

SOFTWARE ENGINEERING LABORATORY

Question-1	To identify the role of software in today's world across a few significant domains.
<p>Problem Description: Software is part of our daily life, identify the areas (or application or systems) how software has been leveraged extensively in the following domains</p> <ol style="list-style-type: none"> Health Care - <i>With the increase in the number of patients as well as the various health services as well as diseases, maintaining a database for health records is the need of the hour, with centralised storage systems slowly moving towards decentralised systems. This helps healthcare professions keep track of their patients as well as helps patients to access all their records on a single platform.</i> Airlines – <i>Airline booking services for various airlines have been used extensively, and have replaced the old systems of over-the-counter ticket booking services. Nowadays, almost all flight tickets are also booked online. Additionally, all airline services also employ complex systems to keep track of flights, crew members and scheduling of various other miscellaneous items.</i> Banking Insurance - <i>Every banking organization maintains its own application software which contains databases of customers, their accounts and all other transaction and account details. These details have to be maintained in real time and updated with every transaction. Additionally, a customer's account details such as balance and other factors are used to maintain insurance information about the customer. Insights from details are also needed for marketing, research and service purposes. This helps drive business related decisions as well.</i> Retail Industry – <i>Retail industries have been greatly benefited by softwares used to drive business decisions. Various analytical tools help assess the customer market and its demands and helps retailers make the right decisions and market the right products and services. It also helps companies keep track of their sales and loss.</i> Education – <i>Education has become one of the most affected areas with the boom of the IT and software industries. From online course platforms such as Coursera and Udemy to even classroom portals to manage classrooms, activities and students such as Google Classroom, education aimed services has seen a high demand – especially in recent times due to the COVID-19 pandemic.</i> <p>Specify any one application and its role for each of the above specified domain's</p> <p>Answer the following Questions:</p> <ol style="list-style-type: none"> Define software - <i>Software consists of any applications and processes including the operation system that run on hardware and help a user carry out various tasks. They consist of instructions that tell the computer what to do. The software makes the hardware run.</i> Give different example software's <i>Microsoft Word, Microsoft Excel, Adobe Photoshop, Chrome Browser</i> Give the Importance of software in human life <i>Softwares help users carry out various tasks. They help the user to interact with the hardware and use the system for various tasks from browsing the internet to typing documents. Without software, users cannot use the hardware and hence the computer would be useless. Without the operating system, any other softwares cannot be installed and used as well.</i> List any future expected softwares <i>Softwares in the future can be used to automate various processes, from security systems and check-ins using facial recognition, to automated correction of answer scripts in examinations. Future softwares may also exist to replace the current system of education with teachers, with everything happening through educational platforms.</i> 	

Question-2

To identify the problem related to software crisis for a given scenario

Problem Description: For each below mentioned scenarios, identify the most appropriate problem related to software crisis based on the given options (map the problems related to software crisis to the given scenarios)

1. Time Slippage
2. Failure at customer Site
3. Cost Slippage
4. Intractable Error after delivery

Scenario A: Airline reservation software was delivered to the customer and was installed in one of the airports at 12.00 AM (mid-night) as per the plan. The system worked quite fine till the next day 12.00 PM (noon). The system crashed at 12.00 PM and the airport authorities could not continue using software for reservation till 02.00 PM. It took two hours to fix the defect in the software.

Scenario B: A polar satellite launch vehicle was scheduled for the launch on October 16th. The auto-pilot of the rocket to be delivered for integration of the rocket on July 16th. The design and development of the software for the auto-pilot more effort because of which the auto-pilot was delivered for the integration on August 16th (delayed by a month). The rocket was launched on November 16th (delayed by a month).

Scenario C: Software for financial systems was delivered to the customer. Customer informed the development team about a malfunction in the system. As the software was huge and complex, the development team could not identify the defect in the software.

Scenario D: Due to the defect in the software for the baggage handling system. There was a loss of 2M Dollars of revenues for the airport authorities.

Scenario	Software Crisis
A	Failure at customers site
B	Time Slippage
C	Intractable Error after delivery
D	Cost Slippage

Answer the following Questions:

1. What do you mean by software crisis?

Software crisis is a term used in the early days of computing science for the difficulty of writing useful and efficient computer programs in the required time. The software crisis was due to the rapid increase in computer power and the complexity of the problems that could be tackled. With the increase in the complexity of the software, many software problems arose because existing methods were inadequate.

2. Give an example of an error in any software

Functionality error – When a particular functionality is supposed to work in a certain way, but either does not work or works in an erroneous manner.

3. List any software failure feature

- Fatal vs non fatal
- Reproducible
- Corrupting
- Critical vs non-critical

4. What do you mean by a project

A project is any undertaking, software development, or application building that takes place either individually or in a collaborative effort and involves a lot of research, design, brainstorming and creative thinking to plan out and implement the idea which usually has an aim or target and solves a problem.

5. Differentiate between a process and a project

A process is any procedure that involves a sequence of steps that need to be carried out or executed to produce a certain result, or solve a problem. A process is used to carry out a functionality or sometimes

many processes are required to work together to carry out a functionality of an application.

A project is a course of action or work-plan that delivers a final product. A project will consist of research, planning, as well as software development to build a solution to solve a problem. A project will consist of building various processes that work together in an application to solve a problem and carry out a specific task with a fixed aim or target.

Question-3

To identify the various requirements development activities viz. elicitation, analysis, specification and verification for the given scenarios

Background: Requirement engineering produces a specification of what a system should do. The intention of requirement engineering is to provide a clear definition of requirement of the systems. This phase is a very important phase because, if the customer requirements are not clearly understood, the ambiguity can get into the other phase of the development. To avoid such issues, requirement has to be elicited using the right elicitation techniques, to be analyzed effectively, specified clearly and verified thoroughly.

All activities are collectively termed as requirement development activities.

Problem Description: Identify the requirement engineering activities associated with each of the following scenarios.

- Akshay is creating an online survey questionnaire for inviting user feedback on the desired features of the application to be developed.
- Vipin is preparing a document which is formal to include all the desired features identified by the survey.
- Bob is identifying all scalability related requirement, security related requirements and performance related requirements from other requirements.
- Rama a team member is sent to client location to observe the business and collect specific requirements of the user.
- Mark as a team member is working on requirements elicited to ensure that they should not be vague and unclear.
- Ana is conducting a facilitated meeting to prompt the requirements with the stakeholders.

Scenario	Requirement Development Activities
A	Requirement Elicitation
B	Requirement Specification
C	Requirement Analysis
D	Requirement Elicitation and Analysis
E	Requirement Analysis and Verification
F	Requirement Elicitation

Answer the following Questions:

1. Define a requirement.

A requirement is a condition, objective or capability or functionality required by a customer or stakeholder that can either perform a specified task or achieve an objective by solving a problem.

2. Give an example for a requirement.

The requirement for a movie booking application can be - The latency to render pages and interface elements on the website and the app should be less than 3 seconds, and when a customer clicks on book now, it should load the various options.

3. List the classifications of the requirements.

Requirements can be classified into:

- Functional Requirements
- Non-Functional Requirements
- Domain Requirements

4. Define non functional requirements

A non-functional requirement is a requirement that specifies criteria that can be used to judge or assess the operation of a system, and not specific behaviours. It defines the system's operation capabilities and constraints that enhance its functionality. These may include speed, security or reliability. A non-functional requirement specifies the quality attribute of a software system.

Question-4

To exhibit skills on modeling concepts learnt using design tool – Use Case Diagram

Identify the use cases and actors for Supermarket System and depict it with a Use Case diagram:

Supermarket: A supermarket needs to develop the software to encourage regular customers. For this, the customer needs to supply his/her residence address, telephone number, and the driving license number. Each customer who registers for this scheme is assigned a unique customer number (CN) by the computer. A customer can present his CN to the checkout staff when he makes any purchase. In this case, the value of his purchase is credited against his CN. At the end of each year, the supermarket intends to award surprise gifts to 10 customers who make the highest total purchase over the year. Also, it intends to award a 22 caret gold coin to every customer whose purchase exceeded Rs.10,000. The entries against the CN are the reset on the day of every year after the prize winners' lists are generated.

