CS708 – Software Requirements Engineering Paper Qs&As for MidTerm June 2017 By: Asif Mansoor

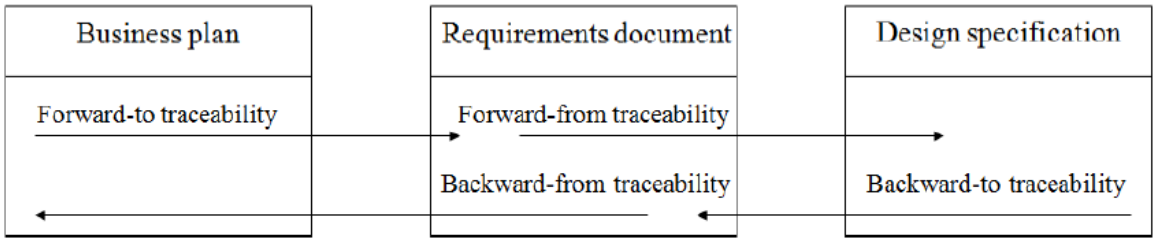
Q1. Define Classification of traceability?

Answer: Refers to ability to describe and follow the life of a requirement, in both a forwards and backwards direction. That is from its origins, through its development and specification, to its subsequent deployment and use, and through all periods of on-going refinement and iteration in any of these phases.

Classifications of Requirements Traceability:

- Backward-from traceability
- Forward-from traceability
- Backward-to traceability
- Forward-to traceability

Backwards and Forwards Traceability



Q2. Types of volatile requirement? And identify key factors of change in requirements.

Answer: Types of Volatile Requirements:

1. Mutable Requirements: These are requirements which change because of changes to the environment in which the system is operating. **2. Emergent Requirements:** These are requirements which cannot be completely defined when the system is specified but which emerge as the system is designed and implemented. **3. Consequential Requirements:** These are requirements which are based on assumptions about how the system will be used. When the system is put into use, some of these assumptions will be wrong**. 4. Compatibility Requirements:** These are requirements which depend on other equipment or processes

Requirements Change Factors:

Requirements errors, conflicts and inconsistencies: As requirements are analyzed and implemented, errors and inconsistencies emerge and must be corrected. These may be discovered during requirements analysis and validation or later in the development process

Evolving Customer/End-user Knowledge of the System: As requirements are developed, customers and end-users develop a better understanding of what they really require from a system

Technical, Schedule or Cost Problems: Problems may be encountered in implementing a requirement. It may be too expensive or take too long to implement certain requirements

Changing customer priorities: Customer priorities change during system development as a result of a changing business environment, the emergence of new competitors, staff changes, etc.

Environmental Changes: The environment in which the system is to be installed may change so that the system requirements have to change to maintain compatibility

Organizational Changes: The organization which intends to use the system may change its structure and processes resulting in new system requirements

Q3. Review of requirements is expensive? How we can reduce this cost. Write the stages of review requirements?

Answer: A group of people read and analyze the requirements, look for problems, meet and discuss the problems and agree on actions to address these problems.

Plan review : The review team is selected and a time and place for the review meeting is chosen

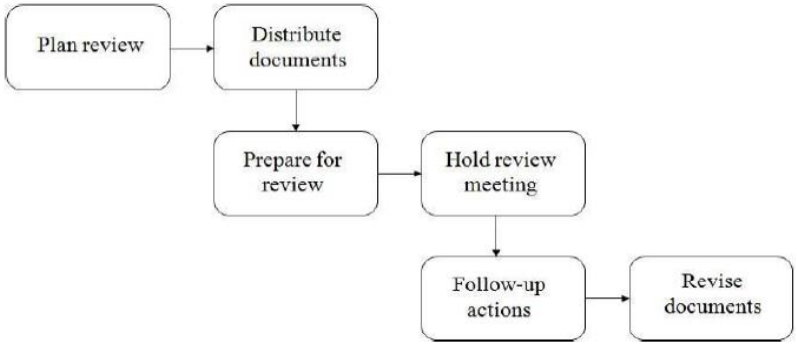
Distribute documents: The requirements document is distributed to the review team members

Prepare for review: Individual reviewers read the requirements to find conflicts, omissions, inconsistencies, deviations from standards and other problems

Hold review meeting: Individual comments and problems are discussed and a set of actions to address the problems is agreed

Follow-up action : The chair of the review checks that the agreed actions have been carried out

Revise document: The requirements document is revised to reflect the agreed actions. At this stage, it may be accepted or it may be re-reviewed



Q4. What you think changing in requirements is so bad? How we can control changes in requirements?

Answer: All stakeholders want to change requirements, due to different reasons. Studies have shown that very significant percentage of delivered defects can be traced back to changing user requirements. A major issue in requirements engineering is the rate at which requirements change once the requirements phase has “officially” ended. This rate is on average 3% per month in the subsequent design phase, and should go down after that. This rate should come down to 1% per month during coding. Ideally, this should come down to no changes in testing; however, this is very rare

Q5. Describe RE Process Maturity Model?

Answer: CMM Level 1: Initial

• Organizations have an undisciplined process and it is left to individuals that how to manage the process and which development techniques to use

CMM Level 2: Repeatable

• Organizations have basic cost and schedule management procedures in place. They are likely to be able to make consistent budget and schedule predictions for projects in the same application area

CMM Level 3: Defined

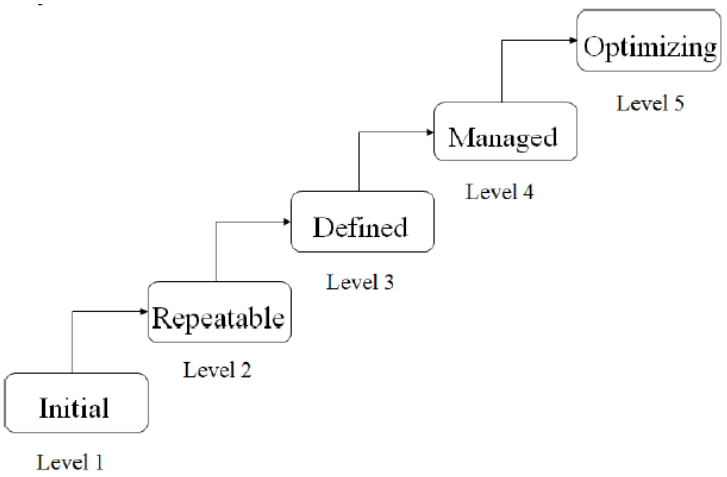
• The software process for both management and engineering activities is documented, standardized and integrated into a standard software process for the organization

CMM Level 4: Managed

• Detailed measurements of both process and product quality are collected and used to control the process

CMM Level 5: Optimizing

• The organization has a continuous process improvement strategy, based on objective measurements, in place



Q6. Why requirement identification is necessary. List out problems with requirement identification.

Answer: It is essential for requirements management that every requirement should have a unique identification. The most common approach is requirements numbering based on chapter/section in the requirements document.

Problems: with this are: Numbers cannot be unambiguously assigned until the document is complete. Assigning chapter/section numbers is an implicit classification of the requirement. This can mislead readers of the document into thinking that the most important relationships are with the requirements in the same section.

Q7. Define Change control process and polices?

Answer: Change management is concerned with the procedures, processes and standards which are used to manage changes to system requirements. Without formal change management, it is impossible to ensure that proposed changes support business goals.

Change Management Policies: The change request process and the information required to process each change request. The process used to analyze the impact and costs of change and the associated traceability information. The membership of the body which formally considers change requests. The software support (if any) for the change control process.

Q8. Explain the importance of listening in interviews. Give steps of listening?

Answer: The art of listening is most important. You can best impress your client by listening and giving due attention to what the client or customer is saying. This requires effort on part of the interviewer.

Listening Steps: *Hear *Interpret *Respond *Evaluate

Hear the Message: Listen to learn as much as you can so that you will know how to respond. Give the speaker your undivided attention; don't just wait for your turn to speak. Concentrate on the message, not the person. Don't interrupt.

Interpret the Message: Observe the speaker's nonverbal cues (gestures, facial expressions, and tone of voice) and factor them into your interpretation. Listen for the attitudes and motives behind the words. Listen for the speaker's needs and wants.

Nonverbal Response to the Message: Make eye contact. Nod affirmatively. Use facial expressions and gestures to indicate that you are listening.

Verbal Response to the Message: Ask questions and probe to get more specific information and ensure understanding. Rephrase the message using different words to check the meaning. Make empathetic remarks that acknowledge you understand the speaker's feelings, without offering opinions or judging him or her.

Evaluate the Message: Identify the main point of the message and its supporting evidence. Clarify facts, perceptions, and opinions. Distinguish between fact and opinion. Group facts in like categories and logical order (importance, chronology).

Q9. Give categories of Requirement Traceability and briefly explain each category?

Answer: Categories of Traceability:

- Requirements-sources traceability
- Requirements-rationale traceability
- Requirements-requirements traceability
- Requirements-architecture traceability
- Requirements-design traceability
- Requirements-interface traceability

Requirements-sources traceability: Links the requirement and the people or documents which specified the requirement

Requirements-rationale traceability: Links the requirement with a description of why that requirement has been specified. This can be a distillation of information from several sources

Requirements-requirements traceability: Links requirements with other requirements which are dependent on them. This should be a two-way link (dependent on them and is-dependent on)

Requirements-architecture traceability: Links requirements with the sub-systems where these requirements are implemented. This is particularly important where sub-systems are being developed by different sub-contractors

Requirements-design traceability: Links requirements with specific hardware or software components in the system, which are used to implement the requirement

Requirements-interface traceability: Links requirements with the interfaces of external systems, which are used in the provision of the requirements

Q10. How inspection is better technique for removal of defects?

Answer: Inspections, by all accounts, do a better job of error removal than any competing technology, and they do it at a lower cost. Inspections are conducted by a group of people working on the project, with the objective to remove defects or errors. Every member of the inspection team has to read and evaluate requirements documents before coming to the meeting and a formal meeting is conducted to discuss requirements errors.

Requirements errors detected during this inspections save lot of money and time as requirements errors do not flow into the design and development phases of software development process.

Q11. Describe Review Process.

Answer: Plan review: The review team is selected and a time and place for the review meeting is chosen. **Distribute documents:** The requirements document is distributed to the review team members. **Prepare for review:** Individual reviewers read the requirements to find conflicts, omissions, inconsistencies, deviations from standards and other problems. **Hold review meeting:** Individual comments and problems are discussed and a set of actions to address the problems is agreed. **Follow-up actions:** The chair of the review checks that the agreed actions have been carried out. **Revise document:** The requirements document is revised to reflect the agreed actions. At this stage, it may be accepted or it may be re-reviewed.

Q12. What is Ease of use and reliability?

Answer: Ease of Use: 1. Training time 2. Number of help frames
Requirements related to “Ease of use” can use different measures to quantify the goal.
Reliability: 1. Mean time to failure 2. Probability of unavailability 3. Rate of failure occurrence
4. Availability
Requirements related to “Reliability” can use different measures to quantify the goal

Q13. “Process improvement makes things better”. How it can benefit for an organization?
Answer:
Process improvement is concerned with modifying processes in order to meet some improvement objectives
• Improvement objectives
– Quality improvement

– Schedule reduction
– Resource reduction
Process Maturity
• Process maturity can be thought of as the extent that an organization has defined its processes, actively controls these processes and provides systematic human and computer-based support for them
• The SEI's Capability Maturity Model is a framework for assessing software process maturity in development organizations
CMM Level 1: Initial
Organizations have an undisciplined process and it is left to individuals that how to manage the process and which development techniques to use
CMM Level 2: Repeatable
Organizations have basic cost and schedule management procedures in place. They are likely to be able to make consistent budget and schedule predictions for projects in the same application area
CMM Level 3: Defined
The software process for both management and engineering activities is documented, standardized and integrated into a standard software process for the organization
CMM Level 4: Managed
Detailed measurements of both process and product quality are collected and used to control the process
CMM Level 5: Optimizing
The organization has a continuous process improvement strategy, based on objective measurements, in place

Q14. What are key components of requirement elicitation?

Answer: 1. Application domain. **2.** Problem to be solved. **3.** Business context. **4.** Stakeholder needs and constraints

Application domain understanding:
Application domain knowledge is knowledge of the general area where the system is applied.

Problem understanding:
The details of the specific customer problem where the system will be applied must be understood.

Business understanding:
You must understand how systems interact and contribute to overall business goals.

Understanding the needs and constraints of system stakeholders:
You must understand, in detail, the specific needs of people who require system support in their work.