

1. What is the software requirement? What is Requirement Engineering?

Suggested answer: software requirement describes what the system shall do, reflecting the needs of customers for a system. Requirement Engineering is the process to find out, analyze, make document and check the needs and the constraints.

2. Explain using your own words the difference between user requirement and system requirement.

Suggested Answer: System requirements describe what the system shall do. System requirements are more detailed descriptions of the software system's functions, services, and operational constraints. System requirements are classified as either functional or non-functional (supplemental) requirements in terms of functionality feature of the requirement. The user requirements (user needs) describe what the user does with the system. The user requirements can vary from broad statements of the system features, precise descriptions of the system functionality.

3. Discover ambiguities or omissions in the following statement of requirements for part of a ticket-issuing system:

- An automated ticket-issuing system sells rail tickets. Users select their destination and input a credit card and a personal identification number. The rail ticket is issued and their credit card account charged. When the user presses the start button, a menu display of potential destinations is activated, along with a message to the user to select a destination. Once a destination has been selected, users are requested to input their credit card. Its validity is checked and the user is then requested to input a personal identifier. When the credit transaction has been validated, the ticket is issued.

Suggested answer:

Ambiguities and omissions include:

1. Can a customer buy several tickets for the same destination together or must they be bought one at a time?
2. Can customers cancel a request if a mistake has been made?
3. How should the system respond if an invalid card is input?
4. What happens if customers try to put their card in before selecting a destination (as they would in ATM machines)?
5. Must the user press the start button again if they wish to buy another ticket to a different destination?
6. Should the system only sell tickets between the station where the machine is situated and direct connections or should it include all possible destinations?
7. Train departure and arrival times. Do customers buy ticket for a specific train? Or for any trip along the route? (If the latter, than no way to tell if all the seats on a train are sold out, or can you do seat assignment?
8. What type of input device (Touchscreen vs Keyboard) system supports?
9. Print receipt for ticket details?

4. Explain using your own words the difference between functional requirement and non-functional requirement.

Suggested answer:

Functional requirements These are statements of services the system should provide. How the services should react and behave in certain condition. In some cases, the functional requirements may also explicitly state what the system should not do. They are described in an abstract way that can be understood by the system users. More specific functional system requirements describe the system functions, its inputs and outputs, exceptions, etc., in detail. The functional requirements specification of a system should be both complete and consistent. • In practice, for large, complex systems, it is practically impossible to achieve requirements consistency and completeness.

Non-functional requirements These are constraints on the services or functions offered by the system. Non-functional requirements often apply to the system as a whole, rather than individual system features or services. The distinction between different types of requirement is not as clear-cut as these simple definitions suggest. Non-functional requirements do not directly concern with the specific services delivered by the system to its users. Non-functional requirements include system properties such as reliability, response time, and store occupancy, and the constraints on the system implementation such as performance, security, or availability. A single non-functional requirement may generate a number of related functional requirements.

5. Write a set of non-functional requirements for the ticket-issuing system, setting out its expected reliability and response time.

Suggested answer:

Possible non-functional requirements for the ticket issuing system include:

1. Between 0600 and 2300 in any one day, the total system down time should not exceed 5 minutes.
2. Between 0600 and 2300 in any one day, the recovery time after a system failure should not exceed 2 minutes.
3. Between 2300 and 0600 in any one day, the total system down time should not exceed 20 minutes.
4. After the customer presses a button on the machine, the display should be updated within 0.5 seconds.
5. The ticket issuing time after credit card validation has been received should not exceed 10 seconds.
6. When validating credit cards, the display should provide a status message for customers indicating that activity is taking place.
7. The maximum acceptable failure rate for ticket issue requests is 1: 10000.
8. The system shall continue to function so long as roll of ticket paper is in the machine, and a network connection is provided for the destination database and credit transactions.

6. What factors influence the completeness and accuracy of the software requirement? Explain your answer.

Suggested answer (ppt35 -36)

There are many factors influence the quality of software requirements. For example

- Understanding: for example, customers vaguely describe their requirements and only have limited information on the user cases. The customers express their requirements in their own terms with implicit knowledge of their own business.
- Different expectations: different stakeholders may want different functions and/or prioritize the functions differently
- Market and business environments: the customers may change their requirements during the process

Additional reading:

https://www.researchgate.net/figure/Factors-that-influence-the-whole-process-of-requirements-elicitation_tbl1_327160869

7. Describe in detail what is an Ethnography.

Suggested answer

(In English, Ethnography means the scientific description of the customs of individual peoples and cultures.)

In software engineering, Ethnography means that software systems are used in a social and organizational context and software system requirements may be derived or constrained by that context. It is because that to satisfy these social and organizational requirements is often critical for the success of the system.

Ethnography is an observational technique that can be used to understand operational processes and help derive support requirements for these processes. An analyst immerses himself or herself in the working environment to observe the actual tasks in which participants are involved. It helps discover implicit system requirements that reflect the actual ways that people work

8. Write a structured specification of the requirement for a “cash-dispensing function in a bank ATM” using the below suggested format: (ppt61 -63)

Function name	ATM cash dispenser
Description	Verifies the cardholder's pin number and dispenses the amount of cash desired.
Main actor(s)	ATM card holder
Pre-condition	User must have enough money in their account; ATM must have enough money; user's pin number must be correct.
Post-condition	Amount of cash in ATM must be subtracted; transaction must be recorded.

Main scenario	<ol style="list-style-type: none"> 1. User inserts debit card; 2. user inputs pin; 3. ATM check the validity of the pin; 4. user enters amount of cash desired; 5. ATM checks if user's account has enough cash to be dispensed; 6. ATM checks if ATM has enough cash to be dispensed; 7. ATM dispenses cash if these checks are passed; 8. ATM eject the debit card and print a receipt.
Exception	<p>Exception 1</p> <ol style="list-style-type: none"> 1. User inserts an invalid debit card; 2. ATM eject the invalid card <p>Exception 2</p> <ol style="list-style-type: none"> 1. User inserts debit card; 2. User inputs pin; 3. ATM check the validity of the pin; user entered invalid pin; 4. ATM eject the card; <p>Exception 3</p> <ol style="list-style-type: none"> 1. User inserts debit card; 2. user inputs pin; 3. ATM check the validity of the pin; 4. user enters amount of cash desired; 5. ATM checks if user's account has enough cash to be dispensed; 6. User has not enough money, ATM display relevant message and go back to step 4. <p>Exception 4</p> <ol style="list-style-type: none"> 1. User inserts debit card; 2. user inputs pin; 3. ATM check the validity of the pin; 4. user enters amount of cash desired; 5. ATM checks if user's account has enough cash to be dispensed; 6. ATM checks if ATM has enough cash to be dispensed; 7. ATM has not enough money, ATM display relevant message and go back to step 4