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Module :1

Overview of IT industry

❖ LAB EXERCISE:

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

❖ **Hellow world program: C Language**

```
// print Hellow world .
#include<stdio.h>
int main()
{
    printf("\n Hello World");
    return 0;
}
```

❖ **EXPLANATION:**

- **include<stdio.h>:** For inpute/output operations.

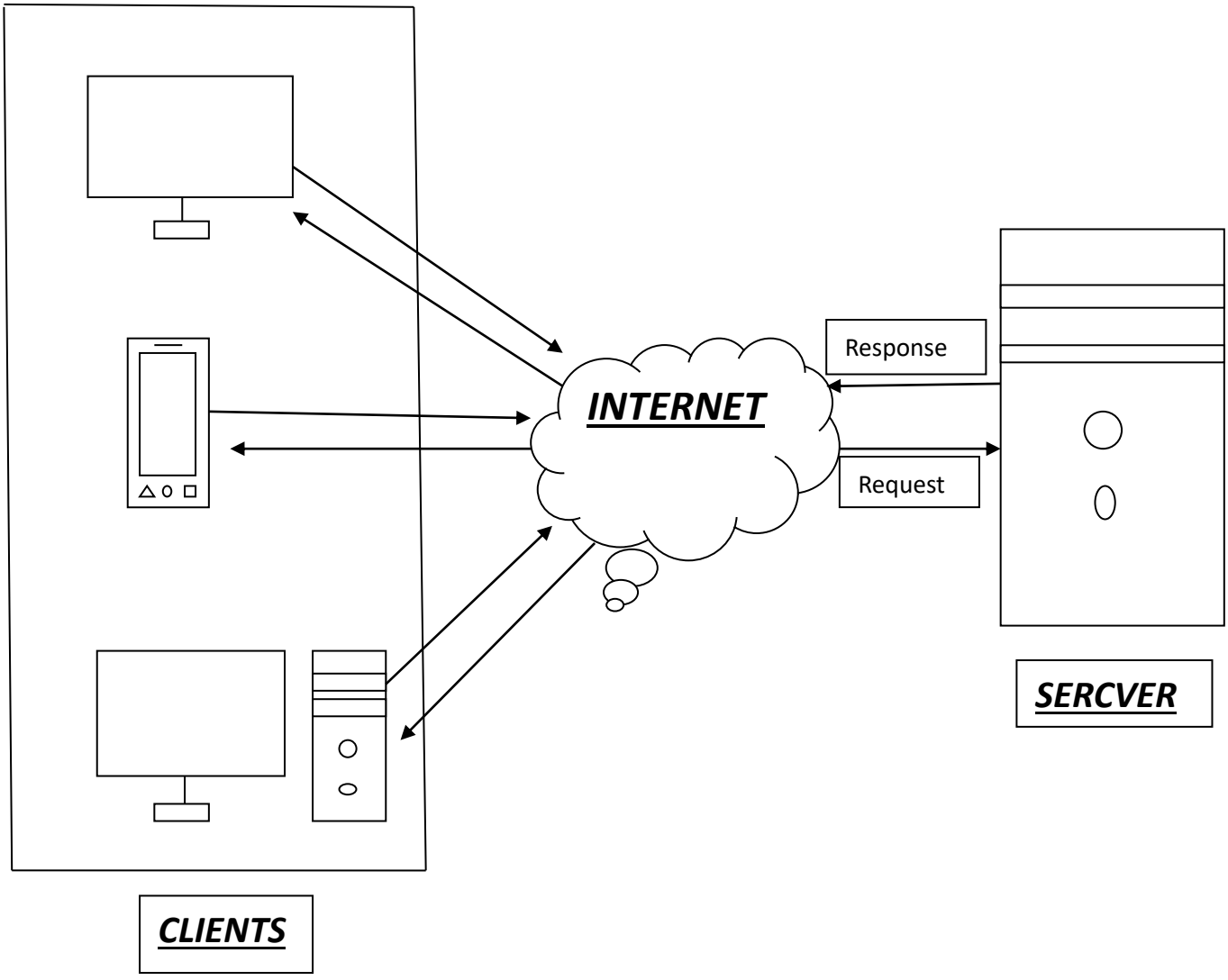
- **main():** Declare main() as the program's entry point.

- **printf():** Use printf() to print "Hellow world" to the console.

- **return 0:** return 0 indicates the program executed successfully.

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

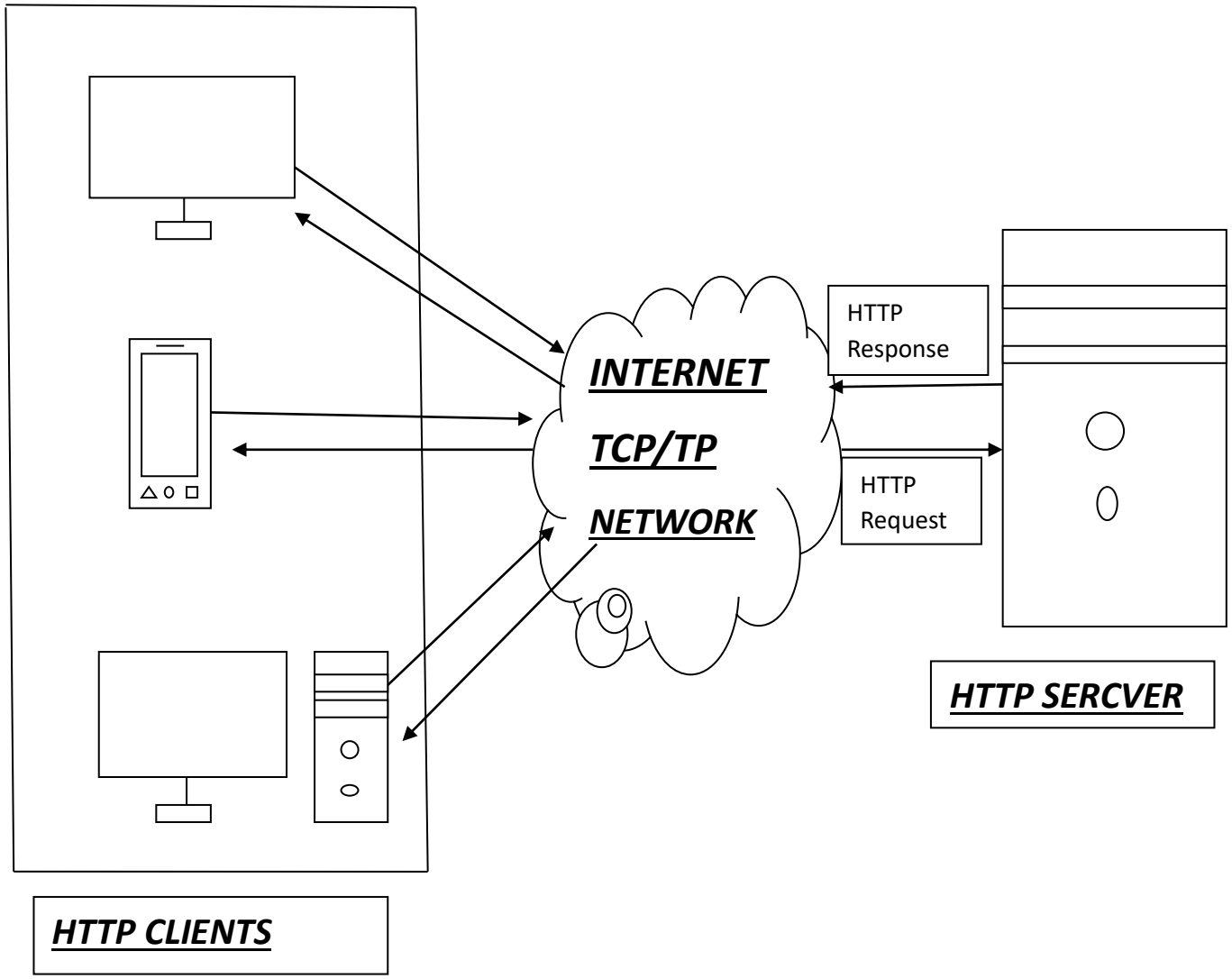
❖ Client-server Architecture:



- ❖ Client sends request to server.
- ❖ Server processes request and sends response.
- ❖ Client receives response and uses it.

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

❖ HTTP Client-server Architecture:



❖ **Server :** Listens on port,receives request,sends response.

❖ **Client :** Sende request to server,receives response.

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

❖ **<u>Broadband Internet:</u>**

- **Pros:**
  1. **Fast speeds**: Broadband internet offers faster speeds than dial-up internet.
  2. **Multiple device support**: Broadband connection can support multiple devices at the same time.
- **Cons:**
  1. **Cost:** Broadband internet can be more expensive than dial-up internet.
  2. **Security risks:** Broadband internet connections can be vulnerable to security risks such as hacking and malware.

❖ **<u>Fiber - optic Internet:</u>**

- **Pros:**
  1. **Fast speeds**:Fiber internet offers speeds of up to 10 gbps.
  2. **Security:** Fiber internet is more secure than other internet types.

- **Cons:**
    1. **Cost:** Fiber internet can be more expensive than other internet types.
    2. **Availability:** Fiber internet is not widely available , especially in rural areas.

❖ **<u>Satellite Internet:</u>**

Satellite internet uses a satellite dish to connect to a satellite in orbit , providing internet access.

- **Pros:**
    1. **Wide Availability**: Satellite internet is available almost anywhere.
    2. **No infrastructure required**: No need for cables or fiber-optic connections.
- **Cons:**
    1. **Cost:** Satellite internet plans can be costly.
    2. **Slow speeds:** Satellite internet speeds are generally slower up to 100 mbps.

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

- **<u>System software</u>:** Analyzing data from System software to gain insights and improve system performance.

- **<u>Application software:</u>** Analyzing data from application software to gain insights and improve user experience.

  - **Social media apps (Facebook , Twitter , Instagrame etc.):** Enables users to connect with others, share content, and participate in online communities.

  - **Web browser (google chrome):** Allows users to access and view websites , online content , and web-based applications.

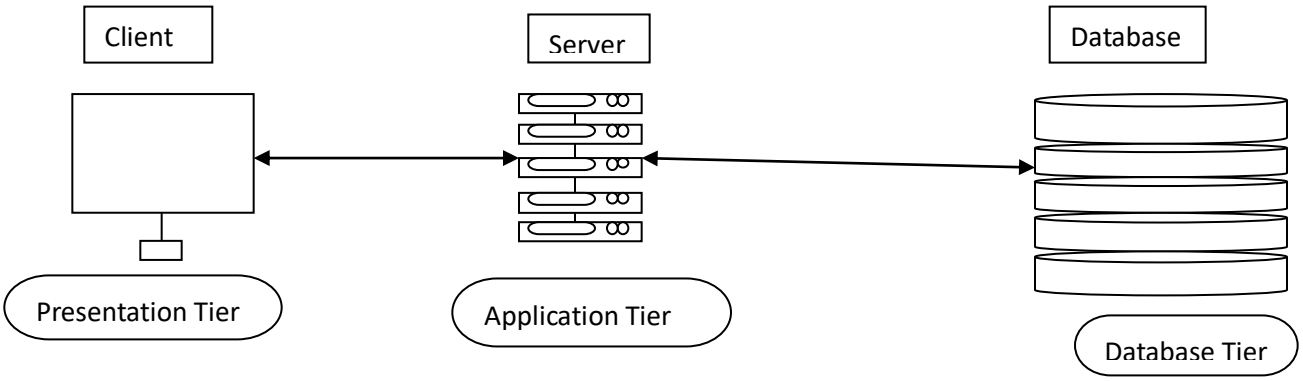
  - **Email client(Gmail):**Provides a platform for sending , receiving , and managing emails , contacts , and calendars.

  - **Media player(vlc):** plays audio and video files, allowing users to enjoy multimedia content.

  - **Photo editing software(Adobe photoshop):** Provides tools and features for editing and manipulating digital images.

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

❖ <u>Three-tier software architecture</u>

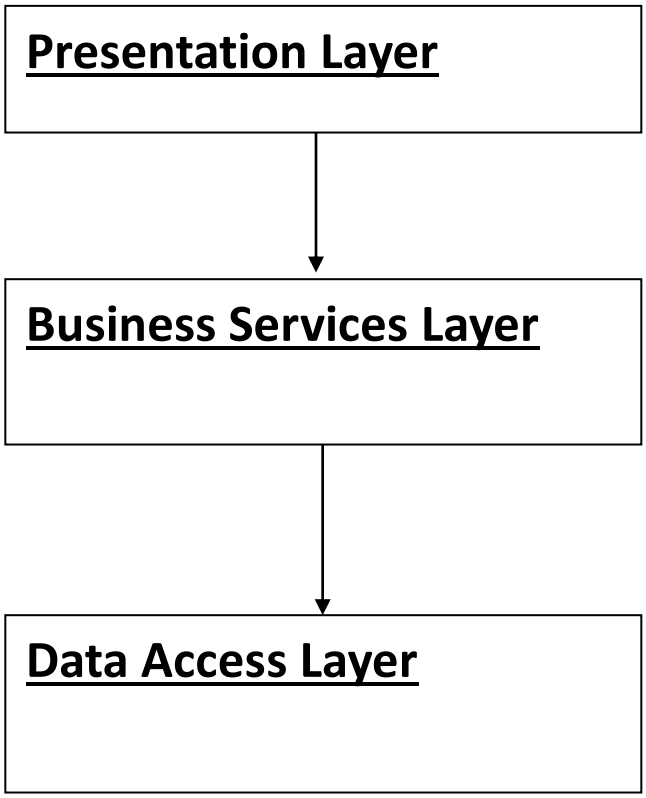


- **Presentation Layer:** The presentation layer ,also known as the user interface (UI) layer , is the topmost layer of a software application . It is responsible for presenting data to the user and receiving input from the user.

- **Application Layer:** The application layer is the middle layer of a software application, situated between the presentation layer and the data access layer .It is responsible for managing the business logic and providing services to the presentation layer.

- **Data access layer:** The database layer is the foundation of a software application, responsible for storing, managing, and providing access to data.

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



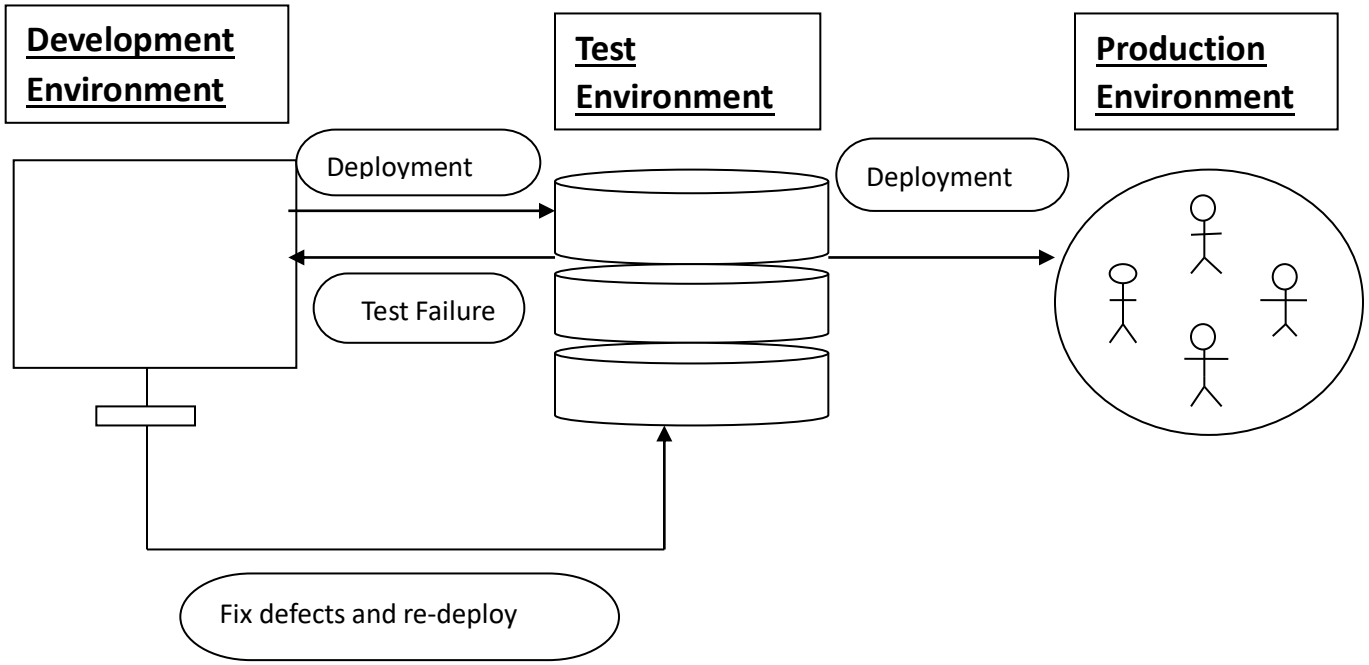
- **Presentation Layer:** The presentation layer is responsible for providing a user-friendly interface to customers.

- **Business Logic Layer:** The business logic layer is responsible for managing the core functionality of the system.

- **Data Access Layer:** The data access layer is responsible for managing the data storage and retrieval.

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

❖ Types of software environments:



- **Development Environment :** A development environment is a setup where software developers create, test, and debug their code.

- **Test Environment:** A test environment is a setup where software testers validate and verify the functionality of an application.

- **Production Environment:** A production environment is a Live setup where an application is deployed and accessible to end-users.

9) Write and upload your first source code file to GitHub.

❖ Upload source code file to GitHub:

- **Log in to GitHub :** first create your account in GitHub . If all so you have account than login your account.
- Create a new repository.
- Make folder fore your program and save your program in that folder.
- That folder move using drop down and upload in your GitHub repository.
- That way you upload your source code file in GitHub.

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

❖ Create repository in GitHub :

- **Log in to GitHub :** first create your account in GitHub .If all so you have account than login your account.
- In the top-right corner of the GitHub dashboard,click on the **"+"** icon. Then Dropdown menu will appear with multiple option you select create a new repository.
- Than fill all repository details like repository name, description, public or private, initialize this repository.

- Click create repository.
- Than your repository is created.

11) Create a student account on GitHub and collaborate on a small project with aclassmate.

❖ Create a student account on GitHub:

- Go to GitHub and "sing up" in the top-right corner.
- Fill all details in registration form , set password.
- Verify your email address by clicking on the link sent to you by GitHub.
- Login in GitHub and make your repository.
- Upload source code file . View another uploaded file.

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

❖ System softwa:

1. window 10.
2. Liunx.

❖ Application Software:

1. Visual Studio Code.
2. Google chrome.
3. Microsoft Office.
4. Google Docs etc.

❖ **Utility Software:**

1. File Explorer.
2. 7-Zip.
3. WinRAR.
4. Firewall.

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

❖ **Application software:**

1. Word Processing Software: Microsoft word,Google Docs.

- Enhances writing, editing, and formatting capabilities.
- Improves document management and collaboration.

2. Spreadsheet Software: Microsoft Excel, Google Sheets.

- Facilitates data analysis, visualization, and management.

3. Presentation Software: Microsoft PowerPoint

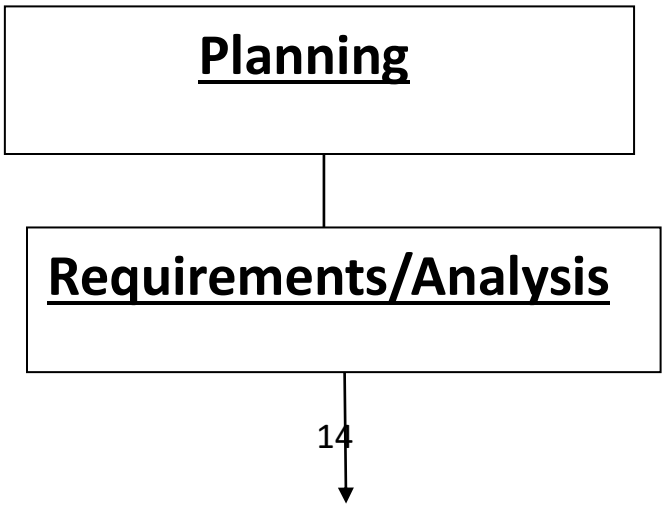
- Enables creation of engaging and informative presentations.
- Enhances communication and collaboration.

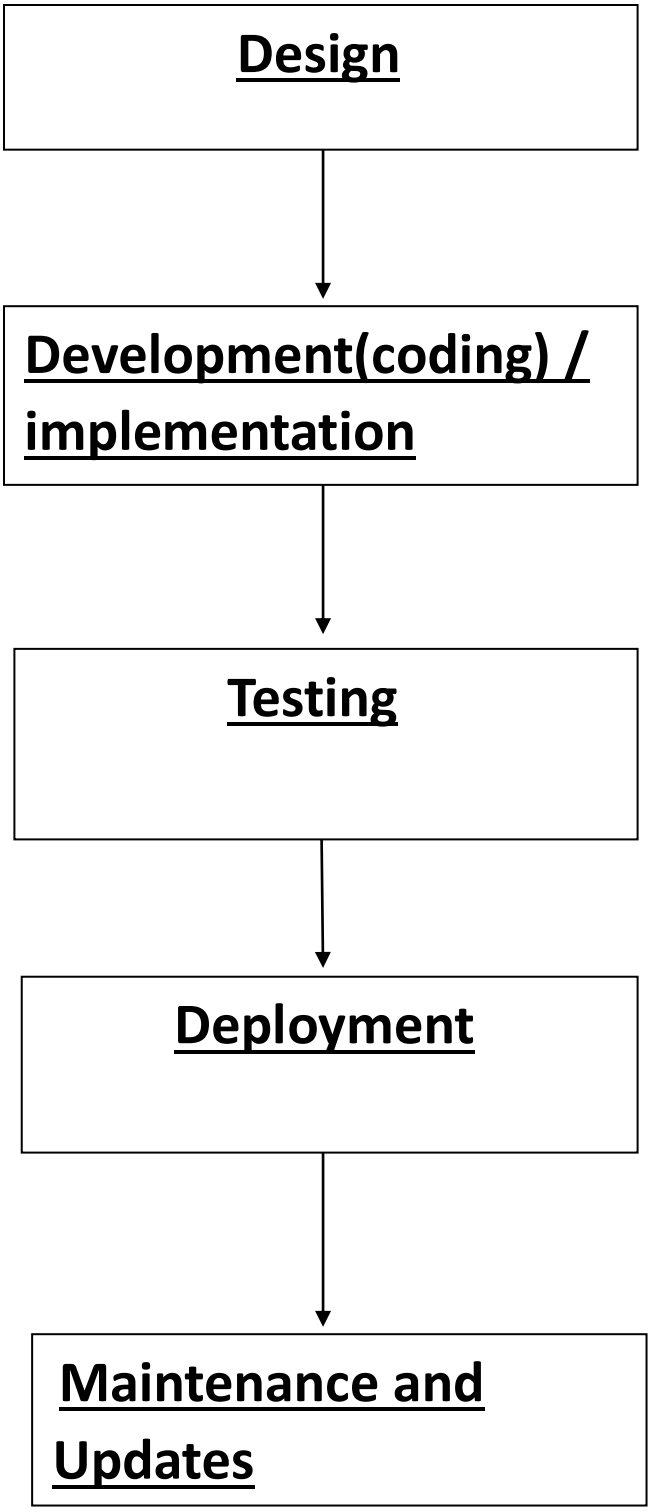
4. Database Management Software: MySQL , Oracle.

- Data storage, retrieval , and management.
- Enhances data analysis and reporting.

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

❖ **Software Development Life Cycle(SDLC):**




Design
Development(coding) / implementation
Testing
Deployment
Maintenance and Updates

15) Write a requirement specification for a simple library management system.

❖ **Requirement specification for a simple Library Management System:**

- **User management** : Make user account , update user account , delete use account.
- **Book management :** New book add in stock detail , finish book stock detail , not available books detail.
- **Borrowing and returning books** : All details store in who is borrow book who is returning book.
- Search book.
- **Reporting :** All information about books.
- **Security :** All data is a secure and maintain in database.
- Data backup and recovery.
- Data encryption and access controls.

16) Perform a functional analysis for an online shopping system.

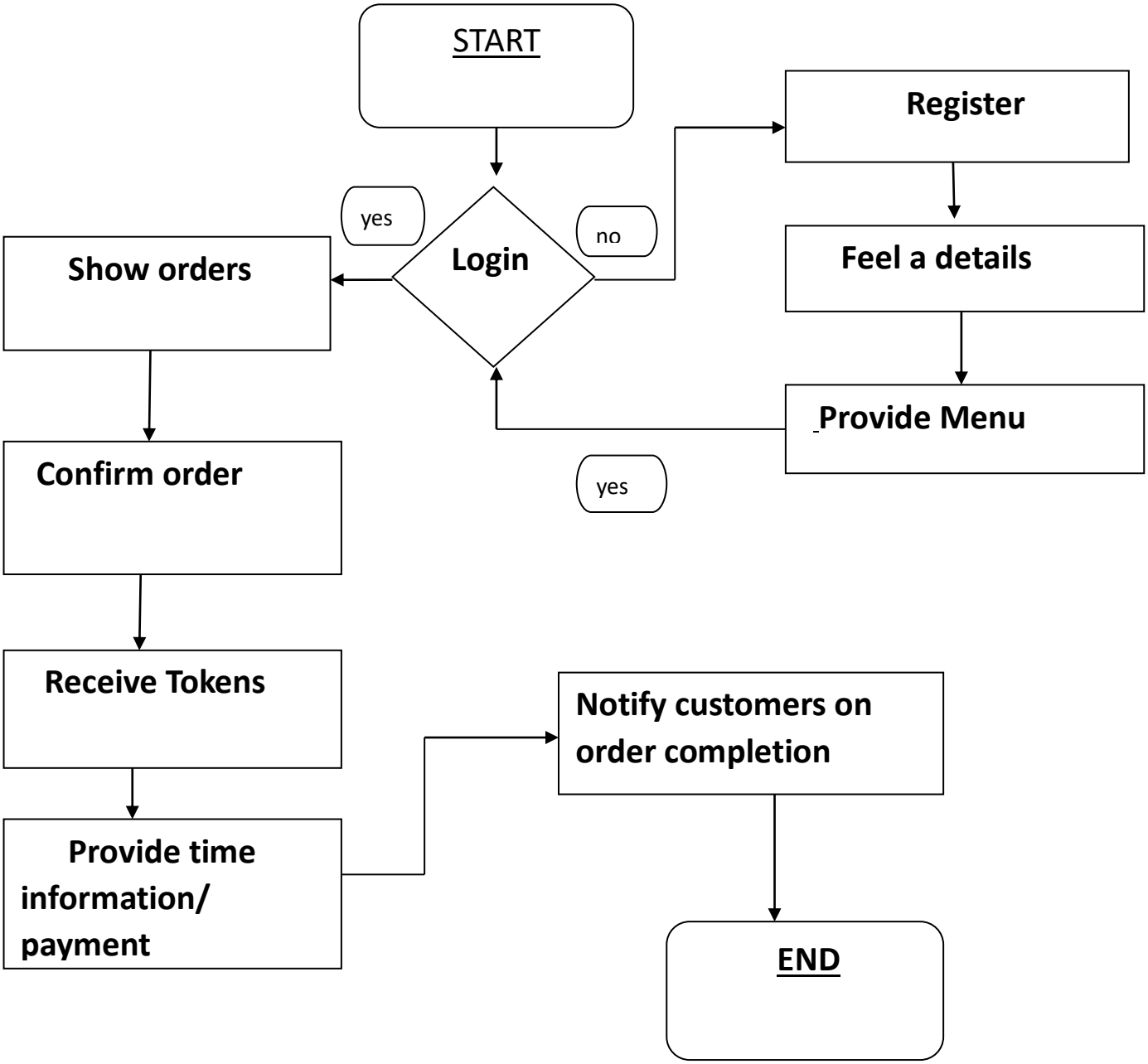
❖ **Functional analysis for an Online Shopping System:**

- **Admin management** : Manage all details of user.
- **User management** : Register new user , login user detail , update user profiles , delete user profiles all this management.
- **Product management** : Display product Details, Search products price , stock details , image , Update product quantities in shopping cart.

- **Order management** : Give orders, Orders status , Delivered , Pending delivered.
- **Payment Management** : Payment methods(credit card,gpay etc...). Handle payment errors.
- **Reporting and Analytics** : Sales reports , show customer history.
- **Data access** : Store product info , retrieve data , update data.

17) Design a basic system architecture for a food delivery app.

❖System architecture for a food delivery app:



18) Develop test cases for a simple calculator program.

- **simple calculator program:**

- **Enter a number :** User enter value for do any operations.
- **Select operator:** User select any operator(+,-,*,%,/..etc.) to perform desired calculation.
- **"=" button:** pressed "=" button to displays the result in screen.

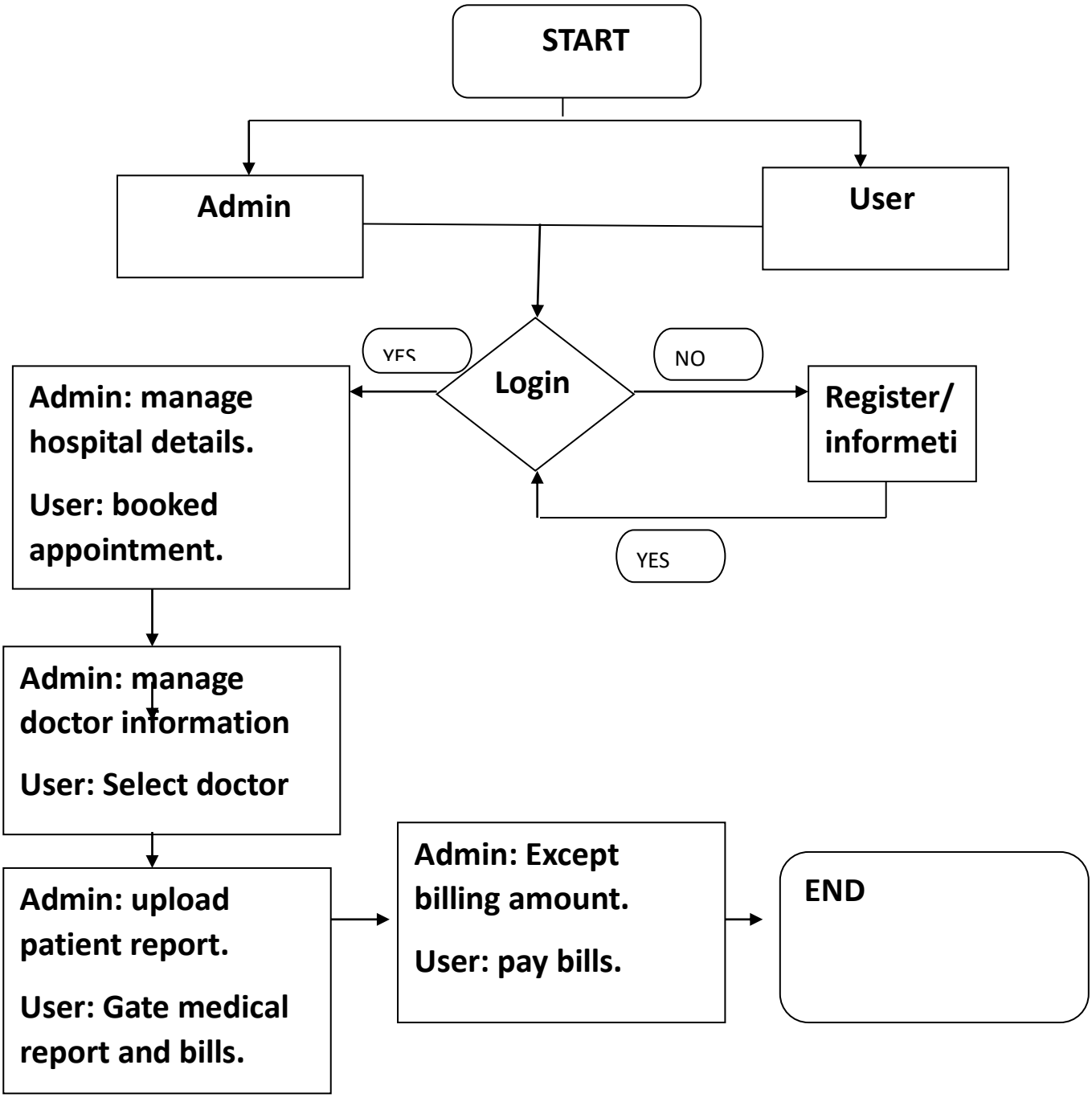
19) Document a real-world case where a software application required critical maintenance.

❖ **A software application required critical maintenance:**

- Make sure your application work smoothly . If any bugs , errors, glitches is in your application you should solve it.
- If user reported any issues you providing timely solutions.
- Time to time updating your software.
- Give storng security patches.
- Time to time updating your security system.
- Add all new featured in important for your application.

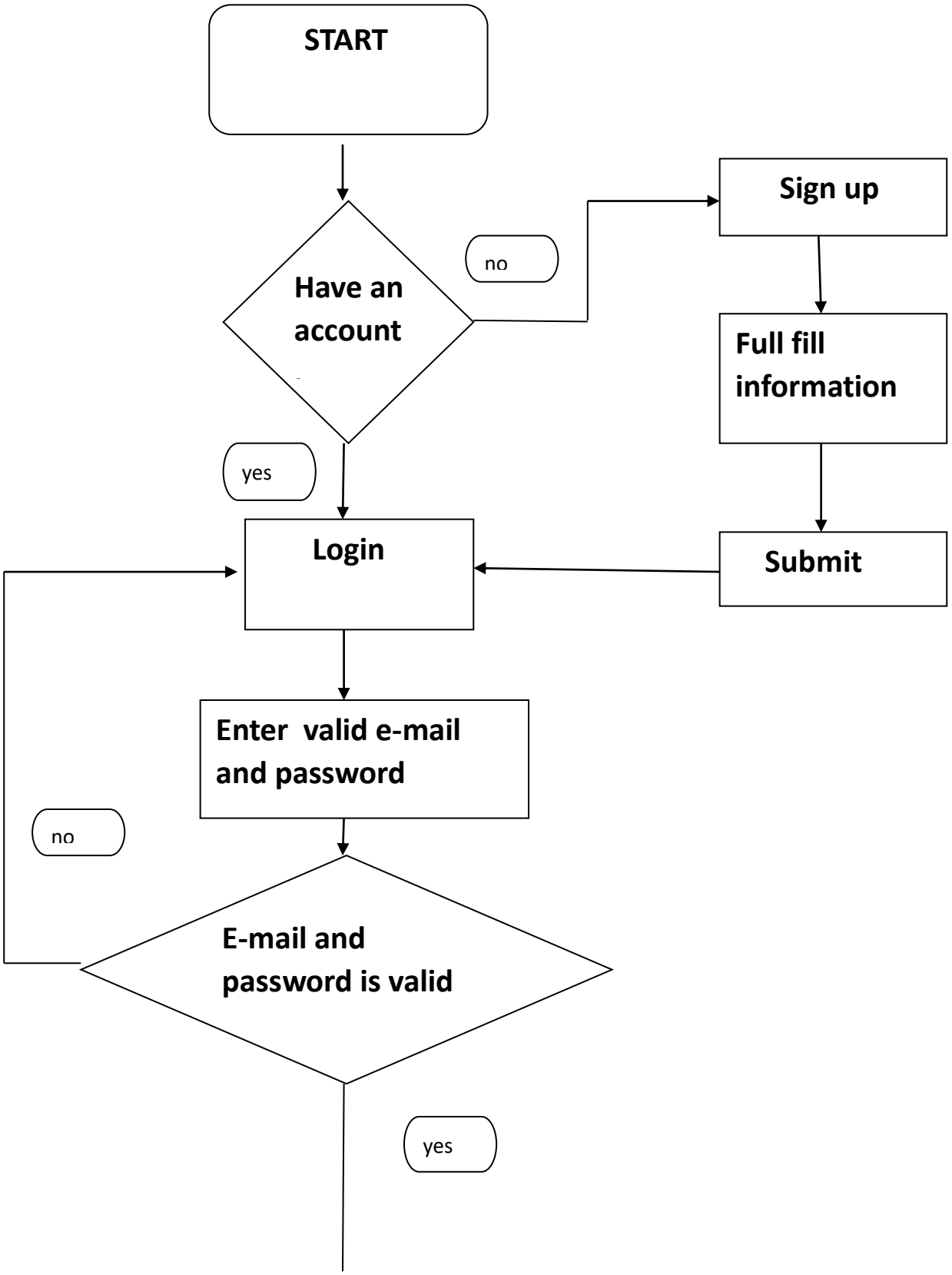
20) Create a DFD for a hospital management system.

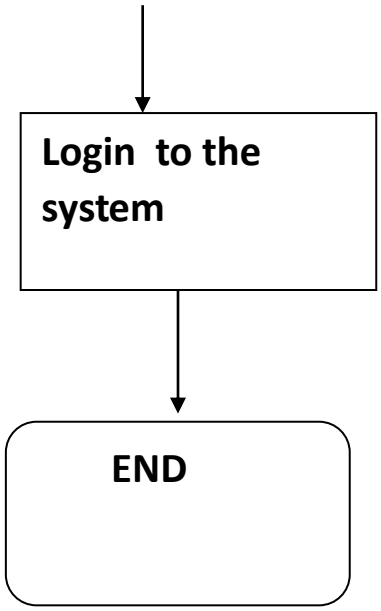
❖ **<u>DFD for a hospital management system:</u>**



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

- **The logic of a basic online registration system :**


START
Have an account
no
Sign up
Full fill information
yes
Login
Submit
Enter valid e-mail and password
no
E-mail and password is valid
yes


Login to the system
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