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1. ELICITATION PROCESS

The purpose of Elicitation is to **draw out, explore,** and **identify** information relevant to the change.

Elicitation Techniques:

1- Traditional Methods
   a- Interviewing and Listening
   b- Interviewing Groups
   c- Survey/Questionnaire
   d- Ethnography
   e- Analyzing procedures and other documents

2- Modern Methods
   a- Joint Application Design
   b- Case tools
   c- Prototyping

TRADITIONAL REQUIREMENTS ELICITATION METHODS

Interviewing individuals

Interviewing groups

Survey/Questionnaire

Ethnography

Studying business documents

WHAT IS INTERVIEWING?

Dialogue with ***stakeholder*** to obtain their ***requirements.***

During interviewing you will gather ***facts***, ***opinions***, and ***observe body language***, ***emotions***, and other signs of what people ***want*** and ***how*** they assess current systems.

CHOOSING INTERVIEW QUESTIONS- OPEN-ENDED QUESTIONS

Are used to probe for ***information*** for which you ***cannot anticipate*** all possible responses or for ***which you do not know the precise question*** to ask.

The person being interviewed is ***encouraged*** to talk about ***whatever interests him*** or her ***within the general bounds*** of the question.

You must ***react quickly*** to answers and determine whether or not any ***follow-up questions*** are needed for clarification or elaboration.

Sometimes ***body language*** will suggest that a user has given an incomplete answer.

"What would you say is the best thing about the information system you currently use to do your job?" or "List the three most frequently used menu options."

CHOOSING INTERVIEW QUESTIONS- OPEN-ENDED QUESTIONS

Advantage:

Previously unknown information can ***surface***. You can then ***continue exploring*** along unexpected lines of inquiry to reveal even more new information.

Often ***put*** the ***interviewees*** at ***ease*** because they are able to respond in their ***own words*** using their ***own structure.***

Give interviewees more of a ***sense of involvement*** and ***control*** in the interview.

Disadvantage:

The ***length of time*** it can take for the questions to be answered.

Difficult to summarize.

CHOOSING INTERVIEW QUESTIONS- CLOSED-ENDED QUESTIONS

Provide a ***range of answers*** from which the interviewee may ***choose.***

Example:

Which of the following would you say is the one best thing about the information system you currently use to do your job (pick only one)?

a. Having easy access to all of the data you need
b. The system's response time
c. The ability to access the system from remote locations

CHOOSING INTERVIEW QUESTIONS- CLOSED-ENDED QUESTIONS

Advantages

work well when the ***major answers*** to questions are ***well known.***

do not necessarily ***require*** a ***large time***

can be an ***easy way to begin an interview*** and to determine which line of open-ended questions to pursue.

you can include an "***other***" option to encourage the interviewee to add unanticipated responses.

disadvantage

useful information that ***does not quite fit into the defined answers may be overlooked*** as the respondent tries to make a choice instead of providing his or her best answer.

GUIDELINES FOR EFFECTIVE INTERVIEWING

Plan the interview.

- Prepare interviewee: appointment, priming questions.
- Prepare agenda, checklist, questions.

Listen carefully and take notes (tape record if permitted).

Review notes within 48 hours.

Be neutral.

ADVANTAGES/DISADVANTAGES OF INDIVIDUAL INTERVIEWS

Interview one person at a time

Advantage

- **Easier** to **schedule** than group interviews

Disadvantages

- **Contradictions** and **inconsistencies** between interviewees
- **Follow-up** discussions are time consuming

GROUP INTERVIEWS

Interview several key people together.

Several Analysts could be involved.

Advantages

- More ***effective use of time***
- Can hear ***agreements*** and ***disagreements*** at once
- Opportunity for ***synergies***

Disadvantage

- ***More difficult to schedule*** than individual interviews

NOMINAL GROUP TECHNIQUE (NGT)

A ***facilitated*** process that supports ***idea generation*** by ***groups***.

Process

- Members come together as a group, but initially work separately.
- Each person writes ideas.
- Facilitator reads ideas out loud, and they are written on blackboard.
- Group discusses the ideas.
- Ideas are prioritized, combined, selected, reduced.

In requirement determination context, NGT applies to ***problems*** with the ***existing system*** or ***ideas*** for ***new features*** in the system being developed.

The end result would be a list of either ***problems or features*** that group members themselves had ***generated*** and ***prioritized***.

SURVEY/QUESTIONNAIRE

Is used to elicit ***business analysis information*** including information about ***customers***, ***products***, ***work practices***, and ***attitudes***—from a ***group of people*** in a ***structured way*** and in a ***relatively short period of time***.

There are two types of questions used in a survey or questionnaire:

- **Close-ended:**

  Easier to analyze because they can be tied to ***numerical coefficients***.

- **Open-ended:**

  Useful when the ***issues are known*** and the ***range*** of user ***responses is not***;

  more ***difficult*** and ***time-consuming***.

SURVEY/QUESTIONNAIRE (CONT.)

Strengths

Relatively ***inexpensive*** to administer.

Easier to ***collect information*** from a ***larger audience***.

Does not typically require ***significant time***.

Suitable for stakeholders are ***geographically dispersed***.

Effective for obtaining ***quantitative data*** for ***statistical analysis***.

Results may yield ***insights*** and ***opinions***.

SURVEY/QUESTIONNAIRE (CONT.)

Limitations

To achieve unbiased results, ***specialized skills*** in statistical ***sampling*** methods are needed when surveying a subset of potential respondents.

The ***response rates*** may be ***too low*** for statistical significance.

Use of ***open-ended questions*** requires ***more analysis***.

Ambiguous questions may be ***unanswered*** or answered incorrectly.

Require ***follow-up questions*** or more survey iterations depending on the answers provided.

ETHNOGRAPHY

- ***Watching*** users ***do*** their ***jobs***
- Can provide ***more accurate information*** than ***self-reporting*** (Ex: Manager, Emails)

- Observation can ***cause*** people to ***change*** their ***normal operating behavior***
- Observation yields only a ***small segment of data*** from a possibly vast variety of data sources
- **Not-continuous**, you receive only a snapshot image of person or task
- Observation is ***very time consuming***

ANALYZING PROCEDURES AND OTHER DOCUMENTS (CONT.)

Four types of useful documents

1- Written work procedures

Describes *how* a *job* is *performed*

Includes *data* and *information used* and *created* in the process of performing the job or task

2- Business form

Explicitly indicate data flow in or out of a system

3- Report

Enables the analyst to work backwards from the report to the data that generated it

4- Description of current information system

MODERN METHODS FOR DETERMINING REQUIREMENTS

Joint Application Design (JAD)

CASE tools

Prototypes

JOINT APPLICATION DESIGN (JAD)

Intensive group-oriented requirements determination technique

Purpose of JAD is to collect systems requirements ***simultaneously*** from the ***key people*** involved with the system (users, managers, and systems analysts).

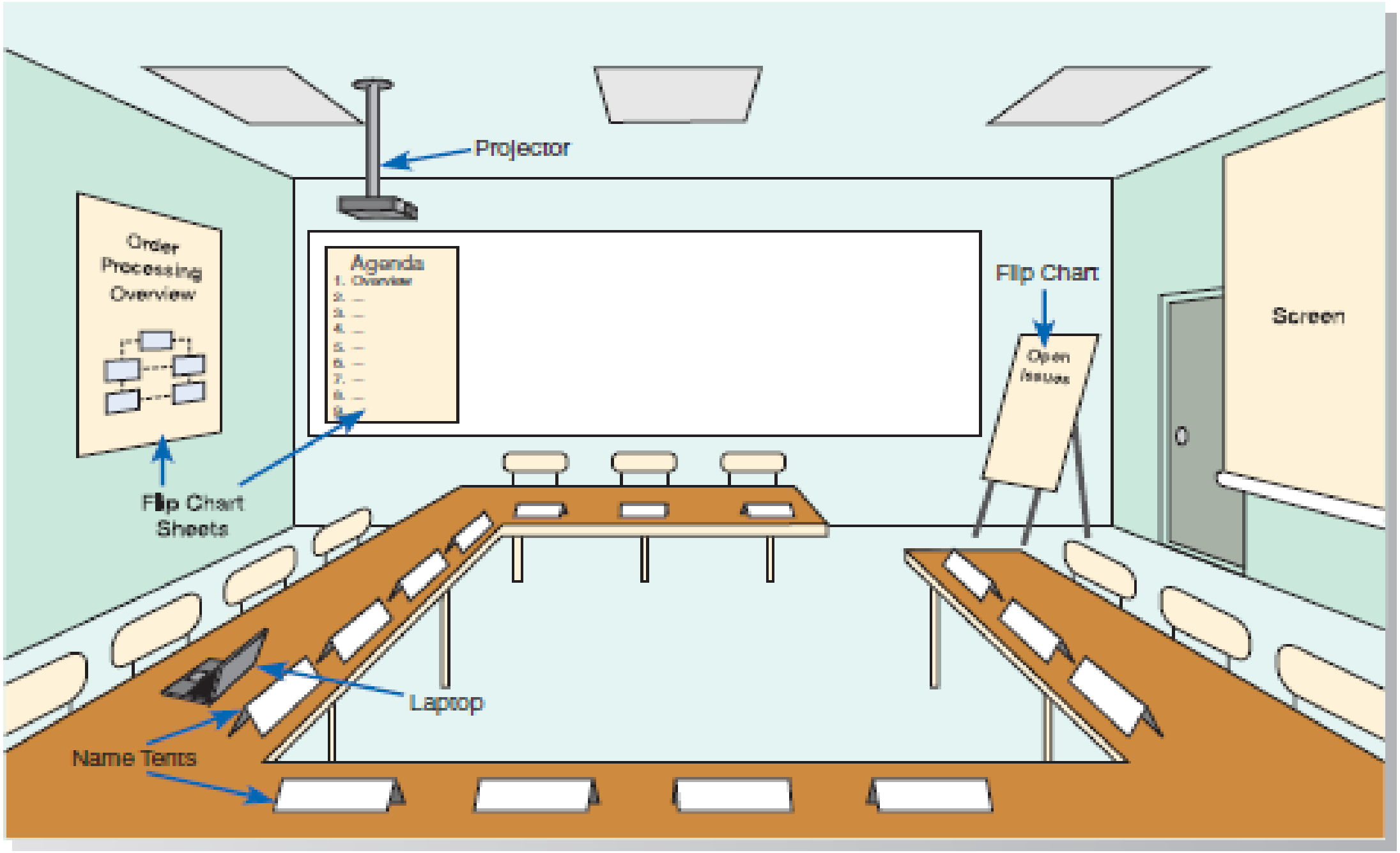
Team members meet in isolation for an extended ***period of time***.

Usually conducted at a **location** other than the place where the people involved normally work.

Highly focused

The result is an ***intense*** and ***structured***, but ***highly effective process***.

Allows you the ***opportunity*** to ***resolve conflicts***, or at least to ***understand why a conflict may not be simple to resolve***.


Projector
Order Processing Overview
Agenda
1. Overview
2. ...
3. ...
4. ...
5. ...
6. ...
7. ...
8. ...
9. ...
Flip Chart
Open Issues
Screen
Flip Chart Sheets
Laptop
Name Tents

PROTOTYPING

Is used to ***elicit*** and ***validate*** stakeholder needs through an ***iterative process*** that ***creates a model*** or ***design*** of ***requirements***.

It is also used to ***optimize user experience***, to ***evaluate design options***, and as a basis for development of the final business solution.

Quickly ***converts requirements*** to ***working version*** of system.

Once the user sees requirements converted to system, will ask for ***modifications*** or will ***generate additional requests***

PROTOTYPING (CONT.)

Most useful when:

- ***User requests*** are not ***clear***
- ***Few users*** are ***involved*** in the system
- Provides a ***visual representation*** for the ***future state.***
- Allows providing ***input\feedback early*** in the ***design process.***
- ***History of communication problems*** between ***analysts*** and ***users***

PROTOTYPING (CONT.)

Drawbacks

- ***Difficult*** to ***adapt*** to more ***general*** user audience.
- ***Technology*** need to be ***understood*** to ***initiate prototyping***.
- ***Unrealistic expectations*** for the ***final solution***.
- Focus on the ***design specifications*** of the solution rather than the non-functional *requirements*.

IMPORTANCE OF REQUIREMENTS ELICITATION IN BUSINESS ANALYSIS

- Ensuring Stakeholder Alignment
- Minimizing Scope/feature Creep
- Enhancing Communication among project stakeholders
- Early mitigation of potential risks

PROBLEMS OF REQUIREMENTS ELICITATION

Stakeholders don't know what they really want.

Stakeholders express requirements in their own terms.

Different stakeholders may have conflicting requirements.

Organisational and political factors may influence the system requirements.

The requirements change during the analysis process. New stakeholders may emerge and the business environment may change.

2. REQUIREMENTS SPECIFICATION

The process of writing down the user and system requirements in a requirements document.

The requirements may be part of a contract for the system development. Therefore, it is important that these are as complete as possible.

WAYS OF WRITING A SYSTEM REQUIREMENTS SPECIFICATION

Notation	Description
Natural language	The requirements are written using numbered sentences in natural language. Each sentence should express one requirement.
Structured	The requirements are written in natural language on a standard template.
Design description languages	This approach uses a language like a programming language, but with more abstract features to specify the requirements. This approach is now rarely used although it can be useful for interface specifications.
Graphical notations	Graphical models, with text annotations, are used to define the functional requirements for the system; UML use case and sequence diagrams are commonly used.
Mathematical specifications	These notations are based on mathematical concepts such as finite-state machines or sets. Although they can reduce the ambiguity, most customers don't understand a formal specification. They cannot check that it represents what they want and are reluctant to accept it as a system contract.

2.1 NATURAL LANGUAGE SPECIFICATION

Requirements are written as natural language sentences supplemented by diagrams and tables.

Used for writing requirements because it is **expressive, intuitive** and **universal.**

This means that the requirements can be understood by users, customers and managers.

PROBLEMS WITH NATURAL LANGUAGE

Lack of clarity

- Precision is difficult without making the document difficult to read.

Requirements confusion

- Functional and non-functional requirements tend to be mixed-up.

Requirements combination

- Several different requirements may be expressed together.

2.2 STRUCTURED SPECIFICATIONS

An approach to writing requirements where the freedom of the requirements writer is limited and requirements are written in a standard way (using a template).

It is sometimes too rigid for writing business system requirements.

A STRUCTURED SPECIFICATION OF A REQUIREMENT FOR AN INSULIN PUMP

Insulin Pump/Control Software/SRS/3.3.2

Function Compute insulin dose: safe sugar level.

Description

Computes the dose of insulin to be delivered when the current measured sugar level is in the safe zone between 3 and 7 units.

Inputs Current sugar reading (r2); the previous two readings (r0 and r1).

Source Current sugar reading from sensor. Other readings from memory.

Outputs CompDose—the dose in insulin to be delivered.

Destination Main control loop.

A STRUCTURED SPECIFICATION OF A REQUIREMENT FOR AN INSULIN PUMP

Action	
CompDose is zero if the sugar level is stable or falling or if the level is increasing but the rate of increase is decreasing. If the level is increasing and the rate of increase is increasing, then CompDose is computed by dividing the difference between the current sugar level and the previous level by 4 and rounding the result. If the result, is rounded to zero then CompDose is set to the minimum dose that can be delivered.	
Requirements	
Two previous readings so that the rate of change of sugar level can be computed.	
Pre-condition	
The insulin reservoir contains at least the maximum allowed single dose of insulin.	
Post-condition	r0 is replaced by r1 then r1 is replaced by r2.
Side effects	None.

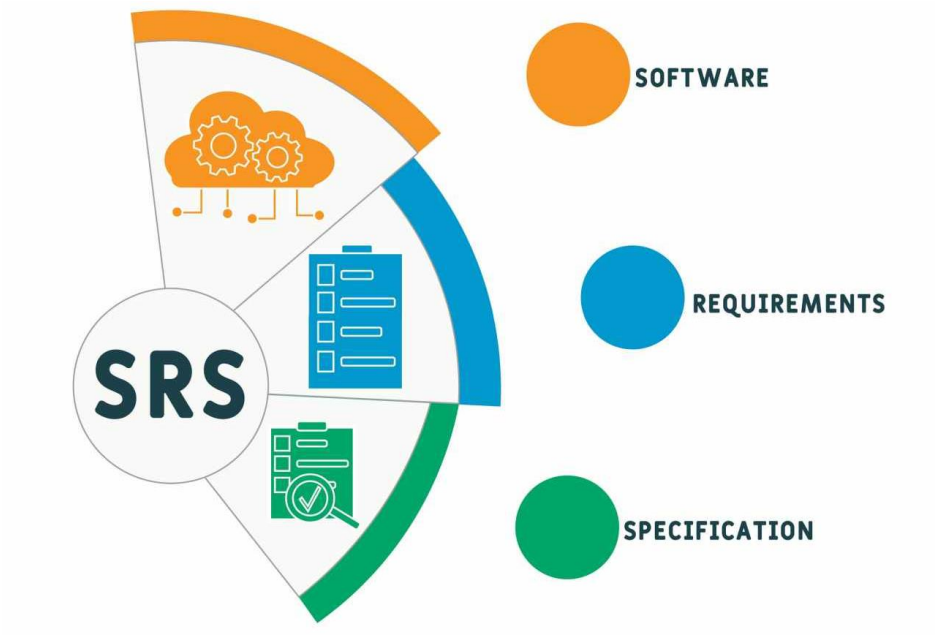
3. GRAPHICAL NOTATION: UML

Use-cases are a kind of scenario in the Unified Modelling Language UML.

High-level graphical model supplemented by more detailed tabular description.

Use cases identify the actors in an interaction and describe the interaction itself.

UML sequence diagrams may be used to add detail by showing the sequence of event processing in the system.


SRS
SOFTWARE
REQUIREMENTS
SPECIFICATION

SRS

The main aim of determining the information requirements of an organization used by analysts is to prepare a precise software requirement specification SRS understood by user.

Ideal SRS Document should:

- be complete, unambiguous, and jargon-free.
- specify operational and strategic information requirements.
- solve possible disputes between users and analyst.
- use graphical aids which simplify understanding and design.

SRS TEMPLATE

1. **Introduction**
   - 1.1 Purpose
   - 1.2 Document conventions
   - 1.3 Project scope
   - 1.4 References
2. **Overall description**
   - 2.1 Product perspective
   - 2.2 User classes and characteristics
   - 2.3 Operating environment
   - 2.4 Design and implementation constraints
   - 2.5 Assumptions and dependencies
3. **System features**
   - 3.x System feature X
     - 3.x.1 Description
     - 3.x.2 Functional requirements
4. **Data requirements**
   - 4.1 Logical data model
   - 4.2 Data dictionary
   - 4.3 Reports
   - 4.4 Data acquisition, integrity, retention, and disposal
5. **External interface requirements**
   - 5.1 User interfaces
   - 5.2 Software interfaces
   - 5.3 Hardware interfaces
   - 5.4 Communication interfaces
6. **Quality attributes**
   - 6.1 Usability
   - 6.2 Performance
   - 6.3 Security
   - 6.4 Safety
   - 6.x others
7. **Internationalization and localization requirements**
8. **Other requirements**

Appendix A: Glossary

Appendix B: Analysis model

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Importance of SRS

- Clear Understanding of Requirements
- Improves Project Planning
- Minimizing Miscommunication
- Facilitates Testing
- Foundation for Development
- Improve Client Satisfaction
- Reduces Scope Creep
- Ease Future Maintenace and Upgrades

BEST PRACTICES FOR DOCUMENTING REQUIREMENTS

- **Requirements have to be clear and understandable.** Make sure you state requirements concisely, without ambiguity or different interpretations. Also, try to avoid technological jargon. Remember that each audience is different, and stakeholders might not be familiar with specialized tech terminology. Instead, enrich your documents with visuals, diagrams, and graphs to support the information and make it easier to perceive.
- **Requirements have to be feasible and sensible.** Focus on the functionality and quality attributes that users need. Remember that requirements have to reflect higher-level business objectives.

BEST PRACTICES FOR DOCUMENTING REQUIREMENTS

- **Requirements have to be specific, accurate, and complete.** Be consistent with the language and make sure that your requirements are accurate. They should cover every scenario but never contradict one another. Avoid vagueness and weak phrases such as “system has to be fast” or “when something happens.” Be specific so that all the readers can understand them similarly.

- **Requirements have to be testable.** Write requirements so that after the product is created, testing can show whether they are delivered successfully.

3. REQUIREMENTS VALIDATION

Demonstrating that the requirements define the system that the customer really wants.

Requirements error costs are high, so validation is very important. Fixing a requirements error after delivery may cost up to 100 times the cost of fixing an implementation error.

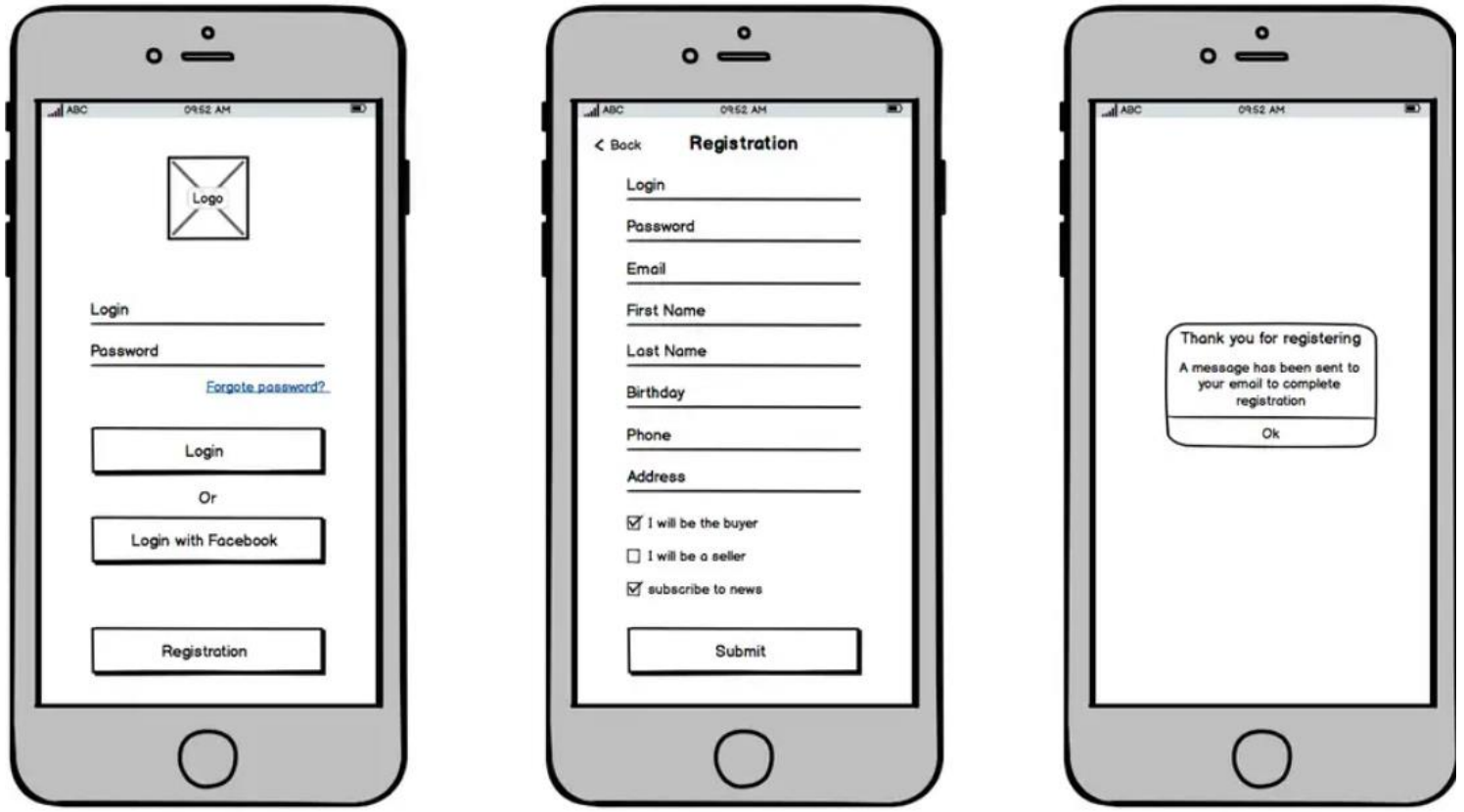
REQUIREMENT VALIDATION

Characteristics of Requirements During Validation Reviews

REQUIREMENT VALIDATION

Requirement Validation Techniques

https://www.collidu.com/presentation-requirement-validation



WIREFRAMES

Wireframes are **low-fidelity graphic structures** of a website or an app. They help map different product pages with sections and interactive elements.

They represent how the solution will look and give an idea of how users will interact with it.

This way, they help **bridge the vision gaps** and let stakeholders and teams get a shared understanding of products in development.

https://www.altexsoft.com/blog/functional-and-non-functional-requirements-specification-and-types/

4. REQUIREMENTS MANAGEMENT

Requirements management is the process of managing changing requirements.

New requirements emerge as a system is being developed and after it has gone into use.

You need to keep track of individual requirements and maintain links between dependent requirements so that you can assess the impact of requirements changes.

REQUIREMENTS TRACEABILITY MATRIX (RTM)

Change is an inevitable part of any project or organization. Whether it's a new requirement, a modification to an existing one, or a shift in priorities, change is bound to happen.

RTM allows to easily identify the **impact of proposed change** on other requirements, enabling them to make informed decisions.

By maintaining an **up-to-date** RTM, project managers can track the progress of each requirement and ensure that any changes are properly documented, communicated, and prioritized.

Requirements Traceability Matrix (RTM)

Requirement ID	Requirement Description	Design	Development	Testing	Test ID	Deployment
RQ1	User registration functionality	Yes	In-Progress	Yet To Start	T001	
RQ2	Product search and filtering capabilities	Yes	Completed	In-Progress	T002	
RQ3	Add to cart functionality	Yes	Completed	Completed	T003	In-Progress
RQ4	Payment integration with third-party API	In-Progress	Yet To Start	Yet To Start	T004	
RQ5	Order confirmation email notification	Yes	In-Progress	In-Progress	T005	

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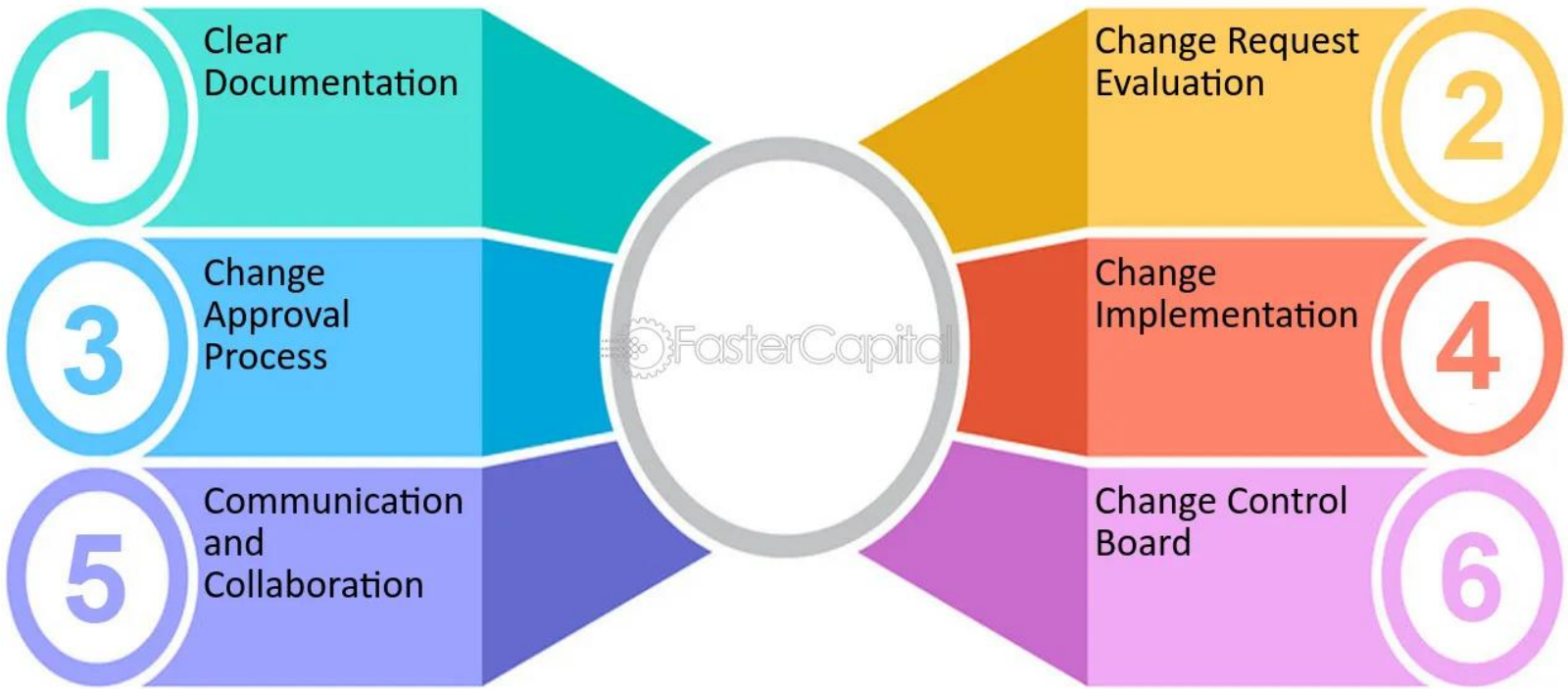
Project Name:	TestKarts.com
Project Manager	Manager Testkarts.com
Project Description:	Testing and Development project for the fresher and experience learner.

Requirements Traceability Matrix

Requirements					Testing							
Req. ID	Requirements Description	Requirements Source	Requirement Type	WBS Deliverables	Test Case ID	Test Description	TEST	UAT	QA	PROD	PRE-PROD	NON-PROD
REQ001	User registration functionality	Business Analyst	Functional	WBS-001	TC001	Verify user can successfully register an account	Pass	Pass	Pass	Pass	Fail	
REQ001	User registration functionality	Business Analyst	Functional	WBS-001	TC002	Verify error message is displayed for invalid inputs	N/A	Fail	Pass	Fail	N/A	
REQ001	User registration functionality	Business Analyst	Functional	WBS-001	TC003	Verify user receives a confirmation email	Pass	N/A	Fail	N/A	Pass	
REQ002	Login functionality	Product Owner	Functional	WBS-002	TC004	Verify user can log in with valid credentials	Fail	Pass	N/A	N/A	N/A	
REQ002	Login functionality	Product Owner	Functional	WBS-002	TC005	Verify error message is displayed for incorrect login	Fail	Fail	N/A	Pass	Fail	
REQ002	Login functionality	Product Owner	Functional	WBS-002	TC006	Verify "Forgot Password" link redirects correctly	Fail	Fail	N/A	Pass	Pass	
REQ003	Create new post	User Stories	Functional	WBS-003	TC007	Verify user can create a new post				N/A	N/A	
REQ003	Create new post	User Stories	Functional	WBS-003	TC008	Verify error message is displayed for empty content	Pass	Pass	Pass	Fail	Fail	

https://www.testkarts.com/manual-testing/traceability-matrix

Establishing a Structured Change Control Process



REQUIREMENTS TRACEABILITY MATRIX (RTM)

Unique Req ID	Requirement description	Source /Requestor	Org /Dept	Business Justification/Need	WBS Deliverable	Test Strategy	UAT Responsibility	Status	Active/ inactive Flag	Comments
1	Change the table component on the dashboard to a graph.	Ella Allen	Sales	Better representaion of the data and improved readability	Task 1.1 Task 4.7	Use cases to be developed.	Follow the test steps as defined in use cases and report any defects.	Done	Active	Jan 5:- Testing started. Jan 8:- Defected reported. Jan 9: Defect fixed Jan 10: UAT Continued
2	Add a drop down list for the regions	Tonya Harper	Sales	Will enable Area managers to understand their market more accurately	Task 1.2	Load testing to be done.	Load runner to be used to simulate a load and the regions will be verified for accurate representation	In Progress	Active	Make sure US territories hawaii and peurto rico are included in a separate regional unit.
3	Create a new category hierarchy to sorting the result set	Sammy Butler	Pricing	Will help the pricing department by automating the selection of categorized data.	Task 1.3	Assigned business users to perform unit testing as well as UAT	Check the categories in the base tables in the EDW.	Hold	Cancelled	It was determined that Pricing requirements were out of scope for this phase
4	...	...	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...	...
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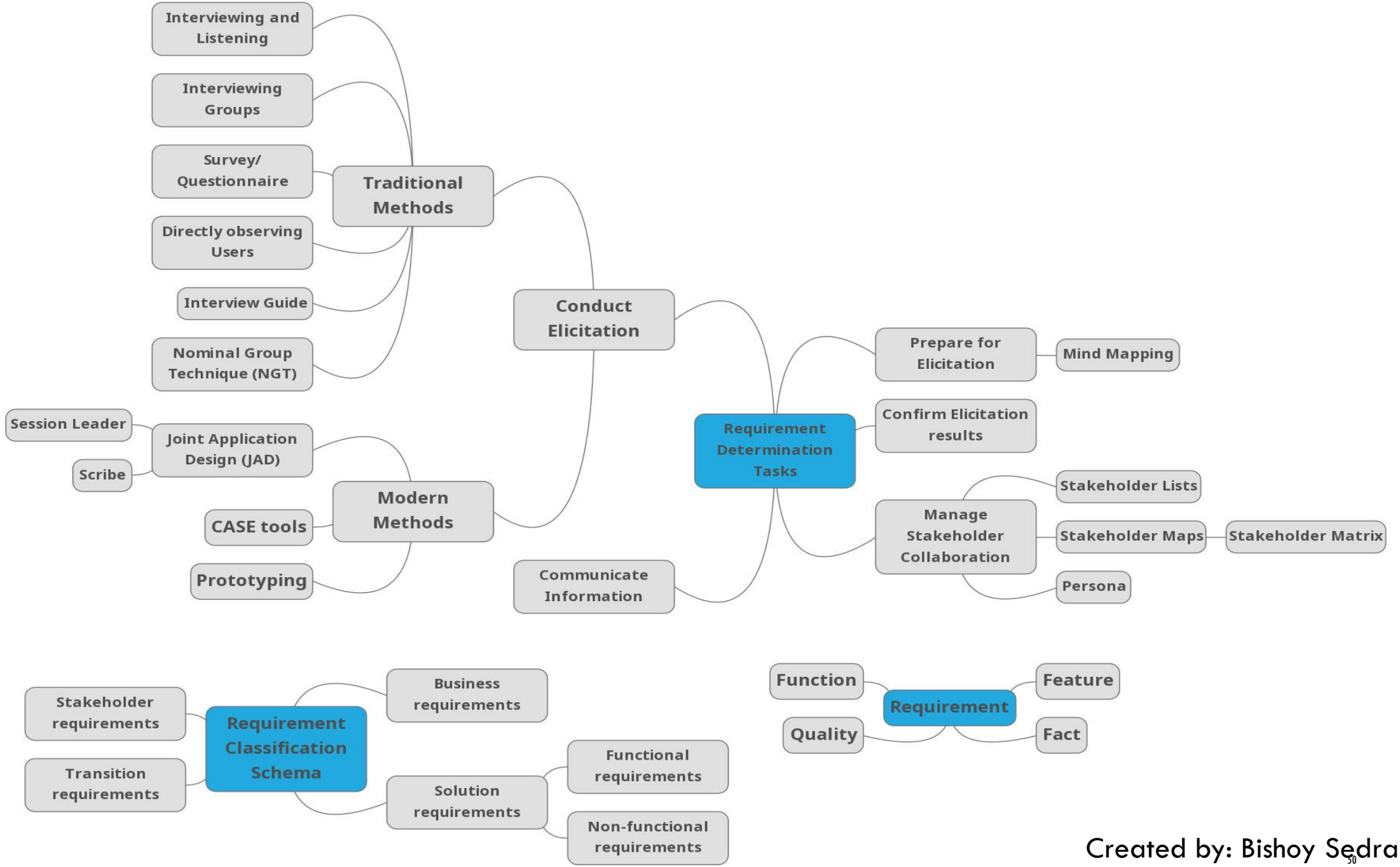

Created by: Bishoy Sedra

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Time for
Assessment

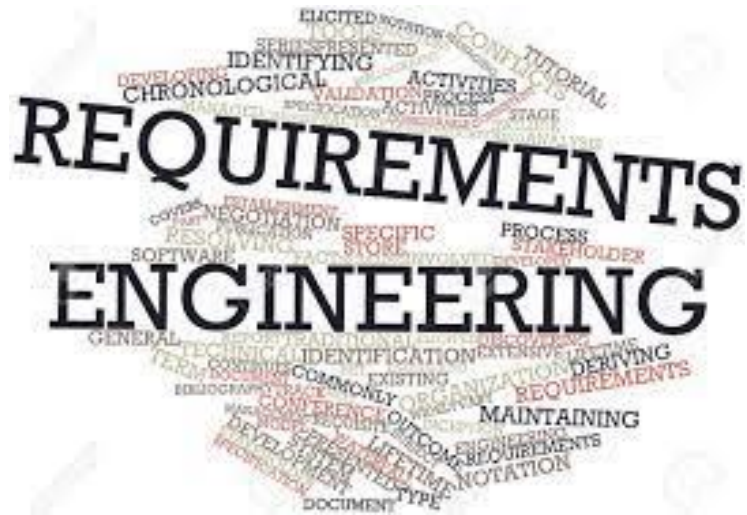
Which requirements elicitation technique includes observing the users work in their own environment?

Elaborate on the advantages of using open-ended questions in the interview process

Which requirements elicitation technique works best to obtain quantitative data for statistical analysis ?

List three modern requirements determination techniques

When do business analysts use prototypes?


REQUIREMENTS
ENGINEERING
ELICITED
IDENTIFYING
CHRONOLOGICAL
ACTIVITIES
TUTORIAL
NEGOTIATION
SPECIFIC
PROCESS
SOFTWARE
STAKEHOLDER
GENERAL
IDENTIFICATION
DERIVING
COMMONLY
EXISTING
REQUIREMENTS
MAINTAINING
NOTATION
DOCUMENT