

## Practical 1 :- Identifying the Requirements from Problem Statements.

### Introduction :-

The identification of requirements is the initial phase in any software development project. No other task (design, coding, testing) could begin until the client's needs were properly established and verified. Typically, business analysts with domain understanding of the subject matter meet with clients to discuss and decide which features should be added.

We will learn how to determine functional and non-functional requirements from a problem statement in this experiment. The primary components of a Software Requirements Specification are functional and non-functional requirements.

### Objectives:-

You will be able to do the following after completing this experiment :-

- Examine a requirements specification for ambiguities, contradictions, and gaps.
- Determine and document functional needs.
- Non-functional requirements should be identified and stated.

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### Requirements :-

"Requirement" is defined by Sommerville as a specification of what should be implemented. The target system's behaviour is defined by requirements. It tells you what to do, but not how. Requirements engineering is the process of determining what a client expects from a system and documenting those expectations in a standard, easily readable, and understandable way. This documentation will be used as guide for the system's subsequent design, implementation, and testing.

Before we begin planning, designing, and implementing the software system for our client, it is critical that we understand its need. There will be major challenges, as well as consumer unhappiness, if we do not have a clear picture of what is to be developed and what all characteristics are expected.

### Characteristics of Requirements :-

The following three properties should be present in any requirements gathered for a new system to be developed:-

- **Unambiguity**:- There should be no doubt about what a future system should accomplish. Consider the following scenario: you're working on a web application for a client. The client wants a large number of individuals to be able to use the

applications at the same time. What constitutes a "sufficient quantity of people"? To you, this could mean 10, but to the client, it could be 100. There's an ambiguity.

- **Consistency** :- Consider the automation of a nuclear power plant as an example. If the radiation level inside the plant exceeds R1, all reactors should be shutdown, according to one of the clients. However, another customer representative advise that the R2 level be used as the threshold radiation level. As a result, there is a discrepancy between the two end users in terms of what they believe to be safe dose of radiation.
- **Completeness** :- A system requirement should state both what the system should do and what it should not do. Consider the software that will be built for ATMs. If a consumer enters a value that exceeds the limit withdrawal amount, the ATM should display an error message and refuse to issue cash.

### Categorization of Requirements:-

Based on the target audience or subject matter, requirements can be categorised into different sorts, as shown below:

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- **User requirements** :- They're stated in natural language so that both consumers can verify their requirements have been appropriately identified.
- **System requirements** :- They're written with technical phrases and/or specs in mind and they're aimed towards development & testing teams.

Based on what they explain, requirements can be divided into two groups :-

- **Functional requirements (FRs)** :- These specify a system's functioning, such as how it should react to a specific set of inputs and what the output should be.
- **Non-functional requirements (NFRs)** :- They are not directly related what functionalities are expected from the system. NFRs, on the other hand, can typically define how the system should behave in specific instances. A NFR might specify, for example, that the system should work with 128MB of RAM. In such circumstances, an NFR may be more important than a FR.

Non-functional requirements could be further divided into categories such as:

- **Product requirements**: For example, a requirement that the web application utilise only plain

HTML and no frames.

- Performance requirements :- For example, the system should remain available 24x7.
- Organizational requirements :- The development process should comply to SEI CMM level 4.

### Functional Requirements :-

#### Identify Functional Requirements

The functional requirements could be identified from a problem description by focusing on the following points :-

- Simply by understanding the problem conceptually, identify the high-level functional requirements. A Library Management System, for example, should be able to issue and return books in addition to everything else.
- Identify the situations in which a system allows an end user to accomplish something useful. In a digital library, for example, a user might use the "Search Book" feature to learn more about the books he's interested in.
- If we treat the system as a black box, we

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can see that it has certain inputs and outputs. The system's functionalities are defined by this block box. For example, to find a book, the user enters the title and receives the book's details and location as an output.

- Any high-level requirement found may have multiple sub-requirements. The "Issue Book" module, for example, could respond differently for different types of users, or for a single user who has issued the book three times in a row.

### Preparing Software Requirements Specifications

The Software Requirements Specification (SRS) is to be developed once all feasible FRs and non-FRs have been identified and are full, consistent, and non-ambiguous. For this reason, IEEE provides a template, which is also available here. The service provider creates the SRS, which is then confirmed by the client. The client and the service provider sign this form as a legal agreement. After the concerned system has been constructed and deployed, if a planned feature is not found in the system, the client can raise an issue through the SRS. Also, if the client requests a new feature that was not specified in the SRS after delivery, the service provider can refer back to the SRS. The current experiment, however, does not include the creation of an SRS.

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## Identifying the Requirements from Problem Statements

       

**1. When is feasibility study done?**

After requirements specifications have been finalized  
 During the period when requirements specifications are prepared  
 Before the final requirements specifications are done  
 Could be done at any time

**2. A good requirement specification is one, which is**

Consistent  
 Complete  
 Unambiguous  
 All of the above

**3. Requirement specification is done**

After requirements are determined  
 Before requirements are determined  
 Simultaneously with requirements determination  
 Independent of requirements determination

**4. Functional requirements of a system are related to**

Using the system (by users) to get some meaningful work done  
 How the system functions under different constraints  
 Whether they adhere to the organization policies

**5. SRS refers to**

Software Requirements Specification  
 System Resources Statement  
 Statement of Reliability of System  
 Standard Requirements Statement

**6. The main objective behind preparing a SRS is to**

Let client and developers agree that they understand each other  
 Formally note down the requirements  
 Estimate the cost of development  
 To judge whether the project could be undertaken

 

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## Steps for conducting the experiment :-

### General Instructions:-

Following are the steps to be followed in general to perform the experiments in Software Engineering Virtual lab.

- 1] Read about the experiment's theory.
- 2] View the simulation for a specific, related problem.
- 3] Take the self-assessment to see how well you've grasped the material (optional, but recommended).
- 4] Complete the exercises on the provided list.

### Experiment Specific Instructions:-

Following are the instructions specifically for the experiment.

- 1] Try to identify any inconsistencies in the required definition based on the problem statement.
- 2] Also, try to figure out what requirements are functional and non-functional.
- 3] Select the appropriate check boxes, then click the 'Submit' button.

  
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## Identifying the Requirements from Problem Statements



Select 1

**Consider the problem statement for an "Online Auction System" to be developed:**

New users can register to the system through an online process. By registering a user agrees to abide by different pre-defined terms and conditions as specified by the system. Any registered user can access the different features of the system authorized to him / her, after he authenticates himself through the login screen. An authenticated user can put items in the system for auction. Authenticated users can place bid for an item. Once the auction is over, the item will be sold to the user placing the maximum bid. Payments are to be made by third party payment services, which, of course, is guaranteed to be secure. The user selling the item will be responsible for its shipping. If the seller thinks he's getting a good price, he can, however, sell the item at any point of time to the maximum bidder available.

**Learning Objectives:**

1. Learn about the three different aspects that have to be taken care of while writing requirements specification

**Limitations:**



**Following are the ambiguities**

None  
 There's no specification when an auction gets over  
 It doesn't say who are registered users  
 No mention about what technology to be used for developing the application

**Following are the inconsistencies**

None  
 An item is said to be sold to the max bidder after auction is over; it can also be sold before the auction is over  
 A registered user seems could be both buyer and seller

**The problem statement is incomplete because**

None  
 No mention of how a new user registers  
 No mention of any dispute regarding the sold product  
 No mention of what kind of products could be put on auction



**Result**  
Excellent!



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## Identifying the Requirements from Problem Statements



Select 2

**Consider the problem statement for an "Online Auction System" to be developed:**

New users can register to the system through an online process. By registering a user agrees to abide by different pre-defined terms and conditions as specified by the system. Any registered user can access the different features of the system authorized to him / her, after he authenticates himself through the login screen. An authenticated user can put items in the system for auction. Authenticated users can place bid for an item. Once the auction is over, the item will be sold to the user placing the maximum bid. Payments are to be made by third party payment services, which, of course, is guaranteed to be secure. The user selling the item will be responsible for its shipping. If the seller thinks he's getting a good price, he can, however, sell the item at any point of time to the maximum bidder available.

**Learning Objectives:**

- Identifying different functionalities to be obtained from a system

**Limitations:** This list is in no way complete; exercise #4 would address this again



**Following functional requirements could be obtained from the requirements specifications**

Registration: New users have to register themselves online with the site and accept its terms & conditions 

User Login: A user has to log in to the site using his correct user ID & password 

Upload Item for Auction: An authenticated user can upload an item into the site, which is to be put on auction subsequently 

Auction Item: User puts an item already uploaded by him into the site on auction 

Balance Check: Bidder should have enough bank balance to bid

Bid for Item: Any registered & authenticated user of the system could place a bid for an item on auction 

Win Auction: After the auction is over, the maximum bidder for the item owns the item post payment 

Ship Item: Seller of the item ships the item to the auction owner after he (seller) receives the payment 

Availability: The system should remain up & running before, during and after an auction

Remove item: Owner removes an item after uploading it, and doesn't put it on auction 

Remove auctioned item: System automatically removes an item from its inventory after it has been successfully auctioned 

Site Support: Customer care for the website should provide 24x7 help over phone



**Result**  
Excellent!

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## Identifying the Requirements from Problem Statements

  
Select 3

**Consider the problem statement for an "Online Auction System" to be developed:**

New users can register to the system through an online process. By registering a user agrees to abide by different predefined terms and conditions as specified by the system. Any registered user can access the different features of the system authorized to him / her, after he authenticates himself through the login screen. An authenticated user can put items in the system for auction. Authenticated users can place bid for an item. Once the auction is over, the item will be sold to the user placing the maximum bid. Payments are to be made by third party payment services, which, of course, is guaranteed to be secure. The user selling the item will be responsible for its shipping. If the seller thinks he's getting a good price, he can, however, sell the item at any point of time to the maximum bidder available.

**Learning Objectives:**

- Identifying characteristics that a system should have, but not done by the system itself

**Limitations:**



**Following possible non-functional requirements could be identified from the requirements specifications**

The system provides option for online registration of new users  
 The system should remain up & running throughout its working hours  
 System automatically removes an item from its database after it has been successfully auctioned  
 Sessions of different users must not affect each other  
 Customer care for the website should provide 24x7 help over phone  
 System should maintain privacy of their users and should not leak their information to third parties  
 System should be able to service 100 users simultaneously  
 System could remain unavailable for up to 2 hours for maintenance once in a quarter with 36 hour prior notice



**Result**  
Excellent!

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