behavioral Skills + Answer/ Approach + BA Terminology like Document names, tools names, process names = UNIQUE Answer

7.2 Business Analysis Planning

Business Plan

Plan is designed before the kick off of the Business Case and retains the credibility throughout the development

A Business plan is a document which contains the set of activities, capabilities and considerations defined for any organization or enterprise in order to achieve the desired outcome or result. The plan comes with certain risks and threats to the organization which are balanced with the strengths and opportunities of the organization.

Business Analysis Planning

BA s will plan how they will handle requirements, Change requests, documents, tools and communicate the same with all stakeholders.

Plan the BPA Activities

During the Business planning the different deliverables of the Business Analysts are identified and efforts required against those deliverables are calculated. This is done to define the scope of the work of the Business Analysts and it help the BA s in identifying the duration of the activities.

Planning Factors

Approach of the BA s
The standards followed by the organization
Type and location of the stakeholders
Assessment process of the organization
Type of the project

Business Communication Scheduling

Business Communication Scheduling and planning includes the process to DEFINE, distribute, update and escalate the information and data from the different stakeholders to responsible Stakeholders

Business Communication works on 3W concept

Who
What
When

The Communication Scheduling is done considering different factors

Physical location of the stakeholders
Authority and Responsibility of the stakeholders
Type of Data
Type of the Project

Performance Monitoring

The functioning of the activities performed by BA s during the different stages of development are monitored and tracked under performance monitoring

Performance measures, reporting and corrective actions play a vital role for performance monitoring

Techniques

Stakeholder interviews
Customer Satisfaction Index
Process Analysis

Estimation

The technique of finding an approximation with the help of limited available information is known as Estimation. The estimation is done with sampled data or sources.

The estimation is a part of Business planning and it is the responsibility of BA s to estimate the factors related to cost, revenue, resource and future enhancements.

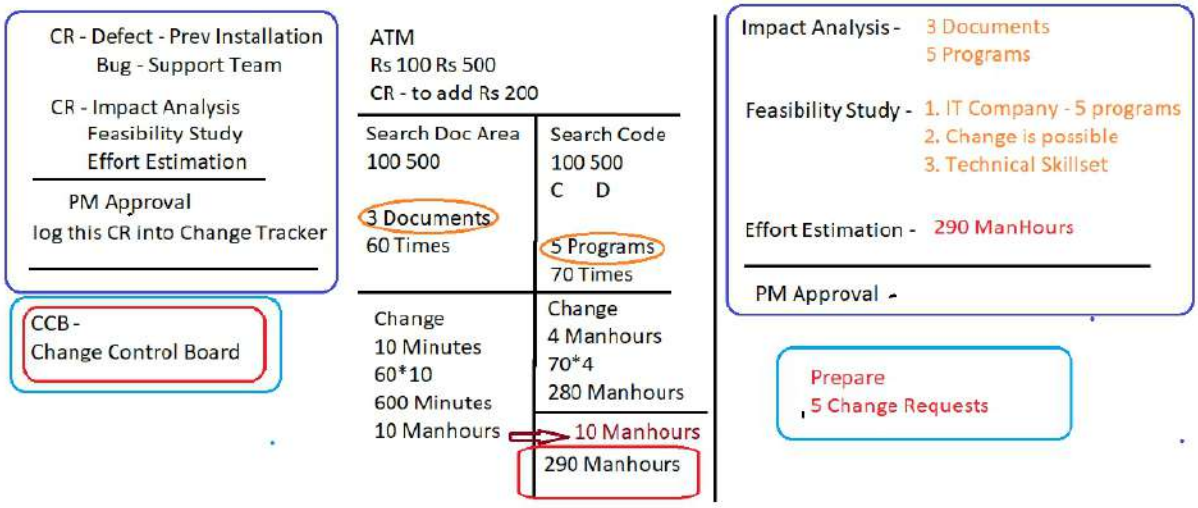
Estimate planning

Estimate planning is performed following the empirical data and methodologies instead of gut feeling of the BA s in order to avoid sloppy decisions. The estimations are supervised by senior managers who are skilled in resource allocation and budgeting in order to avoid any future ambiguities

7.3 Role of BA in handling Change Request

As BA will study and understand the characteristic feature of Requirement is Change over a period of time. As Requirements are inherent to Change, Requirements need to be managed throughout their life. People change their minds, preferences, trends, etc. over time. So as the Businesses change and Markets also change accordingly.

Flash Card – 38



As the project progresses through time (like a month or a year or long), it's inevitable that some things will change that affect the project and so your requirements may also change.

BAs always will be prepared for Change Requests and their management.
Whenever a Change Request comes from the Client, The BA will analyse this Change Request. Initially he performs Feasibility Study to accept the Change and then the Impact Analysis to measure change to project and finally Effort Estimation to implement the change in the project.

Change Management will impact the project scope. That means that any requirement which was not scoped as a part of the initial Business Requirements document, must be managed under a proper change management/control technique and the Business Analyst along with the Project Manager has to carefully review and follow a rigorous change control process. This means, when a change is requested, a Business Analyst should

- Initially the BA Documents the Change Request
- The BA will Analyze the Change Request is really a change or a defect discovered from previous need communications.
- The change manager or the project manager must provide an initial approval if the Business Analyst needs to move further in analyzing the change requested.
- When it comes to change management whether or not to incorporate the changes, depends on yet another important factor which is for the Business Analyst as well as the Project Manager to ensure whether the requested change is a complex one or just a minor change.
- In case the change is complex, it will not only expand the scope of the project drastically which in turn leads to increase the delivery time.

- Business Analysts will help the stakeholders to understand the impact, the change request will have on the organization and to help minimize negative impact that results from that particular change.
- Successful change efforts necessitate the Business Analyst to articulate a realistic or convincing vision that appeals to both internal and external stakeholders.

A BA must be able to communicate a sense of urgency among the stakeholders, lead by example, show strong personal commitment and enable stakeholders to contribute to their full potential.
Successful change management therefore, requires organization to overcome the challenge of bringing all stakeholders to an agreement/consensus about the changes to be incorporated and to avoid conflicts which generally causes delay in the project completion.

CCB – Change Control Board

Analyze and Prepare 5 CRs from your latest Project .

7.4 Role of BA in Projects

Stages	Activities	Artifacts & Resources
Pre project	Enterprise Analysis – SWOT Analysis, GAP Analysis, Market Research, Feasibility Study, Root Cause Analysis, Decision Analysis, Strategy Analysis, Enterprise Architectural Frameworks, Project Scope and Business case writing, Risk analysis	Business Case SOW (Statement of Work) PO (Purchase Order) Sr. BA, Business Architects Pre sales Consultants
Planning & Estimations & Assessment **Flash card – 2** **Flash card – 45** Project Kick Off (Big Picture Plan)	1. Understand Assumptions and Constraints along with Business Rules and Business Goals 2. Plan Packages for Big Projects 3. Understands the project plan from PM 4. BA conducts stakeholders Analysis 5. Plan BA approach strategy (Req. gathering techniques, communication, Req. mgmt, Documents to follow, Tools to use, Change Request Handling methodology)for this Project	PM Sr. BA
Requirements Gathering **Flash card - 39**	1. Stakeholders identify and document 2. Client gives BRD or BA prepares BRD by interacting with Client – Brainstorming , Document Analysis, Reverse engineering, Interviews, workshops, Focus Groups, Observation, Questionnaires . 3. Prototyping can be used by BA to make the Client to give more specific requirements 4. Sort the gathered Requirements (avoiding duplicate Reqs , grouping into similar functionality or into modules) 5. Prioritize requirements – MoSCoW 6. Validate Requirements - FURPS	BRD (Business Requirements Document) BA PM
Requirements Analysis **Flash card - 40**	1. Draws UML Diagrams (Usecase and Activity Diagrams) 2. Prepares Functional Requirements from Business Requirements 3. All Architects comes up with Technical Requirements (SSD) 4. SRS will have Functional Requirements and Technical Requirements 5. Takes Signoff on SRS from Client. SRS is the first legal binding Doc between the Business and the technical Team 6. BA prepared RTM from SRS before Design phase starts. (BA is the owner of RTM). 7. BA traces how requirements are dealt in each phase of development life cycle from Design till UAT	Functional Requirements Specification SSD(Supplementary Support Document) SRS (Software Requirements Specification) RTM (Requirements Traceability Matrix) BA PM Solution-Architect DB – Architect NW – Architect

Design **Flash card - 41**	1. From Usecase Diagram , Test Manager or BA will prepare Test Cases 2. Communicates with Client on the design and Solution documents (updates Status to Client and make them understand how the solution would look like to prepare them to drive UAT) 3. BA will initiate the preparation of End user manuals 4. updates RTM 5. From Use case Diagram Solution-Architect recommends Architecture of the IT solution 6. DB Architect uses Persistence Classes (Entity Classes) and comes up with ER Diagrams or DB Schema. 7. GUI Designer will look into Transient Classes (Boundary Classes) and designs all possible Screens for the IT Solution	Solution Document Design Document – HDD – ADD BA PM Solution-Architect DB – Architect NW – Architect GUI - Designer Test Manger
Coding **Flash card - 42**	1.BA organizes JAD Sessions 2. BA clarifies queries of Technical Team during Coding 3. Developers refer Diagrams and Transient (Controller Classes) of BA and code their unit 4. Update End user manuals 5. Update RTM 6. Conducts regular Status meetings with technical team and the Client and tuning Client for participation in UAT	LDD – CDD Application Development Team BA PM
Testing **Flash card - 43**	1.BA- Prepares Test Cases from Use Cases or assists Test Manager to do so 2. BA performs high level testing 3. BA prepares Client for UAT 4. Test Data is requested by BA from Client 5. Updates End User Manuals 6. Updates RTM 7. Take signoff from Client on Client Project Acceptance form	Test Concerning Documents Application with less errors Testing Team BA PM Client
Deployment and Implementation **Flash card - 44**	1.Forwards RTM to Client or the PM which should be attached to the Project Closure Document 2. Coordinates to complete and share End User Manuals 3. Plans and Organizes Training Sessions for End Users 4. Prepares Lessons learned from this project (to take precautions for coming projects)	

Appendix A - Documents

List of some of the Documents / Templates you may find in a Software Development Project

1. Request for Proposal (RFP)
2. Request for Information (RFI)
3. Request for Quotation (RFQ)
4. Business Case
5. Statement of Work (SOW)
6. Stakeholders Document
7. Kick off Meeting Report (KOM)
8. Software Development Plan (Tasks and Resources)
9. Project Plan (using MPP)
10. Quality Plan
11. Business Requirement Document (BRD)
12. User Requirement Document (URD)
13. Functional Requirement Specification (FRS)
14. Supplementary Specification Document (SSD)
15. Software Requirement Specification (SRS)
16. Requirements Traceability Matrix (RTM)
17. Functional Requirement Document (FRD)
18. Solution Document
19. High Level Design Document (HDD)
20. Application Design Document (ADD)
21. Low level Design Document (LDD)
22. Component Design Document (CDD)
23. Use case Description Document – Use case Specs
24. Change Tracker (CT)
25. Change Request Log
26. Status Reporting
27. Checklists
28. Test Strategy
29. Test Plan
30. Test Case Document - Test Scripts
31. Client Acceptance Form
32. Project Closure Document
33. Fit for Support Document
34. User Manuals

Company specific Templates

Every Company will have their own set of templates for all Documents that are to be used in a project. You are required to access these templates and prepare the concerning Documents.

Appendix B - Tools

Appendix B1 - Rational Suite

Rational Suite: Summary

The following table shows which tools are included with each edition of Rational Suite.

Rational Tool	Analyst Studio	Development Studio (Windows/Unix)	Development Studio - RealTime Edition	Test Studio	Performance Studio	Enterprise
Rational Unified Process	X	X	X	X	X	X
RequisitePro	X	X	X	X	X	X
ClearQuest	X	X	X	X	X	X
SoDA	X	X	X	X	X	X
Rose	Modeler Edition	Enterprise Edition	RealTime Edition		Enterprise Edition	Enterprise Edition
Robot				X	X	X
TestFactory				X	X	X
PureCoverage		X	X	X	X	X
Purify		X	X	X	X	X
Quantify		X	X	X	X	X
LoadTest					X	
Performance Architect					X	

Configuration management

Helps teams control their day-to-day management of software development activities as software is created, modified, built ,and delivered. Comprehensive software configuration management includes version control, workspace management, build management, and process control to provide better project control and predictability. forward engineering The process of generating code from a Rational Rose visual model.

Rational ClearCase

Provides comprehensive configuration management, including version control, workspace management, build management, and process control

Rational ClearQuest

A highly customizable Windows and Web-based change request management tool that lets users track any type of change activity – bug fixes, enhancement requests, documentation changes, and so on – throughout the software development lifecycle.

Rational PureCoverage

Automatically pinpoints areas of code that have not been tested

Rational Purify
Automatically pinpoints hard-to-find runtime memory errors in Windows NT applications.

Rational Quantify
Automatically pinpoints performance bottlenecks in Visual Basic, Visual C++, and Java applications.

Rational RequisitePro
Helps teams easily and comprehensively organize, prioritize, track, and control changing requirements of a system or application. Rational RequisitePro does this through a deep integration with Microsoft Word and a secure, multi-user database.

Rational Robot
Helps with functional testing by automating record and playback of test scripts. Lets you organize, write, and run test suites, and capture and analyze the results.

Rational Rose
The world's leading visual component modeling and development tool; lets you model software applications that meet current business needs.

Rational SoDA
Software Documentation Automation – Overcomes the obstacles of consolidating data from different development tools. Lets you automate the creation of comprehensive software, systems, and project documents from multiple sources.

Rational Suite
An easy-to-adopt-and-support solution that optimizes the productivity of analysts, developers, and testers – and unifies them, creating highly effective software development teams.

Rational Synchronizer
Uses rules, either predefined or user-supplied, to give you a quick start on new work. Creates or updates project items based on the existence of other items in your project, ensuring that details do not fall through the cracks.

Rational TestFactory
Automates reliability testing by combining automatic test generation with source code coverage analysis.

Rational Unified Process
A Web-enabled, searchable knowledge base that enhances team productivity and delivers software best practices via guidelines, templates, and Tool Mentors for all critical software development activities.

Tool Mentor
Step-by-step instructions on how to use a specific Rational tool to perform an activity described in the Rational Unified Process.

Version control
The process of tracking the revision history of files and directories.

- **Rational Suite Analyst Studio**

Edition of Rational Suite optimized for analysts. Contains the team unifying tools – Rational Unified Process, RequisitePro, ClearQuest, and SoDA – and Rational Rose (Modeler Edition).

- **Rational Suite Development Studio**

Edition of Rational Suite optimized for system developers and designers. Contains the team-unifying tools – Rational Unified Process, RequisitePro, ClearQuest, and SoDA – plus Rational Rose (Enterprise Edition), Rational Purify, Rational Quantify, and Rational PureCoverage.

- **Rational Suite Development Studio - RealTime Edition**

Edition of Rational Suite optimized for system developers and designers of real-time or embedded systems. Contains the team-unifying tools – Rational Unified Process, RequisitePro, ClearQuest, and SoDA – plus Rational Rose RealTime, Rational Purify, Rational Quantify, and Rational PureCoverage.

- **Rational Suite Enterprise**

Edition of Rational Suite containing all Rational Suite tools except Rational LoadTest.

- **Rational Suite Performance Studio**

Edition of Rational Suite optimized for test engineers who develop and run performance tests. Contains the team-unifying tools – Rational Unified Process, RequisitePro, ClearQuest, and SoDA – plus Rational Test tools, Rational Rose (Enterprise Edition), and Rational LoadTest.

- **Rational Suite Test Studio**

Edition of Rational Suite optimized for test engineers. Contains the team unifying tools – Rational Unified Process, RequisitePro, ClearQuest, and SoDA – and Rational Test tools

Appendix B2- Various Supporting Tools

- Documentation Tools
  - *MS Office*
  - *ThinkFree*
  - *Adobe Buzzword*
  - *Zoho writer*
- UML Drawing Tools
  - *MS Visio*
  - *Rational Rose*
  - *Smart Draw*
  - *Visual-Paradigm*
  - *Magic Draw*
  - *Concept Draw*
  - *Enterprise Architect*
  - *ArgoUML*
  - *StarUML*
  - *Case Complete*
- Prototyping Tools – Wireframe Tools
  - *JustinmindPrototyper*
  - *WireframeSketcher*
  - *Axure*
  - *iPlotz*
  - *Pidoco*
  - *Pencil*
  - *Microsoft Expression Blend*
  - *iRise*
- Screen capturing Tools
  - *Snagit*
- Business Modeling Tools
  - *ActiveModeler*
  - *eBPMN*
  - *AgilPro*
  - *iServer*
  - *Oracle Business Process Analysis (BPA) Suite*
- Software Development Process Model
  - *RUP*
- Change Management Tools
  - *Rational Clear Quest*
  - *Perforce*
  - *Affiniti*
- Brainstorming Tools
  - *Evernote – A note taking , brainstorming and web clipping tool*
  - *Free Mind – Free mind is a free mind mapping software written in java.*
- Meeting Minutes
  - *MeetingSense*

- SDLC Tools
  - *Microsoft Project Plan (MPP)*
  - *Pivotal Tracker – Agile*
  - *Rational Focal Point*
  - *ALM Complete*

- Database Tools
  - *Microsoft Access*
  - *ERwin Data Modeler*
  - *MySQL Workbench*
  - *SQLyog*
  - *PHPMyAdmin*
  - *Navicat*
  - *Microsoft SQL Server 2008 Management Studio Express*

- Reporting Tools
  - *Rational SoDA*
  - *Telerik*
  - *JReport*
  - *SQL Server Reporting Services (SSRS)*
  - *IBM Cognos Business Intelligence*
  - *Active Reports*
  - *Oracle Reports*
  - *Crystal Reports*

- Requirements Management Tool
  - *Rational Requisite Pro*
  - *Serena Requirements manager*
  - *Reconcile*
  - *Analyst Pro*
  - *IBM DOORS (Dynamic Object Oriented System)*
  - *Contour*
  - *Caliber*
  - *Blueprint*
  - *Ideascope (feedback)*
  - *Optimal Trace*
  - *iRise*

- Configuration (Version Control) Tools
  - *VSS (Visual Source Safe)*
  - *Win CVS (concurrent Versions System)*
  - *Rational Clear Case*
  - *Changeman (mainframes)*
  - *Serena PVCS (Polytron Version Control System)*
  - *TFS (Team Foundation Server)*
- Testing Tools
  - *Win Runner*
  - *Load Runner*
  - *Test Manager*
  - *Testing Anywhere*
  - *Bugzilla*
  - *Silk Test*
  - *Rational Robot*
  - *HP Quality Center*
  - *QTP (Quick Test Professional)*

- Analysis Tools
  - *Google Analytics – Web Analytics tool*
  - *Oracle OLAP (online Analytical Processing) – Oracle 11g*
  - *SSAS – Microsoft SQL Server Analytical Services*
  - *WebFOCUS*
  - *SQL Server Profiler*

- Enterprise Architecture
  - *TOGAF (The Open Group Architecture Frameworks)*
  - *ProVision*

Appendix C - Assignment Questions

1.1. Who is a Business Analyst ?
1.2. What are the responsibilities of a BA ?
1.3. How a BA contributes in Project
1.4. What is a Requirement? Howe many types of Requirements are there?
1.5. Who is a Stakeholder ? How many types of Stakeholders are there?
1.6. What is Business Process Model
1.7. Give BA Completeness Skill Areas.
1.8. Types of IT Companies
1.9. How an IT Company gets a Project
1.10. % of BA In Project Team Size and Project Duration
1.11. Metrics for project
1.12. Describe various Project Types
1.13. Reasons for project failure
1.14. In Audits, what a BA will be inspected?
1.15. Documents Naming Standards ?Why to follow ?
1.16. Explain 5W1H
1.17. Explain Risk
1.18. Discuss Thumbrules of a BA
1.19. Explain Dos and Donts as a BA

2.1. What are the various SDLC Methodologies you are aware of?
2.2. Explain Waterfall Model
2.3. What is the difference between Developer n Programmer
2.4. Application Design Document n Solution Document
2.5. Explain V Model
2.6. Explain various Servers, you know, about IT..
2.7. Explain RUP
2.8. Explain Spiral
2.9. Discuss Agile Manifesto
2.10. Explain Scrum
   a. Scrum Team
   b. Meetings
   c. User Story components
   d. Product Backlog – Sprint Backlog
   e. Product Burndown- Sprint burndown
2.11. Consider e-cart Project,
   a. what are the 6 features proposed?
   b. who are the users of the project?
   c. Write 100 User stories,
   d. write Acceptance Criteria for these user stories.
   e. Explain the Technique of estimating BV- Business Value from the Business Owner perspective
   f. Explain the technique of estimating CP – Complexity Points from the Scrum Developer Perspective
   g. What is velocity of the scrum team
   h. What questions are asked in daily scrum meetings
   i. What is product vision
   j. What is product grooming

2.12. Is there any chance that a company follows Agile and still you will find BRD, SRS documents.. explain your understanding.

3.1. Explain components of IT application
3.2. What are the basic parts involved in achieving a functionality in an IT application
3.3. Explain your awareness on Databases, tables, ER diagrams
3.4. Explain the Components of an IT Application
3.5. Explain about Database Design
3.6. Write about Data Mapping , APIs, Copy Books, Camel casing,
3.7. Explain the following
   a. Object
   b. Class
   c. Component
   d. Package
   e. Sub-systems

3.8. Discuss on
   a. Abstraction, Perito Principle, MVP, Gold Plating
   b. Encapsulation
   c. Inheritance
   d. Polymorphism
3.9. Explain about Relationships
3.10. What is Hardcoding and Soft Coding? What importance Classes have in Code.
3.11. How Classes communicate with each other?

4.1. Describe about Dynamic and Static UML Diagrams?
4.2. Explain about Use Case Diagram.
4.3. Discuss on
   a. Primary Actor
   b. Secondary Actor
   c. System Boundary
   d. Essential Use Case
   e. Supporting Use Case
   f. Generalization
   g. Include
   h. Extend
   i. Automation
4.4. Explain Guidelines for drawing a use case Diagram from a Case Study
4.5. Explain Use Case Spec .
4.6. Write a Use Case Spec for withdrawal of cash from ATM machine

5.1. What is your understanding about architecture.
5.2. Describe 3 Tier Architecture
5.3. Explain MVC Architecture.
5.4. What are MVC Rules to identify Classes from Usecases
5.5. What Guidelines we follow to placed identified Classes in 3 Tier Architecture
5.6. Draw a sample Sequence Diagram and identify it's Components
5.7. Explain Domain Model
5.8. Discuss about
   a. Conceptual model,
   b. data model,
   c. data flow diagram ...

6.1. What is an Activity Diagram
6.2. What is the difference between Activity Diagram and a Flow Chart
6.3. What are the Drawing elements of Activity Diagrams
6.4. What is the Approach to draw an Activity Diagram from a Case Study and identify it's Components
6.5. Please practice activity diagrams discussed in sessions atleast 5 times.
6.6. Eight case studies are given in page 124 of study material. Please draw activity diagrams
6.7. Explain Activity Diagram with swimlanes
6.8. What are the important points we need understand about an Activity Diagram

7.1. Explain about ILS approach in stakeholder analysis
7.2. Explain about RACI matrix of Stakeholder Analysis
7.3. Discuss about IIBA institute
7.4. How IIBA defined Business Analysis and Business Analyst
7.5. Explain the FIVE perspectives of Business Analysis as per IIBA..
7.6. Explain what a BA does in Requirements Gathering
stage
7.7. Discuss on following
   a. Brainstorming
   b. Document Analysis
   c. Reverse Engineering
   d. Focus Groups
   e. Observations
   f. JAD
   g. Workshops
   h. Prototyping
   i. Questionnaire
7.8. How do you prioritize Requirements
7.9. How do you Validate Requirements
7.10. Explain SMARTness of the requirements
7.11. ABC UNIVERSITY
Come up with page designs for student professor and Dean.
7.12. Write 30 Questions , so that you can ask Dean of ABC University and mention how much percent of Information, you could gather from these 30 questions

7.13. Explain SMARTness of a Requirement.
7.14. What points you should keep in your mind, before you ask any questions to your Stakeholders...
7.15. When you can consider that you have asked the right question to the stakeholder.

8.1. Explain Enterprise Analysis
8.2. Discuss on following
  a. Analysis
  b. SWOT Analysis
  c. GAP Analysis
  d. Feasibility Study
  e. Root Cause Analysis
  f. Decision Analysis
  g. Strategy Analysis
  h. Enterprise Architectural Frameworks
  i. Scope
  j. Business Case
8.3. Explain Role of BA in handling Change Request
8.4. Explain Role of BA contributions in traditional Project
8.5. Enterprise Analysis is now known as Strategy Analysis and have become a daily Activity for a BA – Explain this statement

(TOTAL – 84 Questions)

Appendix D - Answers to Situations

Answer to Situation 2 :

Hints : Feasibility Study -- Impact analysis -- Bridge : current status - the new requirement -- Priority 1 / valued customer -- Absorbing resources from other projects / functions -- employing more man power stretching of resources / OT / cancelling leaves -- procuring licenses and infrastructure -- keeping margins to bare minimum -- revisit SLA -- 30% buffer time

1. After receiving the Requirements from the Client, Acknowledge the Client with a Thank you note for sending the requirements and inform the Client that you will come back in couple of days after consulting your technical Team.
2. Consult your Technical Team and find out what can be done to meet these requirements. Suppose , Technical team says this is feasible and wants to have extra 3 more months for delivery of Solution.
3. Then communicate to Client by e mail that after much study on the extra requirements , the Technical team promised to deliver these Requirements in 5 Months time , by putting extra resources in this project as you are an esteemed Customer, we decided not to charge for the extra effort. After sending the email, make a personal call to the Client and explain him with Facts and ask for extra time.
4. Client will now negotiate on extra time and will say OK for 4 months.
5. Suppose if Client does not agree for more time, then pass on the same email to the Project manager. He will handle the situation.

Appendix E -More Case studies

1) Hospital Management System

The hospital has several specialized departments like Cardiology, Gynecologic, Orthopedics, Pediatrics, ENT etc. OPD is another independent department. A doctor is only associated with one specialized department at a time though he/she can be a member of the OPD(Outside Patients Department) department. Each doctor has a visiting time and day in a week.
At reception the patient details are entered and the fees are also taken and the patient is tracked on the basis of the Id generated.

In routine a patient can visit the doctors either directly selecting a doctor manually or by getting admitted to the hospital and then a doctor visits the patients.
A doctor can prescribe tests for the patient to perform . The patient visits the lab to get done the tests prescribed by the doctor. The reports are given to the patient. The payments pertaining to the tests are done at the reception. Referring the reports, the doctor prescribes the patient medicines or further tests or is asked to get admitted.
A patient is admitted into a ward of a specialized department (if available) as per the doctor's prescription. The number of wards is limited and if there is no vacant ward the admission of the patient is rescheduled.
As per the prescription of the doctor the patient is operated on a specified date and time as decided by the doctor who is doing the operation.
After the completion of the treatment a patient may get discharged on an advice of a doctor and upon the complete payment of all due charges at the reception. On payment of full dues the reception generates a discharge ticket for the patient

Valid considerations:

Inclusions

- Admin – Maintains the doctor time sheets,
- Lab in charge – upload fee details, upload reports.
- Pharma in charge – enter medicine payment details. And generating bills
- Every payment is routed to reception by maintaining CBS (centralized billing system)
- Patient is restricted to access the system

Exclusions - Not applicable

---

2) Point of Sale Terminal Management System

Construct a design element for Point of sale terminal management system that can be used for buying and selling of goods in the retail shop.

When the customer arrives at the post check point with the items to purchase. The cashier records each item, price and adds the item information to the running sales transaction. The description and price of the current item are displayed. On completion of the item entry the cashier informs the sales total and tax to the customer. The customer chooses payment type (cash, cheque, credit or debit).After the

payment is made the system generates a receipt and automatically updates the inventory. The cashier handovers the receipt to the customer.

Inclusion

- The customer chooses the payment type and the cashier will accept the payment and initiates the transaction.

Exclusions

- No need to model secondary actor for inventory updates.

---

3) Online Shopping

The telephone agent uses an order registry and customer catalog to obtain access to an order & a customer respectively.
The order registry uses an order number as a qualifier to select particular order instance. A customer catalog uses customer name and phone number as a qualifier to select particular customer.
The attributes of an order are the order numbers and time when it is placed. The order consists of many items.
An item has item number, a quantity, unit price. It also has reference to catalog item which represents listing.
When an order is cancelled or committed, it cancels or commits each of its items first.
When an order's total price method is invoked, the order calls the total price method of each of items and returns the sum.

Valid Considerations:

Inclusion:

- Customer provides his/her details online before placing an order.
- Admin will maintain customer catalog & order catalog with addition, deletion and modification from time to time.
- Alerts (SMS & E-Mail) will be generated by system on successful order commit or cancel.

Exclusion:

Customer is restricted to access the system

---

4) Retail Store Management System

The Retail Store Management System is a system designed for managing i.e. for ordering, arranging and selling goods.

The Retailer checks for the availability of goods in the store. If the stock of goods is less then retailer places order for goods. While ordering the goods, goods area received at store, the retailer then arrange them by product or by price, then retailer makes payment. If the stock of goods is available then he will arrange goods for selling.

The retailer then sales the goods directly to the customer. The customer buys the items from retailer. The retailer prepares bill for goods purchased by the customer, he receives amount by credit or by cash from customer. The supplier supplies the goods to the store. The overall system is used to manage the goods in the store.

Valid Considerations:
Inclusion:

- Retailer accepts payment from customer either by Credit card or by cash.
- Arranging Goods in system either by Price or by product
- Before generates bill, retailer should run the sales transaction.

Exclusion:

- Retailer makes payment directly or third-party services
- Supplier supplies goods manually

---

5) Course-Ware Management System

Construct the design element for a course ware management system that can be used to manage courses and classes for an organization that specialize in providing training.
The organization offers a variety of courses in a variety of areas such as learning management techniques and understanding different software languages and technologies.
Each course is made up of set of topics.
Tutors in the organization are assigned courses to teach according to the area that is specialized in and their availability.
The organization publish and maintain a calendar of different courses and assign tutors every year.
There is a group of Course Administrator in the organization to manage the courses including course content, assign courses to tutor and define the course schedule.
The training organization aim to use the Course-ware Management System to get a better control and visibility to the management of courses as also to streamline the process of generating and managing the schedule of the different courses.

Inclusions –

- If no actor is defined in context admin can be considered as a valid actor on behalf of Organization.
- On successful publishing of calendar, tutors & students will be notified.

Exclusion
NA

---

6) Railway Reservation System

Railway Reservation System is a system used for booking tickets over internet. Any Customer Can book tickets for different trains. Customer can book a ticket only if the tickets are available. Customer searches for the availability of tickets then if the tickets are available he books the tickets by initially filling details in a form. Tickets can be booked in two ways by i-ticket or by e-ticket booking.

In case of i-ticket booking customer can book the tickets online and the tickets are couriered to Particular customer at their address. But in case of e-ticket booking and cancelling tickets are booked and cancelled online sitting at the home and customer himself has to take print of the ticket but in both the cases amount for tickets are deducted from customers account.

For cancellation of i- ticket the customer has to go at reservation office then fill cancellation form and request the clerk to cancel the ticket. Then the refund is transferred to customer account.

Inclusion –

- Clerk can be considered as agent in this scenario for cancellation of I tickets & e-tickets.
- Refund request is initiates by system automatically after ticket cancelation

Exclusion

7) Stock Maintenance.

Customer preference in buying patterns are changing time to time which creates an opportunity to the service provides to enhance the services and sales to meet the business need. To address the current need of the customers service providers, focus on technology integration to provide quality service with Hassel free transactions and track the stock inventory in order to balance the supply-demand model.

Stock maintenance in system is an essential and play key role in current scenario through product details, purchase details, sales and stock movement which helps business owners to track, monitor and manage stock in store. The product details contain product code, Product name, Opening Stock and Prices. These details are maintained in database. In the purchasing function we must have the details about the store, quantity and also price.

The Sales Details contain Date, Customer name, Product code, Quantity and Prices. The Stock Details contain product id, opening stock, purchase stock, current stock, and sales. The stock details are maintaining the database and view the stock between two dates

Inclusion –

- If no actor is defined in context admin can be considered as a valid actor on behalf of Organization

8) Tour Management System.

Previously people wishing to visit places had to manually search for available accommodation at the visiting places. Also they themselves had to make reservation. People hardly had any knowledge of which are the worth seeing places and about its history. Such procedure was time consuming and energy wasting.

Tour Reservation System has made life very easy for such visitors by saving both their time and energy. Visitor requests for scheme to check the availability of the desired tour package. This information is stored in Tour Information System.
System will check whether the customer is existing or new. New user will enter his personal and tour details for reservation. In turn he/she will be provided with system generated unique ID and password. This login information could be used for further transactions.

When customer is satisfied with tour package he/she would request for reservation of tour. Personal details of new customer is stored in cust_info while the details regarding the tour selected by particular customer is stored in tour_info and the details regarding it would be restructured in Tour Information System.

Existing customer can update his/her personal details in cust_info and cancel reservation for tour from tour_info and changes regarding it are also reflected in Tour Information System.
After confirming the tour package the customer will make payment either online or through staff by personally going at the office. Customer can make payment by cash, credit card or by cheque.
System checks for the validity of staff. Once the payment is done by customer, valid staff will make Ticket Reservation System. .

Reserved customer will be able to view details about reservation by providing login information from cust_info and tour_info system.
Administrator can add, delete or modify tour schemes from Tour Information System.

Inclusions:
NA
Exclusions:
NA

For more Case- Studies, please login to your Account in COEPD Webportal

Appendix F- BABoK V3 Mapping

COEPD IT Business Analyst course mapping to iiba BABoK V3

In BABoK V3, we have 10 concepts
1. Business Analysis Key Concepts
2. Business Analysis Planning and Monitoring
3. Elicitation and Collaboration
4. Requirements Life Cycle Management
5. Strategy Analysis
6. Requirements Analysis and Design Definition
7. Solution Evaluation
8. Underlying Competencies
9. Techniques
10. Perspectives

and detailed mapping is given below....

I. Business Analysis Key Concepts

1. Introduction

- Who is a Business Analyst?
- What is Requirement?
- Types of Requirements
- Bond between Requirement and BA
- Who is stakeholder?
- What is Business Process Modeling?
- BA Completeness Skill Areas

II. Business Analysis Planning and Monitoring

7.2.

Business Analysis Planning

- Business Plan
- Business Analysis Planning
- Planning Factors
- Business Communication Scheduling
- Performance Monitoring
- Techniques
- Estimation
- Estimate planning

Requirements Planning

III. Elicitation and Collaboration

Business Requirements Initiation (Gathering Stage)

6.1.1 Stakeholder Analysis

3. Identify Stakeholders
4. Stakeholders Listing Document
5. Stakeholders Summary
6. RACI Matrix – Responsible, Accountable, Consulted, Informed

6.1.2 Requirement Elicitation Techniques

- Brainstorming
- Document Analysis
- Reverse Engineering
- Focus Groups
- Observation
- Workshop
- JAD(Joint Application Development) - Requirements Workshop
- Interview
- Prototyping
- Questionnaire (Survey)

IV. Requirements Life Cycle Management

6.2. Business Requirements Management

6.2.1. Requirements CommunicatioN

3R Concept

6.2.2. Requirements Management

6.2.3. Requirements Organization

- Requirements Definition
- Requirements Modeling
- Requirements Verification

7.3Role of BA in handling Change Request

V. Strategy Analysis

7.1. Enterprise Analysis

- SWOT Analysis
- GAP Analysis
- Feasibility Study
- Root Cause Analysis
- Technique – 5 Why
- Tabular Method – Technique
- Fishbone Diagram
- Decision Analysis
- Financial Factors
- Non- Financial Factors
- Strategy Analysis
- External Environmental Analysis
- PESTLE Technique
- Porter's Five force Model
- Internal Environmental Analysis
- MOST Analysis Technique
- Enterprise Architecture Frameworks
  - The Zachman Framework
  - The POLDAT Framework63
  - TOGAF
- Scope
- Business Case

VI. Requirements Analysis and Design Definition

6.1.3. Sort the requirements (Define Requirements)

6.1.4. Prioritize Requirements

- 100 Dollars Test
- Top 10 requirements
- Numerical Assignment
- MoSCoW

6.1.5. Validating Requirements

- FURPS
- CUCV
- CAE
- APVU
- SMART

VII. Solution Evaluation

6.3. Business Solutions Evaluation and Implementation

6.3.1. Business Solutions

6.3.2 . Solution Assessment

- Assess proposed Solutions
- Requirements Allocation
- Organizational readiness Assessment

6.3.3. Solution Validation

- Verification Vs Validation

6.3.4. Solution Evaluation

6.3.5. Solution Implementation

VIII. Underlying Competencies

3. Business Analyst Competency Skills

3.1. Business Communication

3.2. Supplier Management

3.3. Leadership

3.4. Conflict Management

IX. Techniques

5. OOA and UML

5.1. Learning OOA

- Object
- Class
- Component
- Package
- Subsystems

5.2. Implementing OOA

- Abstraction
- Encapsulation
- Inheritance
- Polymorphism
- Relationships
- Message sending

5.3. Learning UML

- Mostly used Diagrams by BA

5.4. Use Case Diagram

- Actor
- Learning use case Diagrams Step-1: (basic)
- Learning use case Diagrams Step-2: (Generalization)
- Learning use case Diagrams Step 3 (Include)
- Learning use case Diagrams Step 4: (Extend)
- Learning use case Diagrams Step 5: (Automation)
- How to draw Use Case Diagram from a Case study

5.5. Use Case Description Document

- Use Case Spec _ Example

5.6. Deriving Test Cases out of Use-cases

- Test Case Document

5.7. Understanding how a Software Application Works

- An Overview
- Two Tier Architecture
- Three Tier Architecture
- MVC Architecture
- MVC Architecture Rules
- Guideline to place identified MVC Classes in a 3 Tier Architecture

5.8. Sequence Diagram

5.9. Domain Modelling

5.10 Activity Diagram

- Activity Diagram Elements

- Swimlanes

X. Perspectives

4. SDLC Methodologies and Models

4.1. Sequential – waterfall and V Model
4.2. Iterative – RUP (Rational Unified Process)
4.3. Evolutionary – Spiral
4.4. Agile - Scrum
Scrum
BA role in Agile Scrum
7.4. Role of BA in Project

Appendix G - **Nurturing Process Guidelines**

1. Everyday 2 Doubt Clarification Sessions will be conducted
   - Morning 7am
   - Evening 7pm
2. Everyday Nurturing Process Induction will be conducted
   - Check student portal for timings
   - Weekly Once attend Nurturing Process Induction
   - Follow Instructions given in these sessions
3. Daily invest 3Hrs to 5 Hrs time towards BA Learning and Project Practice – Be prepared to invest 500 Hours efforts towards completion of the nurturing process

Appendix H - **BA Job Market Guidelines**

Every week 2 BA Job Market awareness Sessions will be conducted

- Attend these sessions
- Check student portal for timings
- Follow Instructions given in these sessions

BA WORKSHOP – APPENDIX

Imp Tips for Success

1. Please ensure that you pull out **3 hours to 5 hours a day for ba learning** and practice. (At least 2 hours, preferably before you start your work)

2. **Write your Goal on a big poster**
I will become a BA by <Target Date> (keep 4 months)
And stick that poster in your room, where you will spend more time ...

3. Make above poster as your screen saver or password like BAb4May24

4. **Think positive and always say to yourself**
I will become a BA

5. **Don't blame others ..**
Take responsibility of yourself and your Goal

6. **Five hours study time.**
Please fill timesheets in student portal
30 min recollection of previous study concepts.
Write on a paper
1 hr study
30 min of self test n evaluation of 1 hr study
3 hrs practice on projects

7. **Weekly Review of your progress**

8. Ensure that you attend
regularly doubt clarification sessions
and
during nurturing process, weekly once **nurturing process induction**
Or
during job search weekly twice, **BA Job Market Guidance sessions**
And
All Weekend awareness sessions

9. Daily
morning msg yourself...
I will become a BA
Today I will work/ learn on ____ ba topic or project concept
EOD msg yourself
What did you learn that day

10. Please understand that Daily your 3 hrs to 5 hrs of learning will change your career , life and status in the society.

ALL THE BEST

"This was one of the best Business Analyst workshops I have ever attended. All I can say is that the trainers actually know what they teach. Overall the venue, course materials and facilitation was excellent. I recommend this workshop to anyone who is interested in seeing real progress in their Business Analyst career."

- Maraka Sudhakar

"Right place to learn BA concepts and techniques in more practical way rather than simply listening to theoretical explanation. Faculty with real time work experience will make you feel the concepts with relevant examples and correct the though process with respect to BA role and responsibility."

-Ahmad Khan

"I have joined in COEPD for BA training. Here I felt that communication between participant and trainer is accessible all the week days in all business hours. The team is supportive. My trainer taught me every concept in a easy way. I cleared all my doubts. This is a very good institute to learn BA concepts thoroughly."

- Maria Garcia

"The quality of BA course is really good and the plus point is that Trainer helps to relate the theory to practical use during day to day life. A weekend courses are added advantage. Very positive learning experience. Why I recommend COEPD:
-Trainers with hands on industry experience
- Small classes and friendly environment
-The admin staff is also very helpful and very quick to respond back for required support.
- Great location"

- Manjunath Nettem

"The participant have a 360 degrees view of a BA role and responsibilities, the design of the course definitely enhances the knowledge of the student irrespective of his/her domain expertise."

- Uday Ch

"Coepd is the best institute for Business Analyst Training, Team is very supportive. HR Executives are very dynamic and even ready to take stand for you with the Client, she supported me aggressively for my placement."

- Monika Sharma

For More visit... http://www.coepd.com/business-analyst-training-testimonials.html

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