

❖ JAVA – FULL STACK ASSIGNMENT 2024 MODULE - 1

1) What is a Program?

Ans :-

- Program-it is a set of instruction.

2) Write a simple "Hello World" program in two different programming languages of your choice. Compare the structure and syntax.

Ans:-

- ```
#include <stdio.h>
int main ()
{
 printf("hello world");
 Return 0;
}
```

3) Explain in your own words what a program is and how it functions.

Ans:-

- A program is a set of instructions that a computer follows to perform a specific task or set of tasks.
- The program receives input from the user, such as keyboard entries, mouse clicks, or data from a file.
- The program executes its instruction, one by one, using the computer's processor.
- Step-by-steps procedures for solving problems or performing tasks.

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4) What is Programming?

Ans:-

- Programming – To create a program.

5) What are the key steps involved in the programming process?

Ans:-

- a) Analyzing the problem
- b) Algorithm design
- c) Flowchart
- d) Coding
- e) Debugging
- f) Testing
- g) Final output
- h) Documentation

## 6) Types of Programming Languages?

Ans:-

- a) Procedural Programming
- b) Object Oriented programming
- c) Logical Programming
- d) Functional Programming

## 7) What are the main differences between high-level and low-level programming languages?

Ans:-

- High-level programming use is easy to read and write.
- Low-level languages is machine-dependent programming languages.

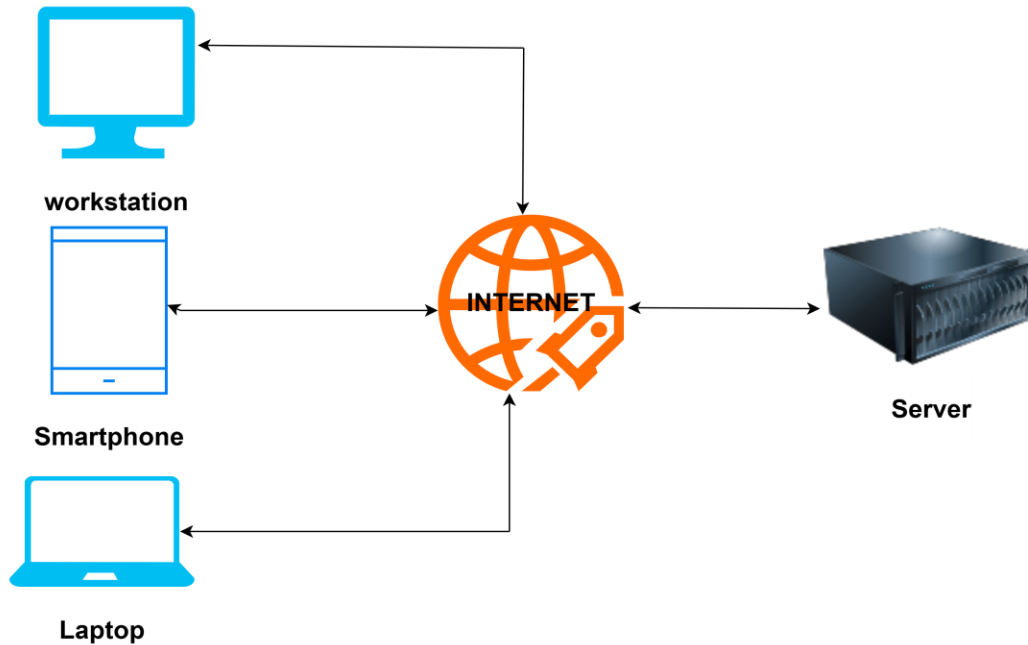
#### 8) World Wide Web & How Internet works?

Ans:-

- WWW : Is a collection of websites or web pages stored in web servers.
- The server retrieves the website and sends the correct data back to your computer.

#### 9) Research and create a diagram of how data is transmitted from a client to a server over the internet?

Ans:-



10) Describe the roles of the client and server in web communication?

Ans:-

- Client sometimes on is Doesn't communication directly with other clients.
- Server is always on is services request from many client hosts.

11) Network Layers on Client and Server?

Ans:-

- Network layers client-server.
  - a) Connection Establishment.
  - B) Addressing.
  - C) Packet Forwarding.
  - D) Error Handling.

12) Design a simple HTTP client-server communication in any language ?

Ans:-

- HTTP client-server communication in popular languages .

13) Explain the function of the TCP/IP model and its layers Client and Servers?

Ans:-

- TCP/IP encapsulates data into packets, adding source and destination IP addresses , ports ,and other control information.
- TCP/IP Layers:-
  - a) Application Layer (AL)

- b)Network Access Layer (NAL)
- c)Internet Layer(IL)
- d)Transport Layer(TL)

14) Explain Client Server Communication ?

Ans:-

- Client Server communication is a fundamental concept in computer networking , where two devices interact to exchange data or services.

15)Types of Internet Connections?

Ans:-

- Types of Internet Connections.
  - a)Digital subscriber line (DSL)
  - b)Cabel Internet
  - c)Fiber Optical
  - d)Satellite Internet
  - e)Wireless

16) Research different types of internet connections (e.g., broadband, fiber, satellite) and list their pros and cons.

Ans:-

- Broadband:
  - Broadband refers to a types oh high-speed internet connection.
  - That provides a fast and reliable way to access.
  - The internet, send and receive data, and communicate with others online.
- Fiber:
  - Fiber, also known as fiber optic, refers to a type of high-speed internet connection that uses light to transmit data through fiber optic cables.
- Satellite:
  - A satellite is a man-made object.
  - That is lunched into space and orbits around the earth or other celestial bodies.



17) How does broadband differ from fiber-optic internet?

Ans:-

- Broadband and fiber optic internet are both high-speed internet technologies.
- Broadband uses existing copper telephone lines or coaxial cables to deliver internet access.
- Broadband speeds typically range from 1 mbps to 100 mbps.
- Fiber optical internet uses light to transmit data through fiber optic cables, which are made up of thin glass or plastic fibers.
- Fiber optic internet speeds can range from 100 mbps to 10 Gbps.

18) Protocols?

Ans:-

- Protocol is a set of rules, convention, and standards that govern how devices, systems, or applications communicate with each other.

19) Simulate HTTP and FTP requests using command line tools (e.g., curl).

Ans:-

- HTTP Requests:-
  - a) GET Request: Use curl or wget to send a GET request to a URL.
  - b) POST Requests: Use curl to send a post request with data.
- FTP Requests:-
  - a) Connect to FTP Server: Use ftp command to connect to an FTP server.
  - b) Login to FTP Server: Use ftp command to login to an FTP server.

20) What are the differences between HTTP and HTTPS protocols?

Ans:-

- HTTP Protocols:

- 1) Use for internal networks, development environments, or situations where security is not concern.
- 2) HTTP does not provides a trusted connection.
- 3) Data is transmitted in plain text.
- 4) Used port 80 by default.

- HTTPS Protocols:

- 1) Use the public – facing websites, e-commerce sites, login pages, or any application that handles sensitive data.
- 2) Data is transmitted over an encrypted connection.
- 3) HTTPS provides a trusted connection.
- 4) Used port 443 by default.

## 21) Application Security?

Ans:-

- Application security refers to the practices, tools, and techniques used to protect software applications.

22) Identify and explain three common application security vulnerabilities Suggest possible solutions?

Ans:-

- 1) SQL Injection:

- When an attacker injects malicious SQL code into a web application's database.
- The input is not properly sanitized or validated.

2) Cross-Site Scripting(XSS):

- That occurs when an attacker injects malicious JavaScript code into a web page.
- An attacker submits malicious input to a web application's input field.

3)Cross-site Request Forgery(CSRF)

- That occurs when an attacker tricks a user into performing unintended action on a web application.

- The attacker tricks a user into visiting the malicious web page.
- Curl is a powerful command-line tool that can be used to simulate HTTP requests.
- Wget is another popular command-line tool that can be used to Simulate HTTP requests.

24) What is the role of encryption in securing applications?

Ans:-

Encryption plays a virtual role in securing applications by protecting sensitive data from unauthorized access, theft, or tampering.

25) Software Applications and Its Types?

Ans:-

- Software application are computer programs designed to perform specific tasks or provide services to users.
- Software Applications Types :-

- a) Application Software.
- b) System Software.
- c) Driver Software.
- d) Middleware.
- e) Programming Software.

26) Identify and classify 5 applications you use daily as either system software or application software?

Ans:-

- a) Google Chrome:-
  - Web browser for accessing and viewing online content.
- b) Microsoft Windows :-
  - Operating system that manages computer hardware and provides a platform.
- c) Microsoft Office Word:-
  - Word processing software for creating and editing documents.

d) Antivirus Software:-

→ Protects computer system from malware, viruses, and other security threats.

e) Adobe Photoshop:-

→ Image editing and graphics design software.

27) What is the difference between system software and application software?

Ans:-

- System Software:-

- System software acts as an intermediary between computer hardware and application software, enabling.

- The two communicate and function together seamlessly.

- Application software:-

→ It is designed to meet the needs of a particular industry, business, or individual, and is typically used to solve a problem, complete a task, or provide entertainment.

## 28) Software Architecture?

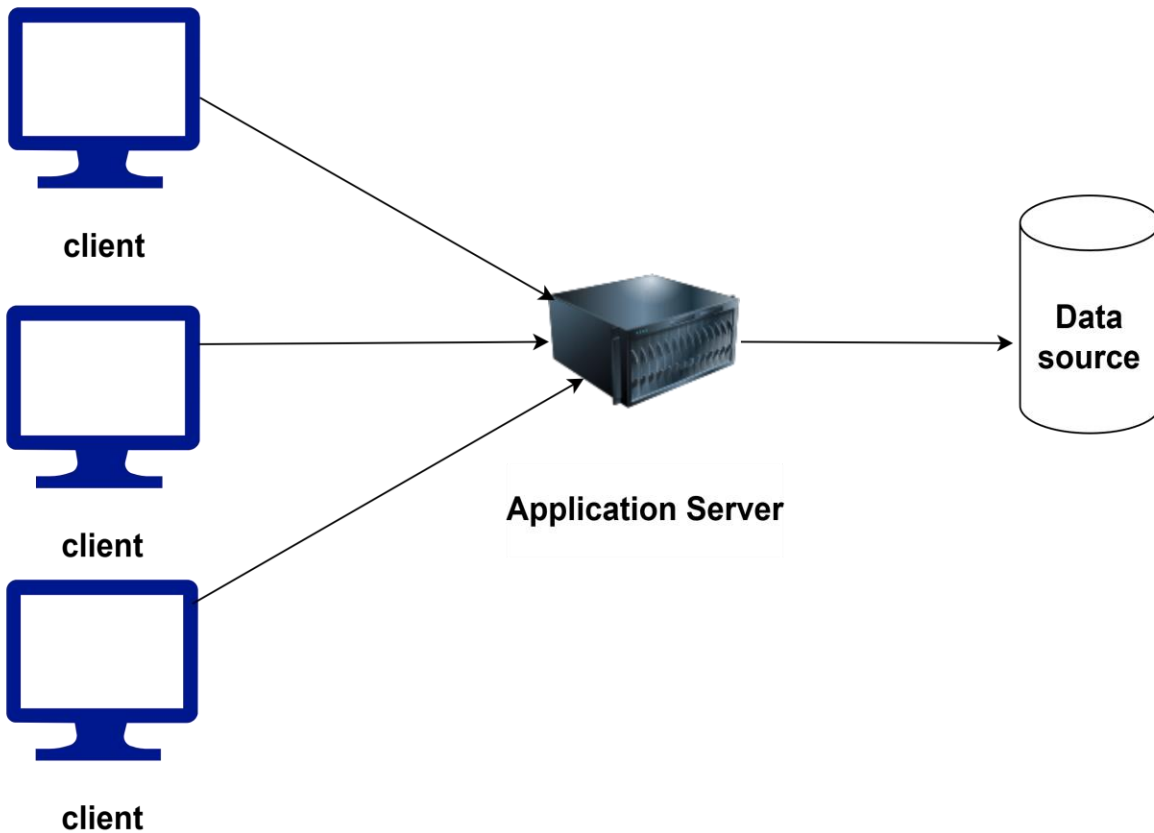
Ans:-

- Software architecture is the blueprint of building software.
- It provides a framework for understanding how the software system works, how it is organized, and how it interacts with its environment.

## 29) Design a basic three-tier software architecture diagram for a web application?

Ans:-





30) What is the significance of modularity in software architecture?

Ans:-

- Modularity is a fundamental concept in software architecture that refers to the degree to which a

system is composed of smaller, independent, and interchangeable modules.

### 31) Layers in Software Architecture?

Ans:-

- a) Presentation Layers.
- b) Application Layers.
- c) Business Layers.
- d) Persistence Layers.
- e) Database Layers.

### 32) Create a case study on the functionality of the presentation, business logic, and data access layers of a given software system?

Ans:-

- Presentation Layer:
  - The presentation layer of the the CRM-Plus application is responsible for rendering user interface and handling user input.
  - We verified that the user interface is intuitive and easy to navigate.

- Business Logic Layer:-
  - The business logic layer of the CRM-Plus application is responsible for executing the core business logic of the application.
- Data Access Layer:-
  - The data access layer of the CRM-Plus application is responsible for interacting with the database and retrieving or updating data.

33) Why are layers important in software architecture?

Ans:-

- Layers are important in software architecture for several reasons.
- Layers help isolate different concerns or components of the system, making it easier to develop, test, and maintain.

34) Software Environments?

Ans:-

- The combination of physical and logical components that support the development, execution, and management of software.
- A software environment refers to the combination of physical and logical components that support the development, execution, and management of software systems.

35) Explore different types of software environments (development, testing, production). Set up a basic environment in a virtual machine?

Ans:-

- Development Environment:-
  - A setup where developers create, code, and test software application.
  - It typically includes IDEs, compilers, debuggers, and version control system.
- Testing Environment:-
  - A setup designed to test software applications under various conditions, such

as different operating systems, browsers, or hardware configurations.

- Production Environment:-

→ It requires careful configuration, monitoring, and maintenance to ensure high availability, performance, and security.

36) Explain the importance of a development environment in software production?

Ans:-

- Improved Productivity a well-set-up development environment enables developers to work efficiently, focus on coding, and deliver high-quality software faster.

37) Source Code?

Ans:-

- Source code is the source of computer program.
- It contains declaration, instruction, functions, loops and other statements, which act as instructions for the program on how to function.

38) Write and upload your first source code file to GitHub?

Ans:-

- Source file steps:-

- 1) Create a GitHub account.
- 2) Install Git.
- 3) Create a New Repository.
- 4) Create a New Source Code File.
- 5) Initialize a Git Repository.
- 6) Add and Commit the File.
- 7) Link the Local Repository to GitHub.
- 8) Push the Changes to GitHub.

39) What is the difference between source code and machine code?

Ans:-

- Source code:-

- Source code is the human-readable instructions written in a programming language.
- It is the fundamental of software development, as it provides a set of instructions that a computer can understand and execute.
- Machine code:-
  - Machine code is the binary code that a computer's processor can execute directly.
  - It is the Lowest-level programming language, consisting of 0s and 1s that represent instructions and data.

#### 40) GitHub and Introductions?

Ans:-

- GitHub:-
  - GitHub is one of the most popular resource for developers to share code and work on projects together.
  - Git is used for managing the changes to a project over time.
- Introduction:-

- Introduction is the opening section or part of a text, speech, presentation, or other forms of communication.
- Its primary purpose is to provide a brief overview, establish the context, and set the tone for the rest of the content.

41) Create a GitHub repository and document how to commit and push code changes?

Ans:-

- Committing Code Changes:-
  - Create a new file in your repository.
  - Run the command `git add .txt` to stage the file.
  - Run the command `git log` to view the commit history.
- Push Code Changes:-
  - Run the command `git remote add origin`.
  - Run the command `git remote -v` to verify the remote repository.
  - Run the command `git push -u origin master` to push the changes to GitHub.



42) Why is version control important in software development?

Ans:-

- Version control is a crucial aspect of software development that enables developers to manage changes to their codebase over time.
- Version control enables multiple developers to work on the same codebase.

43) Student Account in GitHub?

Ans:-

- A student account in GitHub is a special type of account designed for students to help them learn and develop their coding skills.
- Students get access to GitHub learning lab, which offers interactive coding lessons and exercises.
- GitHub offers a range of benefits and features specifically for students, including.

44) Create a student account on GitHub and collaborate on a small project with a classmate?

Ans:-

- Go to your repository's settings, click on "Collaborators", and add your classmate's GitHub username.
- Create a new branch for your project using the command `git branch features/new-features`.
- Make changes to your code, commit them using `git commit -m "Commit Message"`.

45) What are the benefits of using GitHub for students?

Ans:-

- Students receive a free upgrade to GitHub.
- Students get access to GitHub learning lab, which offers interactive coding lessons and exercise.
- Students receive discounts on GitHub services like GitHub Pages, GitHub Actions, and more.

- Students can download GitHub a graphical users interface.

#### 46) Types of Software?

Ans:-

- Software Types:-
  - a) System Software.
  - b) Application Software.
  - c) Programming Software.
  - d) Utility Software.

#### 47) Create a list of software you use regularly and classify them into the following categories: system, application, and utility software?

Ans:-

- System Software:-
  - A customized operating system designed specifically for educational institution.
  - A set of device drivers that enable EduPro hardware components to communicate with the EduPro OS.

- Application Software:-
  - A web-based platform that enables teachers to create and manage online courses, assignments, and assessments.
  - A digital library of educational resources, including and interactive simulations.
- Utility System:-
  - A utility software that enables administrators to backup and recovers.
  - A utility software that enables administrators to clean up temporary files, and other unnecessary data to free up.

48): What are the differences between open-source and proprietary software?

Ans:-

- Open – Source:-
  - Open source refers to a type of software license.

- The source code is freely available for anyone to access, modify, and distribute.
- Open source software is often free or low-cost, reducing software expenses.
- Proprietary Software:-
  - Proprietary refers to software, technology, or intellectual property that is owned and controlled by a single company or individual.
  - The source code is not publicly available, and only the owning company has access to it.
  - Proprietary software often comes with dedicated support from the owning company.

#### 49) GIT and GITHUB Training?

Ans:-

- GIT:-
  - Git training refers to the process of learning and mastering the git version control system.

- Git training enables teams to collaborate more effectively on projects, reducing conflicts and improving overall productivity.
- GitHub:-
  - GitHub training refers to the process of learning and mastering.
  - the GitHub platform, a web-based version control system that allows developers to collaborate on software projects.
  - GitHub training enables teams to collaborate more effectively on projects, reducing conflicts and improving overall productivity.

50) Follow a GIT tutorial to practice cloning, branching, and merging repositories?

Ans:-

- Log in to your GitHub account.
- Fill in the repository name, description, and choose “public” or “private” visibility.
- Navigate to the directory where you want to clone the repository.

- Use the git branch command to create a new branch.
- Use the git merge command to merge the changes from the feature branch.

51) How does GIT improve collaboration in a software development team?

Ans:-

- Git keeps a record of all changes made to the code, allowing team members to track who made changes, when, and why.
- Git allows team members to work on the project locally, without relying on a centralization server.

52) Application Software?

Ans:-

- The most common type of software, application software is a computer software package that performs a specific function for a user, or in some cases, for another application.

53) Write a report on the various types of application software and how they improve productivity?

Ans:-

- Application software plays a virtual role in enhancing productivity in various industries and aspects of life.
- These software applications improve productivity by providing personalized learning experiences, feedback and enhancing student engagement.

54) What is the role of application software in businesses?

Ans:-

- Application software plays a vital role in business by providing various benefits that improve productivity, efficiency, and decision-making.

55) Software Development Process?

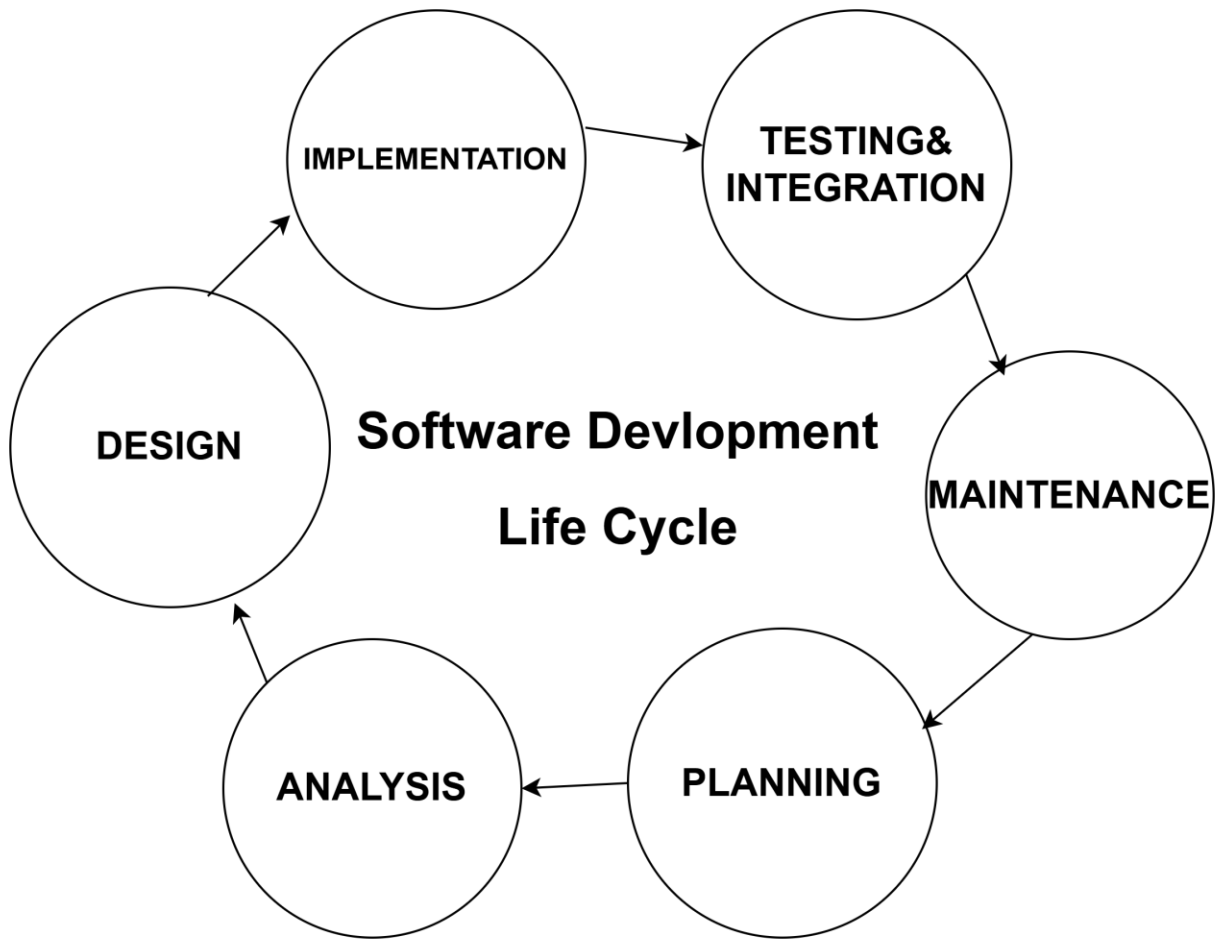
Ans:-



- The software Development Process, also known as that software development life cycle ,is a framework used to plan, design, develop, test, and deliver software applications.

56) Create a flowchart representing the Software Development Life Cycle (SDLC).

Ans:-



57) What are the main stages of the software development process?

Ans:-

- The main stage of the software development process is planning, analysis, design, implementation, testing, deployment, maintenance.

## 58) Software Requirement?

Ans:-

- Software requirement are the specification and constraints.
- That define what a software system should do, how it should behave, and the quality attributes it should process.

## 59) Write a requirement specification for a simple library management system?

Ans:-

- The simple library management system is designed to manage the daily operations of a small library.
- The system will enable librarians to efficiently manage book inventory, track borrowing and

returning of books, and maintain member information.

60) Why is the requirement analysis phase critical in software development?

Ans:-

- The requirement analysis phase is a crucial step in software development that lays the foundation for the entire project.
- Requirement analysis provides a basis for creating test cases and validating the software product against the specified requirements.

61) Software Analysis?

Ans:-

- Software analysis is the process of examining and valuating software systems, application, or components to understand their behavior, structure, and performance.

62) Perform a functional analysis for an online shopping system?

Ans:-

- The online shopping system is designed to facilitate the buying and selling of products over the internet.

63) What is the role of software analysis in the development process?

Ans:-

- Software analysis plays a crucial role in the development process, serving as a bridge between requirements gathering and design.

64) System Design?

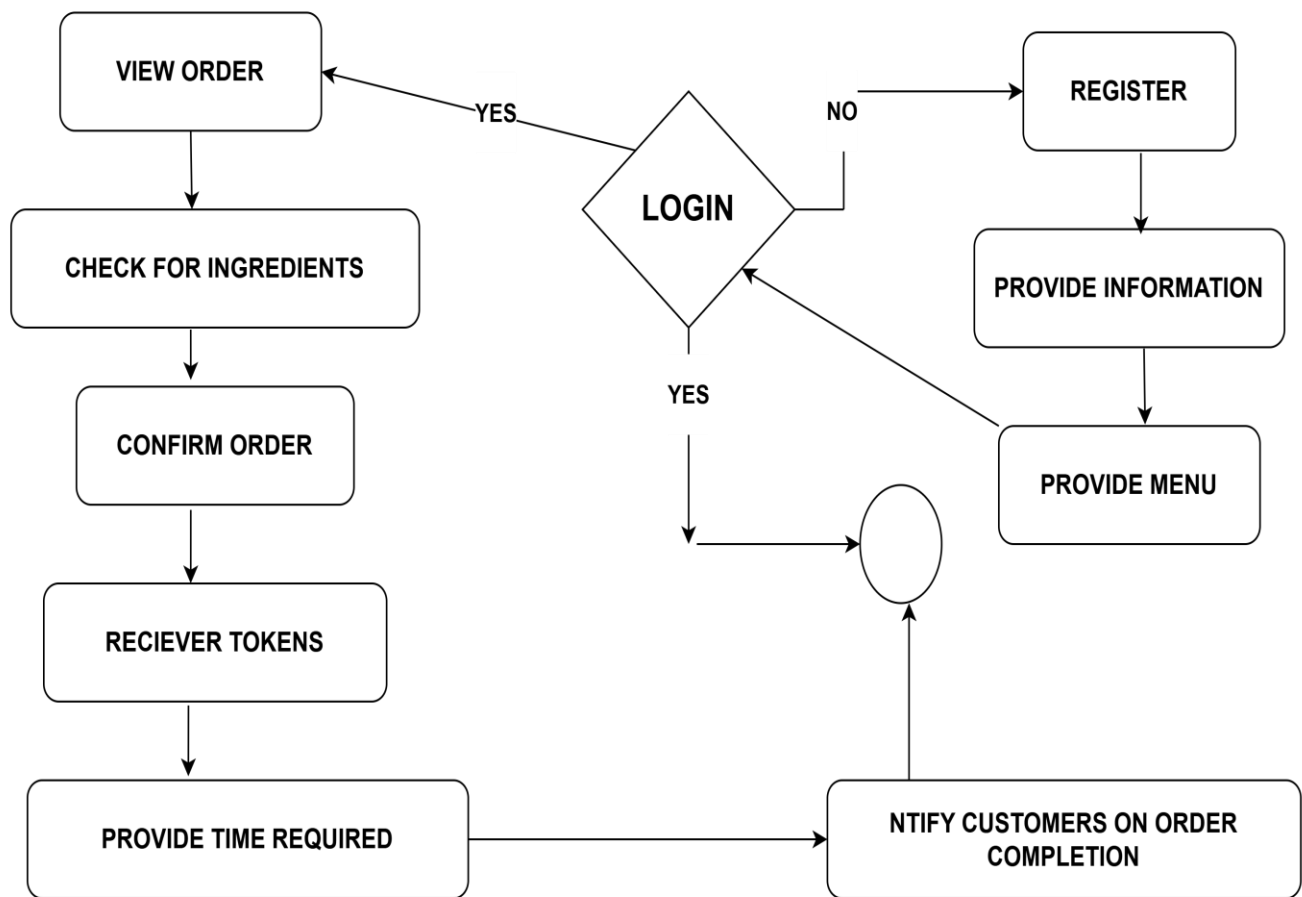
Ans:-

- System design is the process of defining the architecture, components, and interfaces of a system to meet the requirements and constraints of the projects.

- It involves creating a detailed design document that outlines the system's structure, behavior, and interactions.

65) Design a basic system architecture for a food delivery app?

Ans:-



66) What are the key elements of system design?

Ans:-

- System design involves creating a detailed plan for a system , including its architecture, components, interfaces, and data structure.

67) Software Testing?

Ans:-

- Software testing is the process of evaluating a software application or system to determine.
- Whether it meets the required specifications, works as expected, and is free from defects and errors.

68) Develop test cases for a simple calculator program?

Ans:-

- a) Select the addition operator (+)  
b) Select the subtraction operator(-)  
C) Select the multiplication operator(\*)  
D) Press the equal button(=)

E) Select the division operators(/)

69) Why is software testing important?

Ans:-

- Software testing is a crucial aspect of software development that ensures the delivery of high-quality software products.

70) Maintenance?

Ans:-

- Maintenance is the process of keeping a software system or application up-to-date, efficient, and reliable over time.

71) Document a real-world case where a software application required critical maintenance?

Ans:-

- The tech surge team conducted a thorough review of the website's code to identify and fix bugs.



- The team upgraded the website's infrastructure, including the addition of more servers and improved database management.

72) What types of software maintenance are there?

Ans:-

- Software maintenance is the process of modifying and updating software applications after their initial release.
- Types:-
  - a) Defect Repair
    - b) Error Correction
    - c) Performance Optimization
    - d) Code Refactoring

73) Development?

Ans:-

- Development refers to the process of creating, designing, testing, and deploying a software application, system, or product.

74) What are the key differences between web and desktop applications?

Ans:-

- Web Key:-

- A web key, also known as a website key or encryption key.
- It is a unique string of characters used to secure online communication between a website and its users.
- There are two types of web key.
  - a) Public key.
  - b) Private key.
- Some websites use API keys as web keys to authenticate and authorize access to their APIs.

- Desktop key:-

- A desktop key , also known as a product key or license key.
- It is a unique string of characters used to activate and validate a software applications or

operating system installed on a desktop computer.

→ There are three types of key.

a) Product key.

b) License key.

c) Serial number.

→ A 25- character key used to activate and validate the windows operating system.

75) Web Application?

Ans:-

- Web application is a software application.
- That runs on a web server and is accessed through a web browser or mobile app.

76) What are the advantages of using web applications over desktop applications?

Ans:-

- Web applications offer several advantages over desktop applications.

- Web applications can be accessed from anywhere, at any time, using a device connected to the internet.
- Web applications can run on multiple platforms, including windows, macOS, and Linux.
- Web applications can be easily update, modified, or customized to meet changing user needs or business requirements.

77) Designing?

Ans:-

- Designing is the process of creating and developing concepts, plans, and specifications for products, system, services, and experiences.

78) What role does UI/UX design play in application development?

Ans:-

- UI/UX(User Interface/User Experience) design plays a crucial role in application developments.
- There are 6 types of role in UI/UX.
  - A) User Research.
  - B) User Personas.
  - C) Wireframing and Prototyping.
  - D) Visual Design.
  - E) Interacting Design.
  - F) Usability Testing and Feedback.
- Conducting research to understand user needs, behaviors, and motivation.
- Creating user personas to guide design decisions and ensure the application meets user needs.

79) Mobile Application?

Ans:-

- A mobile application, also known as a mobile app, is a software application designed to run on mobile

devices such as smartphones, tablets, and smartwatches.

80) What are the differences between native and hybrid mobile apps?

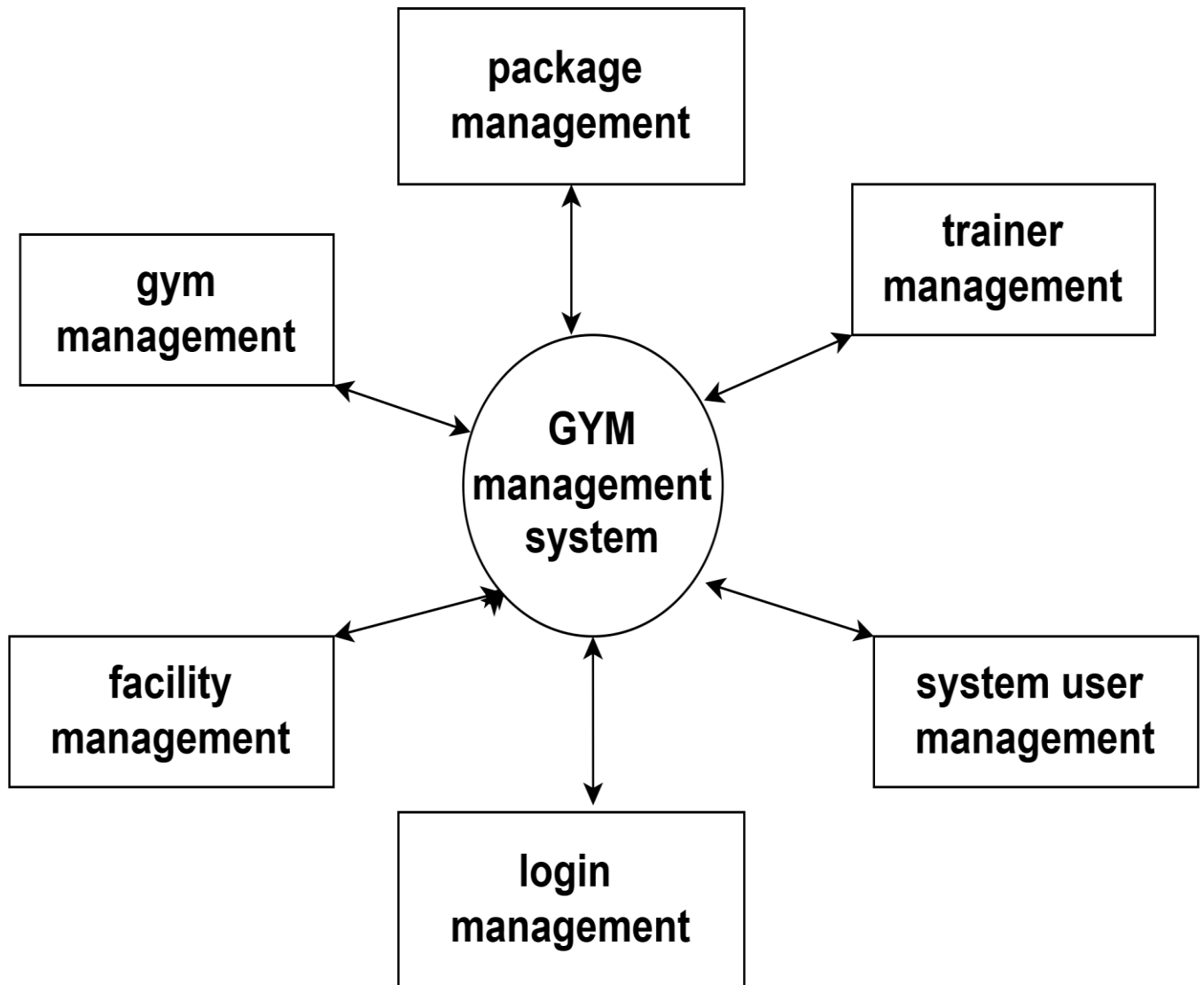
Ans:-

- Native Mobile Application:-
  - A native mobile application is a software application.
  - Native apps are designed to take advantage of the device's hardware and software capabilities, providing a fast, seamless, and intuitive user experience.
  - Native apps are more secure than web-based apps, as they are built using the device's native security features.
- Hybrid mobile applications:-
  - A hybrid mobile application is a software application,
  - Hybrid apps are built using web technologies such as HTML, CSS and JAVASCRIPT, but are

wrapped in a native container that allows them to access device-specific features and hardware.  
→ Hybrid apps can be developed faster than native apps, as they use web technologies and don't require native code.

81) DFD (Data Flow Diagram)

Ans:-

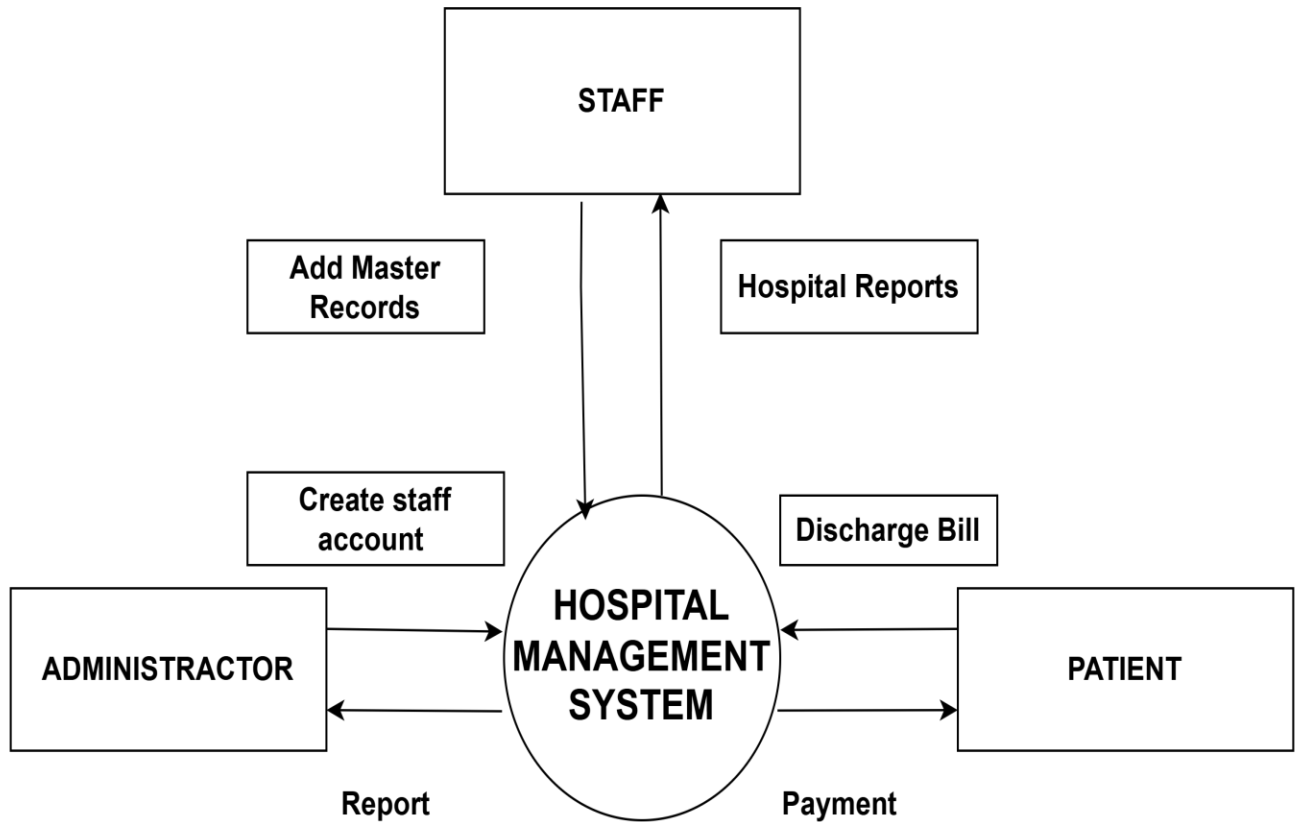


- Zero Level DFD – GYM Management System

82) Create a DFD for a hospital management system?

Ans:-





83) What is the significance of DFDs in system analysis?

Ans:-

- Data Flow Diagrams are a graphical representation of the flow of data through a system, highlighting.
- DFDs provide a common language and visual representation, facilitating communication among stakeholders, analysis, and developers.

84) Desktop Application?

Ans:-

- A desktop application is a software program.
- That runs on a computer's desktop, providing a user interface and functionality to perform specific task.

85) Build a simple desktop calculator application using a GUI library?

Ans:-

- Building a simple desktop calculator application using tkinter GUI library.
- 1) Import the tkinter library.  
2) Create the main window.  
3) Create the entry field for displaying numbers.  
4) Define functions for button clicks.  
5) Create number buttons.  
6) Create operator buttons.  
7) Run the applications.

86) What are the pros and cons of desktop applications compared to web applications?

Ans:-

- Prons Application:-
  - Desktop applications can provide faster performance and responsiveness, as they don't rely on network connectivity and server responses.
  - Desktop applications can provide better security, as they don't rely on web-based

vulnerabilities and can implement robust security measures.

- Cons Application:-

- Desktop application are typically designed for a specific operating system and hardware platform, limiting their compatibility .

- Desktop applications can be more expensive to develop, as they require specialized skills and resources.

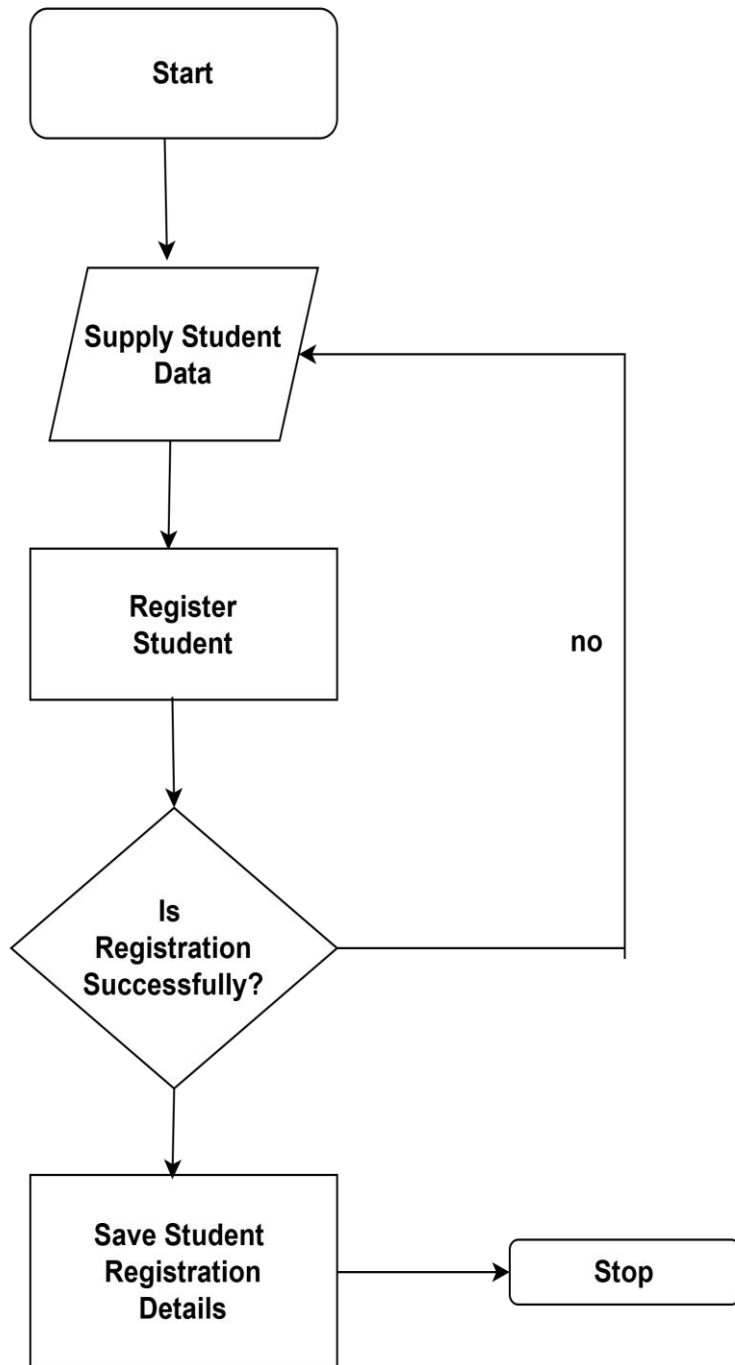
## 87) Flow Chart?

Ans:-

- A flow chart is a graphical representation of a process, system, or algorithm, showing the sequence of steps and the flow of data or control.

88) Draw a flowchart representing the logic of a basic online registration system?

Ans:-



89) How do flowcharts help in programming and system design?

Ans:-

- Flow charts play a significant role in programming and system design.
- Flow charts help programmers and system designers visualize complex processes, algorithms, and systems, making it easier to understand and analyze them.
- Flow charts serve as a documentation tool, making it easier to maintain, modify, and update existing systems and programs.