Module: 1

Se- overview of IT industry

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

In c:=

#include <stdio.h>

int main() {

printf("Hello, World!\n");

return 0;

}

In java:=

public class HelloWorld {

public static void main(String[] args) {

System.out.println("Hello, World!");

}

}

Structure:=

=>C programs are structured around functions, with the entry point always being the main() function.

=>In Java, the entry point is also a main() method, but it is part of a class.

Syntax:=

=>The program starts with #include <stdio.h>, and the main() function is written inside curly braces {}.

=>Java uses System.out.println() for printing output to the console, unlike C’s printf().

2. .Research and create a diagram of how data is transmitted from a client to a server over the internet.

=>

HTTP request

server

Phone

laptop

network

HTTP respone

3. . Design a simple HTTP client-server communication in any language.

=>

HTTP request

server

HTTP response

=>

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

1. Broadband:=

(pros):=

=>Broadband refers to high-speed internet connections that provide faster speeds.

(cons):=

=>Multiple users in the same area may experience slower speeds during high-traffic times.

1. Fiber Optic Internet:=

(prob):=

=>Fiber can offer extremely fast internet speeds.

(cons):=

=>Fiber is not available everywhere.

1. Satellite Internet:=

(prob):=

=>Available almost anywhere.

(cons):=

=>slower speeds compared to fiber or broadband connections.

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

=>1. Simulating HTTP Request using curl:=

=>To simulate an HTTP GET request to retrieve the content of a webpage.

=>curl <http://example.com>

=>2. Simulating FTP Request using curl:=

=>To download a file from an FTP server.

=>curl username:password ftp://ftp.example.com/path/to/file.txt =>username:password: Specifies the FTP username and password.

=>ftp://ftp.example.com/path/to/file.txt: The URL of the file to be downloaded from the FTP

6.Identify and explain three common application security vulnerabilities. Suggest possible solutions..

=>1. Buffer Overflow:=

=>A buffer overflow occurs when more data is written to a buffer (an array or a memory block) than it can hold.

=>Buffer overflows happen when an application does not check the size of the input data.

(solution):=

Bounds Checking: Always check the size of the data being written into buffers and ensure it fits within the allocated space.

=>2. SQL Injection:=

=>SQL Injection is a type of security that allows attackers to manipulate SQL queries by injecting SQL code into the input fields of a web application.

(solution):=

=>Use Parameterized Queries: Always use parameterized queries (prepared statements).

7.Identify and classify 5 applications you use daily as either system software or application software.

1.operating system:=

=>The operating system (OS) is the core software that manages hardware resources.

2.google chrome:=

=>Google Chrome is a web browser used to access websites and other internet resources.

3.antivirus software:=

=>Antivirus software protects the system from malware and other malicious threats.

4.microsoft word:=

=>Microsoft Word is a word processing application used to create and edit documents.

5.file manager:=

=>A file manager is a utility that helps users organize and manage files and folders on the system.

8. Design a basic three-tier software architecture diagram for a web application.

* three tier architecture

server

database

client

9. Create a case study on the functionality of the presentation, business logic, and data access layers of a given software system.

=>1. Presentation Layer (Client-Side or Frontend):=

=>The presentation layer is responsible for presenting the user interface and handling user interactions.

=>HTML, CSS, JavaScript, and frontend libraries like React, Angular.

2. Business Logic Layer (Backend or Application Server):=

=>The business logic layer is responsible for processing requests from the layer business rules,interacting with the data access layer.

3.Data Access Layer (Database or Data Storage):=

=>The data access layer is responsible for managing the storage, retrieval, and manipulation of data.

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

=>1. Development Environment:=

=>This is where developers write, debug, and test the application code.

=>It is to allow easy debugging and fast iterations.

=>2.Testing Environment:=

=>This environment is used for testing the application.

=>Automated Testing Tools.

=>3. Production Environment:=

=>This is the environment where the application is deployed for end-users.

=>It needs to be secure and highly perform.

11. Write and upload your first source code file to Github.

=>print("Hello, World!")

=>Upload to github

=>git add hello\_world.py

=>git commit -m "First commit"

=><https://github.com/username/repo.git>

=>git push

12. Create a Github repository and document how to commit and push code changes.

=>Git push: Pushes changes from the local repository to GitHub.

=>git commit -m "Add hello\_world.py".

13. Create a student account on Github and collaborate on a small project with a classmate.

=>Create a Student Account on GitHub.

=>Create a New Repository for the Project.

=>Click on the Settings tab in the repository.

=>Collaborators section on the left sidebar.

=>Under Manage access,Invite Your Classmate to Collaborate.

=>find your classment and Collaborate on the Project.

14. Create a list of software you use regularly and classify them into the following categories: system, application, and utility software.

=>1.system software:=

=>System software is responsible for hardware . It includes the operating system and other foundational software.

=>2. Application Software:=

=>Application software is designed for end-users to perform specific tasks or activities.

=> **Microsoft Word** (For document processing)

=>**Microsoft Excel** (For data analysis).

=>3. Utility Software:=

=>Utility software helps manage, maintain, and optimize the system, enhancing its performance.

=>Antivirus software- McAfee.

=>Backup tools- google drive backup.

15. Follow a GIT tutorial to practice cloning, branching, and merging repositories.

=>1.**Clone a Repository:=**

Cloning a repository means creating a copy of a remote repository (usually hosted on GitHub) to your local machine.

=>2.**Create a New Branch:=**

Branching allows you to work on separate features or bug fixes without affecting the main codebase.

=>3. **Push the New Branch to GitHub:=**

=>You want to push the branch to the remote repository on GitHub.

=>example: git push origin my-new-branch.

16. Write a report on the various types of application software and how they improve productivity.

types of application software:=

=>Application software can be classified into several categories based on their functions. The main categories include 1)Productivity Software, 2)Media Software, 3)Business Software, 4)Educational Software.

how they improve productivity:=

1).Spreadsheets (e.g., Microsoft Excel):= These tools enhance productivity by automating calculations, creating graphs and charts.

2).Image Editing Software (e.g., Adobe Photoshop):= It improves productivity in creative fields such as graphic design, marketing, and advertising by offering features like filters.

3).Project Management Software (e.g.Microsoft Project):= These tools improve productivity by managing resources, and promoting collaboration with team members.

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

* Analysis

System designing

Implementation

Testing

Deployement

Maintenance

18. Write a requirement specification for a simple library management system.

=>This Library Management System will serve as a simple tool to manage books, members, and activities in a small to medium-sized library.

=>It will support the basic operations like adding books, registering members and returning books.

=>Managing books in the library (adding, removing, searching, updating).

=>Functional Requirements in Book Management is Add New Book

And remove book.

19. Perform a functional analysis for an online shopping system.

1). Overview of the System:=

=>which will allow users to browse, search, select, and purchase items online.

=>An online shopping system allows users to buy products through an e-commerce platform.

=>user authentication , order processing, payment, and delivery management.

2).User Registration and login:=

=>Customers can create an account by providing personal details (name, email, password, shipping address, phone number).

=>Customers can log in using their registered email and password.

3). Product Management:=

=> The system will display all available products, categorized by product type (electronics, clothing, etc.).

Clicking on a product will take the user to a detailed page with product.

4). Shopping Cart:=

=>Customers can add products to their shopping cart and specify quantities.

=>Customers can view all items currently in their cart along with their prices, quantities, and total cost.

=>Users can remove items from the cart.

5). Payment Processing:=

=>payment gateways like PayPal, or credit card.

=>The system should validate payment details (e.g., credit card number, expiration date, CVV).

6). Shipping and Delivery Management:=

=>The system will provide customers with shipping options standard, express.

=>Once the order is delivered, customers will receive a confirmation, and the order will be marked as "Delivered" in the system.

=>that is called function analysis for online shopping.

20. Design a basic system architecture for a food delivery app.

=>This basic system architecture is designed for a food delivery app that handles user authentication, order management, restaurant menus, payment processing, and delivery tracking.

=>1).Client-Side (Mobile App or Web App):=Where users interact with the system to browse restaurants, place orders, track deliveries, etc.

=>2).Backend Services:= Responsible for handling requests, processing orders, managing user data, interacting with external (e.g., payment , location services).

=>3).Database:=Stores data about users, restaurants, menus, orders, payment history, etc.

=>4).Admin Panel:= A dashboard for the restaurant owners and app administrators to manage orders, menus, users, and delivery statuses.

=>that is basic system architecture for food delivery.

21. Develop test cases for a simple calculator program.

=>1. Addition

=>Input: 2 + 3

=>Output: 5

=>2. Subtraction

=> Input: 10 - 4

=>Output: 6

=>3. Multiplication

=> Input: 5 \* 3

=>Output: 15

=>4. Division

=> Input: 8 / 2

=> Output: 4

=>5. Division by Zero

=> Input: 5 / 0

=> Output: ERROR

22. Document a real-world case where a software application required critical maintenance.

=>example of how critical software maintenance, testing, and deployment practices in high-risk environments.

=>The failure exposed weaknesses in their deployment strategy and software validation procedures.

=>the industry has become more aware of the importance of software testing, real-time monitoring, approach to deploying changes in high-stakes systems.

23). Create a DFD for a hospital management system.

=>

staff

Add record

Hospital

record

Create staff

discharged

administration

patient

report

payment

DFD for hotel management

24). Build a simple desktop calculator application using a GUI library.

=>

25). Draw a flowchart representing the logic of a basic online registration system.



Check Registration Status

Is User

already

Register

Redirect to login

Display ragister

no

User submits from

no

Save user data

Is input valid

yes

Confirmation

Register successful