# Mid Assessment│Summer 2023

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**CSE** - 21st Batch │ **Course Title:** Software Engineering

**Course Code:** CSI - 321 │ **ID:** 2121210071

# Answer to the Question no- 1

## (a)

**Software Engineering-**

Software engineering is the branch of computer science that deals with the design, development, testing, and maintenance of software applications. Software engineers apply engineering principles and knowledge of programming languages to build software solutions for end users.

## (b)

**SDLC Activities-**

SDLC or the Software Development Life Cycle is a process that produces software with the highest quality and lowest cost in the shortest time possible. SDLC provides a well-structured flow of phases that help an organization to quickly produce high-quality software which is well-tested and ready for production use.

The Software Development Life Cycle (SDLC) refers to a methodology with clearly defined processes for creating high-quality software. in detail, the SDLC methodology focuses on the following phases of software development:

- Requirement analysis
- Planning
- Software design such as architectural design
- Software development
- Testing
- Deployment

**Spiral Model-**

The Spiral Model is one of the most important Software Development Life Cycle models, which provides support for Risk Handling. In its diagrammatic representation, it looks like a spiral with many loops. The exact number of loops of the spiral is unknown and can vary from project to project. Each loop of the spiral is called a Phase of the software development process.

### Phases of Spiral Model-

The Spiral Model is a risk-driven model, meaning that the focus is on managing risk through multiple iterations of the software development process. It consists of the following phases:

- **Planning:** The first phase of the Spiral Model is the planning phase, where the scope of the project is determined and a plan is created for the next iteration of the spiral.
- **Risk Analysis:** In the risk analysis phase, the risks associated with the project are identified and evaluated.
- **Engineering:** In the engineering phase, the software is developed based on the requirements gathered in the previous iteration.
- **Evaluation:** In the evaluation phase, the software is evaluated to determine if it meets the customer's requirements and if it is of high quality.
- **Planning:** The next iteration of the spiral begins with a new planning phase, based on the results of the evaluation.

(c)

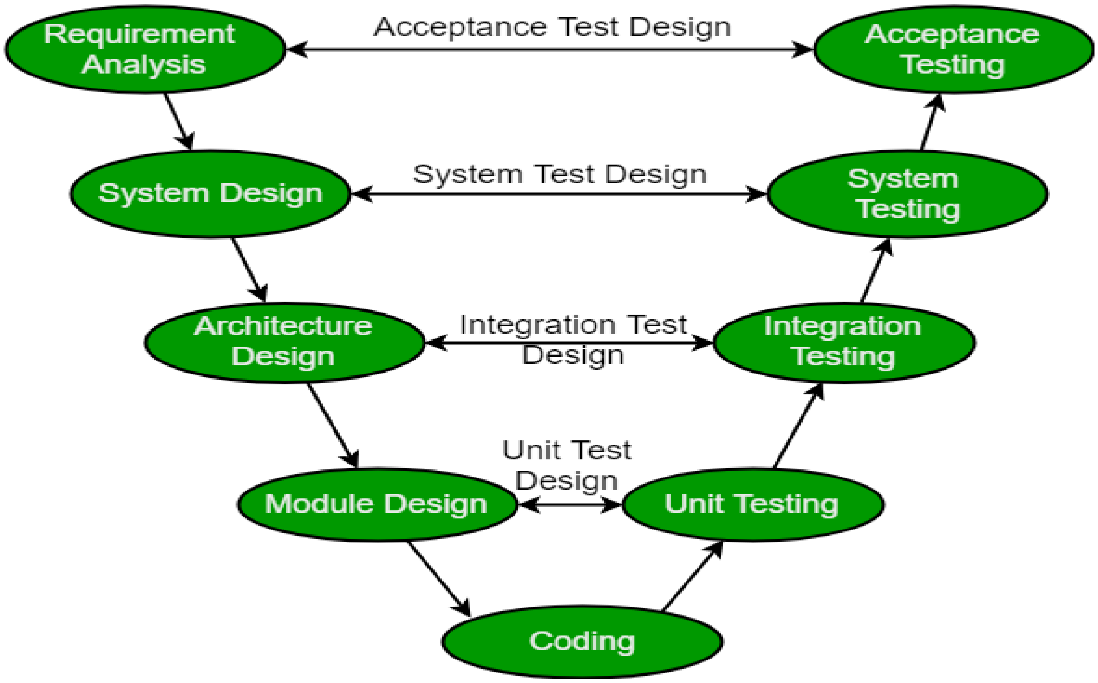
### The V-Model-

The V-Model is a software development life cycle (SDLC) model that provides a systematic and visual representation of the software development process. It is based on the idea of a "V" shape, with the two legs of the "V" representing the progression of the software development process from requirements gathering and analysis to design, implementation, testing, and maintenance.

**The V-Model is a linear and sequential model that consists of the following phases:**

1. **Requirements Gathering and Analysis:** This is where the customer's requirements for the software are gathered and analyzed to determine the scope of the project.
2. **Design:** In the design phase, the software architecture and design are developed, including the high-level design and detailed design.
3. **Implementation:** In the implementation phase, the software is actually built based on the design.
4. **Testing:** In the testing phase, the software is tested to ensure that it meets the customer's requirements and is of high quality.

5. **Deployment:** In the deployment phase, the software is deployed and put into use.
6. **Maintenance:** In the maintenance phase, the software is maintained to ensure that it continues to meet the customer's needs and expectations.
7. **Verification:** It is the process of evaluation of the product development phase to find whether specified requirements meet.
8. **Validation:** Validation is the process to evaluate the software after the completion of the development phase to determine whether software meets the customer expectations and requirements.



**Design Phase:**

- Requirement Analysis.
- System Design
- Architectural Design
- Module Design

**Testing Phase:**

- Unit Testing
- Integration testing
- System Testing
- User Acceptance Testing (UAT)

## (d)

**Graphical user interface elements-**

Graphical user interface elements are those elements used by graphical user interfaces (GUIs) to offer a consistent visual language to represent information stored in computers. These make it easier for people with few computer skills to work with and use computer software.

Graphical user interfaces use visual conventions to represent the generic information shown. Some conventions are used to build the structure of the static elements on which the user can interact, and define the appearance of the interface.

**Window:** This is the element that displays the information on the screen. It is very easy to manipulate a window. It can be opened or closed with the click of an icon. Moreover, it can be moved to any area by dragging it around. There are multiple types of windows in a graphical user interface, such as container window, browser window, text terminal window, child window, message window etc.

**Menu:** A menu contains a list a choices and it allows users to select one from them. A menu bar is displayed horizontally across the screen such as pull down menu. When any option is clicked in this menu, then the pull down menu appears.

**Icons:** Files, programs, web pages etc. can be represented using a small picture in a graphical user interface. This picture is known as an icon. Using an icon is a fast way to open documents, run programs etc. because clicking on them yields instant access.

**Controls or Widgets:** Information in an application can be directly read or influences using the graphical control elements. These are also known as widgets. Normally, widgets are used to display lists of similar items, navigate the system using links, tabs etc. and manipulating data using check boxes, radio boxes etc.

**Tabs:** A tab is associated with a view pane. It usually contains a text label or a graphical icon. Tabs are sometimes related to widgets and multiple tabs allow users to switch between different widgets. Tabs are used in various web browsers such as Internet Explorer, Firefox, Opera, Safari etc. Multiple web pages can be opened in a web browser and users can switch between them using tabs.

# Answer to the Question no- 2

## (a)

**Project manager-**

Project managers in software organize software projects and can assign tasks to software engineering teams according to the specifications of a task. Software project managers use their leadership skills, technical knowledge and experience to direct their teams and ensure software meets client requirements.

## (b)

**Role and Responsibilities of a software Project Manager-**

A software project manager is the most important person inside a team who takes the overall responsibilities to manage the software projects and plays an important role in the successful completion of the projects. Most of the managers take responsibility for writing the project proposal, project cost estimation, scheduling, project staffing, software process tailoring, project monitoring and control, software configuration management, risk management, managerial report writing and presentation and interfacing with clients. The task of a project manager are classified into two major types:

1. Project planning
2. Project monitoring and control

**Project planning-**

Project planning is undertaken immediately after the feasibility study phase and before the starting of the requirement analysis and specification phase. During the project planning the project manager performs the following activities:

1. **Project Estimation:** Project Size Estimation is the most important parameter based on which all other estimations like cost, duration and effort are made.
    - **Cost Estimation:** Total expenses to develop the software product is estimated.
    - **Time Estimation:** The total time required to complete the project.
    - **Effort Estimation:** The effort needed to complete the project is estimated.
2. **Scheduling:** After the completion of the estimation of all the project parameters, scheduling for manpower and other resources is done.
3. **Staffing:** Team structure and staffing plans are made.

4. **Risk Management:** The project manager should identify the unanticipated risks that may occur during project development risk, analyze the damage that might cause these risks, and take a risk reduction plan to cope with these risks.
5. **Miscellaneous plans:** This includes making several other plans such as quality assurance plans, configuration management plans, etc.
   - **Lead the team:** The project manager must be a good leader who makes a team of different members of various skills and can complete their individual tasks.
   - **Motivate the team-member:** One of the key roles of a software project manager is to encourage team members to work properly for the successful completion of the project.
   - **Tracking the progress:** The project manager should keep an eye on the progress of the project.
   - **Liaison:** The project manager is the link between the development team and the customer. Moreover, the project manager checks whether the project is fulfilling the customer's requirements or not.
   - **Monitoring and reviewing:** Project monitoring is a continuous process that lasts the whole time a product is being developed, during which the project manager compares actual progress and cost reports with anticipated reports as soon as possible.
   - **Documenting project report:** The project manager prepares the documentation of the project for future purposes. These reports help to maintain and enhance the quality of the project in the future.

- Knowledge of project estimation techniques
- Good decision-making abilities at the right time
- Previous experience of managing a similar types of projects
- Good communication skills to meet the customer satisfaction
- A project manager must encourage all the team members to successfully develop the product
- He must know the various type of risks that may occur and the solution to these problems

## (c)

**Objectives of Software Design-**

Following are the purposes of Software design:

1. **Correctness:** Software design should be correct as per requirement.
2. **Completeness:** The design should have all components like data structures, modules, and external interfaces, etc.
3. **Efficiency:** Resources should be used efficiently by the program.
4. **Flexibility:** Able to modify on changing needs.
5. **Consistency:** There should not be any inconsistency in the design.
6. **Maintainability:** The design should be so simple so that it can be easily maintainable by other designers.