Module -1: Overview of It Industry

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Q1. Write a simple “hello world” program in two different programming languages of your choice. Compare the structure and syntax.

Ans.

i. In c language print hello world:

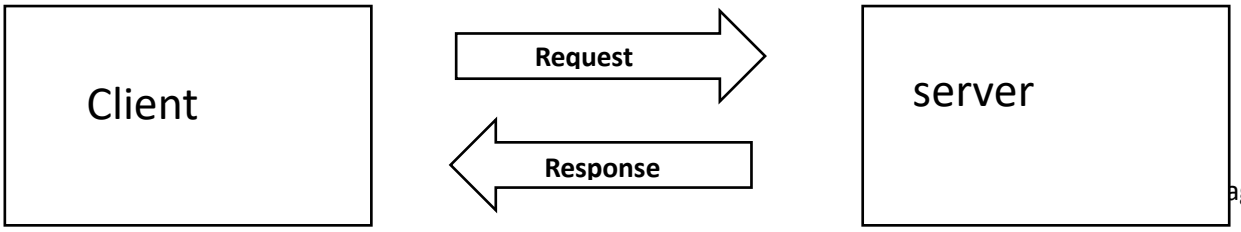
```
→#include<stdio.h>
   Int main(){
     Printf(“hello world”);
    return 0;
   }
```

ii. In c++ language print hello world:

```
→ #include <iostream>
   int main() {
   std::cout << "Hello, World!" << std::endl;
   return 0;
  }
```

Q2. Research and create a diagram of how data is transmitted from a client to a server over the internet.

Ans. Client to server data transfer over the internet involves a set of protocols and interactions that enable devices and servers to communicate and exchange information.



Q3. Design a simple HTTP client-server communication in any language.

Ans .

Q4.Research different types of internet connections (e.g., broadband, fiber, Satellite)and list their pros and cons.

Ans .

1. Broadband (DSL/Cable):-

- DSL: Digital Subscriber Line (via telephone lines)
- Cable: Via coaxial TV cables

➔ Pros:

- Widely available
- Affordable
- Always-on connection

➔ Cons:

- Slower than fiber
- Speed can degrade with distance (DSL)
- Shared bandwidth (Cable)

2. Fiber Optic :-

- Transmits data using light through optical cables

➔ Pros:

- Very high speeds (up to 1 Gbps+)
- Reliable and low latency

- Good for heavy streaming, gaming, remote work

➔ Cons:

- Higher cost
- Limited availability in rural areas
- Installation can take time

3. Satellite

- Uses satellites in orbit to deliver internet

➔ Pros:

- Available in remote and rural areas
- Does not require physical cables

➔ Cons:

- High latency (delay)
- Slower speeds
- Affected by weather
- Data caps and higher

4. Mobile (4G/5G)

- Wireless internet via mobile networks

➔ Pros:

- Portable and convenient
- Good coverage in cities
- 5G offers high speeds

➔ Cons:

- Data limits/throttling
- Coverage varies
- Speed may drop in crowded areas

5. Dial-Up (Legacy)

- Uses telephone line and modem

➔ Pros:

- Extremely cheap
- Works anywhere with a phone line

➔ Cons:

- Very slow (~56 kbps)
- Cannot use phone and internet simultaneously
- Obsolete for modern needs

Q5. Simulate HTTP and FTP requests using command line tools (e.g., curl).

Ans.

Action	**HTTP Command**	**FTP Command**
GET Request	curl http://example.com	curl ftp://ftp.example.com/
POST Request	curl -X POST -d "key=value" http://example.com	curl -T localfile.txt ftp://ftp.example.com/

Download File	curl -O http://example.com/file.zip	curl -O ftp://ftp.example.com/file.txt
Upload File	curl -X PUT -T file.txt http://example.com/upload	curl -T file.txt ftp://ftp.example.com/upload/
Custom Headers	curl -H "Header: Value" http://example.com	curl -H "Header: Value" ftp://ftp.example.com/

Q6. Identify and explain three common application security vulnerabilities. Suggest possible solutions.

Ans.

1. SQL Injection (SQLi)

Description**:**

Attackers inject malicious SQL queries into input fields to access or manipulate a database.

Example**:**

Sql:

SELECT * FROM users WHERE username = 'admin' --' AND password = 'password';

Solution**:**

- Use prepared statements (parameterized queries).
- Validate and sanitize all user inputs.
- Use **ORMs** (e.g., SQLAlchemy, Hibernate) when possible.

2. Cross-Site Scripting (XSS)

Description**:**

Malicious scripts are injected into trusted websites and executed in the user's browser.

Example**:**

Html:

<script>alert('Hacked');</script>

Solution**:**

- Escape and encode output (e.g., HTML, JavaScript, URL).
- Use **Content Security Policy (CSP)** headers.
- Sanitize user input (e.g., using libraries like DOMPurify).

3. Broken Authentication

Description**:**

Poorly implemented login or session management lets attackers impersonate users.

Example**:**

- Weak or predictable passwords
- Session IDs in URLs

Solution**:**

- Use **multi-factor authentication (MFA)**.
- Implement **secure password storage** (e.g., bcrypt).
- Set **secure, HttpOnly, and SameSite** flags on cookies.

Q7. Identify and classify 5 applications you use daily as either system software or application software.

Ans.

Software/Application	Type	Classification	Purpose
1. **Google Chrome**	Application Software	Web Browser	Browsing the internet
2. **Microsoft Word**	Application Software	Word Processor	Document creation and editing
3. **Windows 10/11 OS**	System Software	Operating System	Manages hardware and software resources
4. **Antivirus Software**	System Software	Utility	Protects the system from malware
5. **Spotify**	Application Software	Media Player	Streaming and playing music

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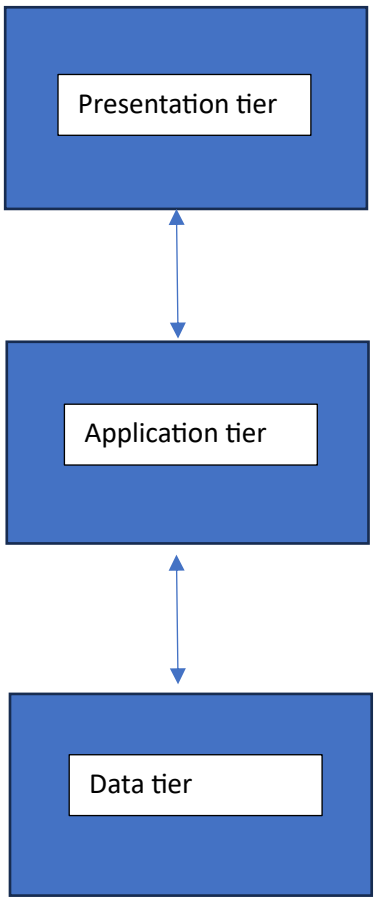
Q8. Design a basic three-tier software architecture diagram for a web application.

Ans.Three tier architecture overview:

1. Presentation tier(client)
2. Application tier(server)
3. Data tier(database)



Q9.Create a case study on the functionality of the presentation, business logic, and data access layers of a given software system.

Ans.

1.presentation layer:

- The front end interface where users interact with the application. It handels displaying data and receiving user input and making request to business logic layer.

2.business logic layer:

- The core of the application that process user requests applies business rules and communicate with the data access layer.It handles tasks like order processing, payment handling, inventory management, and user authentication.

3.Data access layer:

- Manages all databases interactions and ensure data persistence. It retrivies and store information like product details,user profiles and order history.

Q10.Explore different types of software environments (development, testing, Production).Set up a basic environment in a virtual machine.

Types of Software Environments:-

Environment	**Purpose**	**Users**
Development	Where developers write, build, and debug code	Developers
Testing	Used to test the application for bugs, performance, etc.	QA/Testers
Staging	Pre-production; simulates production for final checks	DevOps, QA
Production	Live environment where end-users access the application	End Users

Setup:

1.Install Virtual Machine Software

2.Create a New Virtual Machine

3.Install the Operating System

4.Set Up Development Tools (For Development Environment)

5.Set Up Testing Tools (For Testing Environment)

6.Set Up Production Environment (For Production Environment)
7.Finalize and Test.

Q11.Write and upload your first source code file to Git hub.

1. Create a GitHub account
2. Create a new repository for your project.
3. Upload a files to your project's repository.

Q12.Create a Git hub repository and document how to commit and push code changes.

Ans.

Step 1: Create a GitHub Repository

1. Go to https://github.com and log in.
2. Click the **"+"** in the top right → Select **"New repository"**.
3. Fill in:
    - **Repository name** (e.g., my-first-repo)
    - Optional description
    - Choose **Public** or **Private**
    - Check **"Initialize this repository with a README"** (optional)
4. Click **"Create repository"**.

Step 2: Stage and Commit Changes

```
# Stage the file
git add hello.py
```

Commit the file

git commit -m "Add hello.py with greeting message

Step 3: Push Changes to GitHub

git push origin main

Q13.Create a student account on Github and collaborate on a small project with a classmate.

Ans. I don’tknow

Q14. Create a list of software you use regularly and classify them into the Following categories: system, application, and utility software.

Ans.

→**1.** System Software

Software that runs the computer hardware and system operations.

- Windows 10/11 – Microsoft operating system
- macOS – Apple's operating system for Mac computers

→**2.** Application Software

Software used to perform specific user tasks.

- Google Chrome – Web browser
- Microsoft Word – Word processing

→ **3.** Utility Software

Software that helps maintain or optimize the system.

- WinRAR / 7-Zip – File compression/extraction
- Task Manager – Monitors system activity

- Disk Cleanup – Deletes unnecessary files

Q15.Follow a GIT tutorial to practice cloning, branching, and merging repositories.

Ans.

→**1.** Clone a Repository**:-**

git clone https://github.com/username/repo-name.git

cd repo-name

→**2.** Create and Switch to a New Branch:-

git checkout -b new-feature

Make changes in files (e.g., edit or add a file).then,

git add .

git commit -m "Add new feature"

→**3.** Merge Branch into Main

Switch to the main branch:

git checkout main

git merge new-feature

Q16.Write a report on the various types of application software and how they Improve productivity.

Ans.

→1.Productivity Software:

Tools like Microsoft Office and Google Workspace streamline document creation, data analysis, and collaboration.

→ 2.Utility Software:

Programs like antivirus and file management tools optimize system performance and prevent downtime.

→3.Web Browsers:

Browsers facilitate quick access to online resources, supporting research and communication.

→4.Communication Software:

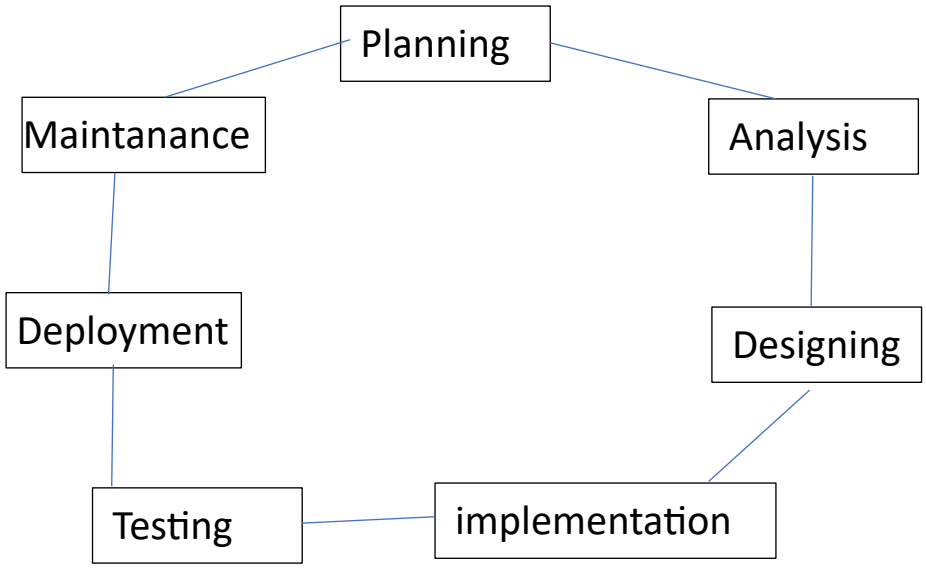
Platforms like Zoom and Slack enable seamless remote collaboration, saving time and resources.

→5.education software :

Platforms like Moodle and Coursera provide on-demand learning, reducing time spent on traditional education.

Q17. Create a flowchart representing the Software Development Life Cycle (SDLC).

Ans.



Q18. Write a requirement specification for a simple library management system.

Ans.

→1.user management:

Handel library members,staff with secure login system

→2.book management:

admin can add,update or remove book.user can search for the book and check for the avilability. planning analysis designing implementing testing deployment SDLC maintenance

→ 3.borrowing& returning: track issued book,due dates.

Q19.Perform a functional analysis for an online shopping system.

Ans.

Online Shopping System – Functional Analysis

→ **Main Functions:**

1. User Registration & Login
    - Users can create accounts and log in.
2. Product Browsing & Search
    - Users can view products by category or search by name.
3. Shopping Cart
    - Add, remove, or update items in the cart.
4. Order Placement
    - Checkout, enter address, choose payment method.
5. Payment Processing

- Support for cards, UPI, or COD.

6. Order Tracking
   - Users can view order status (e.g., shipped, delivered).
7. Admin Panel
   - Manage products, users, and orders.

Q20.Design a basic system architecture for a food delivery app.

Ans.

Basic System Architecture – Food Delivery App

→ 1. Frontend (User Interface)

- Customer App: Browse food, place orders, track delivery
- Restaurant App: Manage menu, accept/reject orders
- Delivery App: View delivery tasks and routes.

→ 2. Backend (Server & Logic Layer)

- Order Management System: Handles order flow
- Authentication Module: Login/signup for users
- Payment Gateway: Processes payments securely
- Notification System: Sends updates (SMS, email, app alerts)

→ 3. Database

- Stores users, orders, restaurants, menus, delivery data

→ 4. External Services

- Map API: For delivery tracking and location
- Payment API: For online transactions
- SMS/Email API: For notifications

Q21.Develop test cases for a simple calculator program.

Ans.

To test case calculator you can test.

→1. Basic arithmetic:addition , subtraction , multiplication , division .
→2.complax case: divide by zero Multiple calculation (ex :2+3*5)
→3.handeling decimal input

→4.error handling : invalid operator, alphabets.

Q22. Document a real-world case where a software application required Critical maintenance.

Ans.

Case: Facebook Outage – October 2021

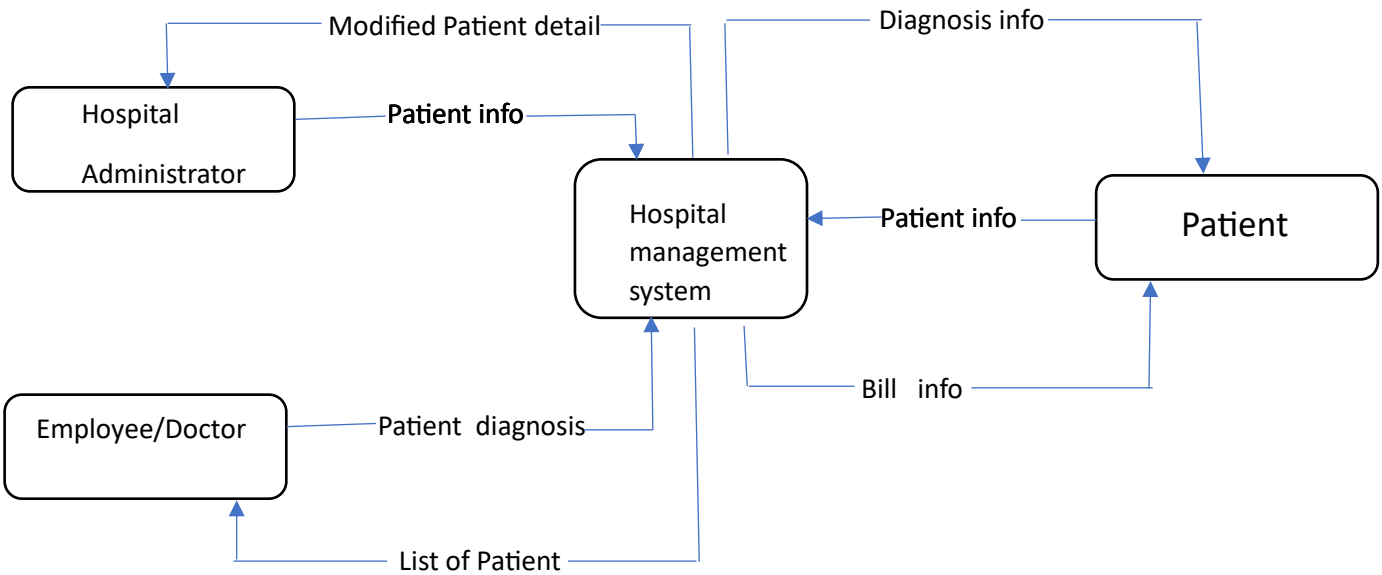
→What happened:
Facebook, Instagram, and WhatsApp went down for over 6 hours worldwide.

→Cause:
A faulty configuration change during routine maintenance disrupted the backbone network that connects Facebook's data centers.

→Result:
Facebook engineers had to quickly identify the issue and apply critical maintenance to bring systems back online safely.

Q23. Create a DFD for a hospital management system.

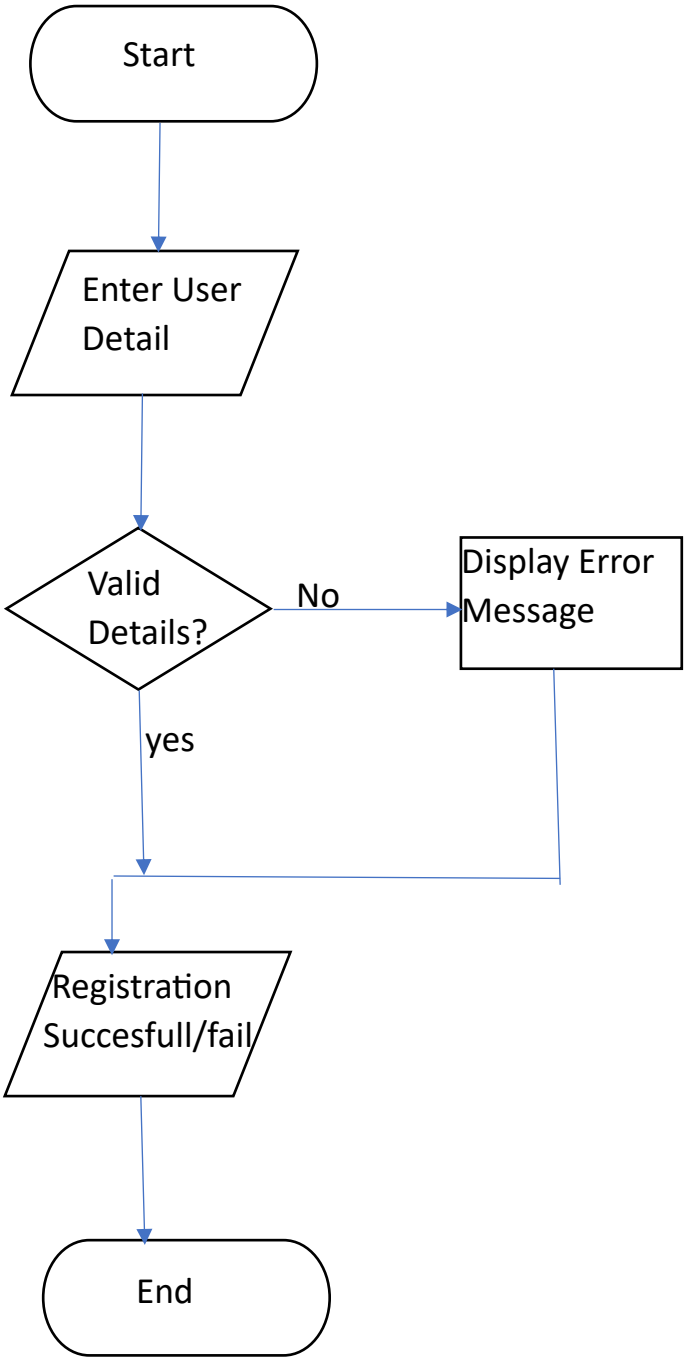
Ans.



Q24. Build a simple desktop calculator application using a GUI library.

Ans. I don't know.

Q25. : Draw a flowchart representing the logic of a basic online registration system.


Start
Enter User Detail
Valid Details?
No
Display Error Message
yes
Registration Succesfull/fail
End