**Lab Exercise**

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

**Ans-**

1. Python Program:

# Hello World in Python

Print ("Hello, World!")

2. C Program:

// Hello World in C

#include <stdio.h>

int main() {

printf("Hello, World!");

return 0;

}

| **Feature** | **Python** | **C** |
| --- | --- | --- |
| Syntax Simplicity | Very simple | More structured |
| Output Statement | print("Hello, World!") | printf("Hello, World!"); |
| Main Function Required | ❌ No | ✅ Yes |
| Semicolon Needed | ❌ No | ✅ Yes |
| Header Files | ❌ Not required | ✅ Required (#include <stdio.h>) |

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

**Ans-**

**Client (Browser / App)**

**|**

**| Request: "GET /data"**

**↓**

**[ TCP/IP Stack]**

**↓**

**[ Router / Internet]**

**↓**

**[ TCP/IP Stack]**

**↓**

**Server (e.g., Web Server)**

**|**

**| Response: "Here is your data"**

**↑**

**[ TCP/IP Stack]**

**↑**

**[ Router / Internet]**

**↑**

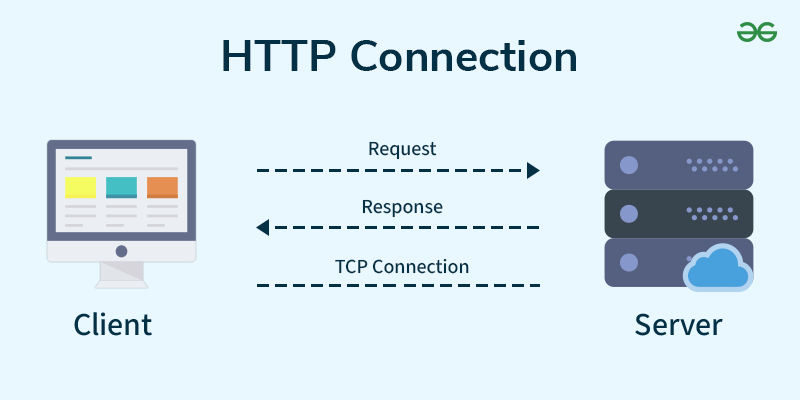
**[ TCP/IP Stack]**

**↑**

**Client receives data**

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

**Ans-**



**4) Research different types of internet connections (e.g., broadband, fibre,**

**satellite) and list their pros and cons.**

**Ans-**

**✅ 1. Digital Subscriber Line (DSL)**

**Pros:**

* **Widely available**
* **Allows internet and phone use at the same time**
* **Affordable for basic users**

**Cons:**

* **Speed depends on distance from service provider**
* **Slower compared to modern options like fiber**

**✅ 2. Cable Internet**

**Pros:**

* **Faster than DSL**
* **Suitable for streaming and gaming**
* **Uses existing TV cable lines**

**Cons:**

* **Shared bandwidth can cause speed drops during peak hours**
* **Limited availability in rural areas**

**✅ 3. Fiber Optic**

**Pros:**

* **Very high speed (up to 1 Gbps or more)**
* **Low latency and highly reliable**
* **Great for heavy users (streaming, gaming, work-from-home)**

**Cons:**

* **Limited availability in some regions**
* **Installation may be expensive**

**✅ 4. Satellite Internet**

**Pros:**

* **Available in remote and rural areas**
* **Doesn’t require cable or phone lines**

**Cons:**

* **High latency (delay), not good for gaming or video calls**
* **Weather can affect signal quality**
* **Data caps and slower speeds**

**✅ 5. Wireless Internet (Mobile Data / Wi-Fi)**

**Pros:**

* **Convenient and portable**
* **Easy to set up**
* **Useful for smartphones and hotspots**

**Cons:**

* **Speed and reliability depend on signal strength**
* **May have data limits or be costly**

**✅ 6. Broadband over Power Lines (BPL)**

**Pros:**

* **Uses existing electrical infrastructure**
* **Easy access where other services are unavailable**

**Cons:**

* **Not widely available**
* **Interference issues can occur**

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

**Ans-**

1. Simulating an HTTP Request Using curl

Command:

curl <http://example.com>

Explanation:

* This command sends an HTTP GET request to the server at example.com.
* The server responds with the HTML content of the page.
* Useful for testing websites or APIs.

2. Simulating an FTP Request Using curl

Command (to download a file):

curl ftp://ftp.example.com/file.txt --user username:password

Explanation:

* Connects to an FTP server.
* Logs in with provided username and password.
* Downloads the file file.txt from the FTP server.

**6) Identify and explain three common application security vulnerabilities.**

**Suggest possible solutions.**

**Ans-**

1. SQL Injection

* Problem: Hacker tricks the app to get into the database.
* Fix: Check and clean user input.

2. XSS (Cross-Site Scripting)

* Problem: Hacker puts bad code in a website that runs on other people’s screens.
* Fix: Don’t show user input directly. Clean it first.

3. Weak Login System

* Problem: Easy passwords or no security checks.
* Fix: Use strong passwords and add OTP or 2-step login.

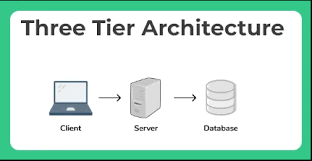
**7) Identify and classify 5 applications you use daily as either system software**

**Or application software.**

**Ans-**

* Google Chrome – Application Software
* Microsoft Word – Application Software
* Windows 10 – System Software
* VLC Media Player – Application Software
* Antivirus (like Quick Heal) – System Software

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

**Ans-**

**[ User / Browser ]**

**|**

**--------------------------**

**| 1. Presentation Layer | → HTML, CSS, JS**

**--------------------------**

**|**

**--------------------------**

**| 2. Application Layer | → Backend logic (PHP, Python)**

**--------------------------**

**|**

**--------------------------**

**| 3. Data Layer | → Database (MySQL, etc.)**

**--------------------------**

**9) 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 (Frontend / UI)

Role: This is what the user interacts with.

* User browses restaurants and food items
* Adds food to cart
* Enters delivery details
* Makes payment

Technologies Used:  
HTML, CSS, JavaScript, React, Flutter (for mobile)

✅ 2. Business Logic Layer (Application Layer)

Role: This handles all decision-making and rules.

* Processes order and verify payment
* Applies discounts and taxes
* Matches user with nearby delivery agents
* Calculates estimated delivery time

Technologies Used:  
Node.js, Java, PHP, Python

✅ 3. Data Access Layer (Database Layer)

Role: Deals with storing and retrieving data.

* Saves user profiles, orders, and payment info
* Fetches list of restaurants and menus
* Tracks real-time delivery status
* Stores feedback and reviews

Technologies Used:  
MySQL, MongoDB, PostgreSQL

**10) Explore different types of software environments (development, testing,**

**production). Set up a basic environment in a virtual machine.**

**Ans-**

✅ Types of Software Environments:

1. Development Environment
   * Used by developers to write and build code
   * Contains IDEs, compilers, and debugging tools
   * Example: VS Code, Python, XAMPP
2. Testing Environment
   * Used by QA (testers) to test features
   * Isolated from development and production
   * Includes tools for automated/manual testing
   * Example: Selenium, Postman, JUnit
3. Production Environment
   * The live environment where real users access the application
   * Must be stable, secure, and monitored
   * Example: Hosted web server (Apache, Nginx), Cloud (AWS, Azure)

🖥️ Basic Virtual Machine Setup (Example using VirtualBox):

1. Install VirtualBox or VMware
2. Create a new virtual machine
   * Choose OS (e.g., Ubuntu or Windows)
   * Allocate RAM and disk space
3. Install a development stack
   * Example for web development:
     + Install Apache, MySQL, PHP (or use XAMPP)
     + Install code editor (e.g., VS Code)
4. Test a basic web page or script
   * Create a hello.php file
   * Run it in the browser from localhost

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

**Ans-**

1. Write a Simple Code File

Create a simple file named hello.py:

# hello.py

print("Hello, GitHub!")

2. Create a Repository on GitHub

* Go to [https://github.com](https://github.com" \t "_new)
* Click New Repository
* Name it (e.g., first-code)
* Add a description (optional)
* Choose Public
* Click Create repository

3. Upload the Code Using Git (Command Line)

Open terminal or Git Bash:

git init

git add hello.py

git commit -m "Add hello.py"

git branch -M main

git remote add origin https://github.com/your-username/first-code.git

git push -u origin main

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

**Ans-**

✅ Step 1: Create a GitHub Repository

1. Go to [https://github.com](https://github.com" \t "_new)
2. Click on “New” to create a new repository
3. Enter a repository name (e.g., my-first-repo)
4. (Optional) Add a description
5. Choose Public or Private
6. Click Create repository

✅ Step 2: Prepare Your Project Locally

Create a folder and add a file (e.g., main.py):

python

Copy code

# main.py

print("This is my first commit!")

✅ Step 3: Use Git to Commit and Push Code

Open Git Bash or Terminal, then run:

bash

Copy code

git init # Initialize Git in the folder

git add . # Stage all files

git commit -m "Initial commit" # Commit changes with a message

git branch -M main # Rename default branch to main

git remote add origin https://github.com/your-username/my-first-repo.git

git push -u origin main # Push changes to GitHub

🔁 Replace your-username with your actual GitHub username.

✅ Summary:

* You created a GitHub repository
* Committed code using Git
* Pushed it to GitHub successfully

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

**Ans=--Title: Create a student account on GitHub and collaborate on a small project with a classmate**

🎯 Objective

To understand version control using GitHub and practice real-time collaboration on a basic project.

🧑‍💻 Tasks to Perform

1. Create a GitHub account by visiting [https://github.com](https://github.com" \t "_new).
2. Set up your profile with your real name and profile photo.
3. Create a new repository named collab-project.
4. Add a README.md file describing the project.
5. Invite your classmate as a collaborator via repository settings.
6. Both team members should commit at least one file each.
7. Explore features like:
   * Issues
   * Pull requests
   * Commit history

⚙️ Tools Required

* GitHub account
* Web browser
* Basic internet connection

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

**Ans—**

Title: Create a list of software you use regularly and classify them into the following categories: System, Application, and Utility Software

🎯 Objective

To recognize and categorize commonly used software based on their function and purpose within a computing environment.

🧑‍💻 Tasks to Perform

1. Identify 9–12 software applications you use regularly on your computer or smartphone.
2. Organize the software into one of the three types:
   * System Software
   * Application Software
   * Utility Software
3. Present the information in a table format with proper headings.

📋 Table Format

| Software Name | Category | Description / Purpose |
| --- | --- | --- |
| Windows 11 | System Software | Manages hardware and provides system interface |
| Android OS | System Software | Mobile operating system |
| MS Word | Application Software | Word processing and document creation |
| Google Chrome | Application Software | Internet browsing |
| VLC Media Player | Application Software | Playing audio and video files |
| Tally ERP | Application Software | Accounting and financial management |
| WinRAR | Utility Software | Compressing and extracting files |
| CCleaner | Utility Software | Cleaning junk files and optimizing performance |
| Antivirus (e.g., Avast) | Utility Software | Protecting against malware and viruses |

⚙️ Tools Required

* Access to your device’s installed software list
* Pen-paper or text editor for writing
* Internet (optional, for researching unfamiliar software)

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

**Ans—**

Title: Follow a GIT tutorial to practice cloning, branching, and merging repositories

🎯 Objective

To understand and apply the basic operations of Git for version control, including cloning a repository, creating branches, and merging code.

🧑‍💻 Tasks to Perform

1. Cloning a Repository
   * Use git clone to download a remote repository to your local machine.
   * Example:

bash

code

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

1. Creating a Branch
   * Create a new branch to add features without affecting the main code.
   * Example:

bash

code

git checkout -b feature-branch

1. Making Changes
   * Edit files, commit the changes using git commit, and push to the new branch.
2. Merging Branches
   * Switch to the main branch and merge the feature branch into it.
   * Example:

bash

code--

git checkout main

git merge feature-branch

1. Resolve Merge Conflicts (if any)
   * Practice conflict resolution when Git highlights file conflicts.

⚙️ Tools Required

* Git installed on your computer
* GitHub account with a repository
* Command-line interface or Git GUI (like Git Bash, GitHub Desktop)

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

**Ans—**

Title: Write a report on the various types of application software and how they improve productivity

🎯 Objective

To explore different types of application software and understand how they assist users in completing tasks more efficiently and effectively.

🧑‍💻 Tasks to Perform

1. Research and list different categories of application software.
2. Provide examples of each category.
3. Write a brief report explaining how each type improves user or organizational productivity.

📝 Suggested Report Structure

🔹 1. Word Processing Software

* Example: Microsoft Word, Google Docs
* Productivity Impact: Helps create, edit, format, and print text documents quickly and professionally.

🔹 2. Spreadsheet Software

* Example: Microsoft Excel, Google Sheets
* Productivity Impact: Allows data analysis, calculations, chart generation, and financial modeling.

🔹 3. Presentation Software

* Example: PowerPoint, Canva
* Productivity Impact: Enables professionals to communicate ideas effectively with visual support.

🔹 4. Database Management Software (DBMS)

* Example: Microsoft Access, MySQL
* Productivity Impact: Organizes and retrieves structured data efficiently, saving time and effort.

🔹 5. Multimedia Software

* Example: Adobe Photoshop, VLC Media Player
* Productivity Impact: Facilitates content creation, editing, and consumption (videos, graphics, audio).

🔹 6. Web Browsers

* Example: Google Chrome, Mozilla Firefox
* Productivity Impact: Provides access to information, tools, and web applications instantly.

🔹 7. Communication Software

* Example: Zoom, Microsoft Teams, Slack
* Productivity Impact: Enables instant messaging, video conferencing, and team collaboration.

⚙️ Tools Required

* Word processor (MS Word, Google Docs)
* Internet access for research

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

**Ans—**

Title: Create a flowchart representing the Software Development Life Cycle (SDLC)

🎯 Objective

To visually represent the phases of the Software Development Life Cycle (SDLC) using a standard flowchart and understand the role of each phase in structured software development.

🧑‍💻 Tasks to Perform

1. Study the six basic phases of SDLC.
2. Use a diagram tool (e.g., Draw.io, Lucidchart, MS Visio, or even pen-paper) to design a flowchart.
3. Ensure each SDLC phase is shown with correct flow and relationships.

📋 Phases of SDLC to Include

* 1. Requirement Analysis
* 2. System Design
* 3. Implementation (Coding)
* 4. Testing
* 5. Deployment
* 6. Maintenance

📊 Sample Flowchart Structure

csharp

Copy code

[Start]

↓

[Requirement Analysis]

↓

[System Design]

↓

[Implementation]

↓

[Testing]

↓

[Deployment]

↓

[Maintenance]

↓

[End]

You can also include decision points (e.g., after testing: "Is software bug-free?" → Yes → Deploy / No → Return to Coding)

⚙️ Tools Required

* Draw.io / Lucidchart / Pen-paper
* Internet (for SDLC references)

**18)Write a requirement specification for a simple library management system**

**Ans—**

Title: Write a requirement specification for a simple Library Management System

🎯 Objective

To prepare a clear and concise Software Requirement Specification (SRS) document that outlines the functional and non-functional requirements of a Library Management System.

🧑‍💻 Tasks to Perform

1. Define the purpose and scope of the system.
2. Identify the functional requirements (what the system should do).
3. Identify the non-functional requirements (system qualities like performance, security).
4. Present the specification in standard SRS format.

📝 Sample Requirement Specification Document

🔹 1. Introduction

* Purpose:  
  To manage books, members, and borrowing activities in a digital format.
* Scope:  
  The system will allow librarians to add/remove books, register members, issue/return books, and generate reports.

🔹 2. Functional Requirements

* The system shall allow the librarian to:
  + Add, delete, and update book records.
  + Register and manage members.
  + Issue books to members.
  + Return books from members.
  + Generate overdue fine reports.
* The system shall display:
  + Available and borrowed books.
  + Member transaction history.
  + Due date alerts.

🔹 3. Non-Functional Requirements

* Usability: User-friendly UI for easy navigation.
* Reliability: System should handle simultaneous users and maintain data consistency.
* Security: Login credentials required for librarian and staff access.
* Performance: The system should perform all operations within 2 seconds.
* Portability: Should work on web browsers and desktop platforms.

🔹 4. Assumptions

* Users have basic computer literacy.
* Database is regularly backed up.

⚙️ Tools Required

* Word processor (e.g., MS Word, Google Docs)
* Internet (optional, for reference templates)

📝 Learning Outcome

After completing this lab, students will:

* Understand how to define functional and non-functional requirements
* Gain practice in writing technical documents
* Learn how proper specification prevents software development errors

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

**Ans—**

Title: Perform a functional analysis for an online shopping system

🎯 Objective

To identify and analyze the core functional components of an online shopping system and understand how each contributes to the overall system behavior.

🧑‍💻 Tasks to Perform

1. Identify key user roles and system actors (e.g., Customer, Admin).
2. List core functional requirements and explain their purpose.
3. Draw a functional block diagram (optional) for better understanding.

📋 Functional Requirements of Online Shopping System

🔹 1. User Registration & Login

* Users must be able to register and securely log in.
* Forgot password and user authentication features included.

🔹 2. Product Browsing and Search

* Users can browse by category, search for products using keywords, and filter results.

🔹 3. Shopping Cart

* Users can add/remove products, view totals, and update quantities.

🔹 4. Checkout and Payment

* System calculates total price with taxes and shipping.
* Supports payment gateways like UPI, Credit/Debit Cards, Net Banking.

🔹 5. Order Management

* Users can view order history, current status (shipped, delivered), and cancel orders.

🔹 6. Admin Functionalities

* Add/update/delete product listings
* Manage inventory, users, and process orders

🔹 7. Feedback and Reviews

* Customers can leave product ratings and reviews.

🧱 Optional Functional Block Diagram

A diagram showing the flow between:  
User → Product Search → Cart → Checkout → Payment → Order Confirmation

⚙️ Tools Required

* Word processor
* Diagramming tool (for functional block diagram, optional)

📝 Learning Outcome

After completing this lab, students will be able to:

* Identify key functionalities of real-world systems
* Perform structured analysis of a complex application
* Understand how to break down large systems into manageable features

1. **Design a basic system architecture for a food delivery app**

**Ans—**

Title: Design a basic system architecture for a food delivery app

🎯 Objective

To design a simple yet complete system architecture for a food delivery application, showing how different components interact in real-time to fulfill user requests.

🧑‍💻 Tasks to Perform

1. Identify the main system components and user roles.
2. Design a basic architecture diagram.
3. Describe the role of each component and how data flows through the system.

🧱 Architecture Components

🔹 1. Frontend (User Interface)

* Customer App: Browse restaurants, place orders, track delivery.
* Restaurant Panel: Accept/prepare orders, update status.
* Delivery App: Accept delivery tasks, update real-time location.

🔹 2. Backend (Application Server)

* Handles:
  + Order placement logic
  + Authentication and user data
  + Payment integration
  + Notification system (push/SMS/email)
  + Order status updates

🔹 3. Database Layer

Stores:

* User data (login, address, orders)
* Restaurant menus and availability
* Payment history and reviews
* Delivery logs

🔹 4. Payment Gateway API

* Securely processes transactions via UPI, cards, wallets, etc.

🔹 5. Real-Time Tracking System

* Uses GPS and mapping APIs (e.g., Google Maps)
* Tracks delivery location
* Shows ETA to customers

🔹 6. Notification System

* Sends order confirmations, delivery status, offers, etc.

📊 Sample Architecture Diagram (Text Representation)

css

Copy code

[Customer App] ——> [Backend Server] <—— [Restaurant Panel]

│ │

▼ ▼

[Payment Gateway] [Database Layer]

│ ▲

▼ │

[Real-time GPS] <—— [Delivery App]

⚙️ Tools Required

* Drawing tool (Draw.io / Lucidchart / MS PowerPoint)
* Word processor for documentation

📝 Learning Outcome

After completing this lab, students will:

* Understand the structure of multi-user, real-time systems
* Be able to create and explain a basic system architecture
* Recognize the importance of APIs, data storage, and user interfaces in modern apps

**21) Develop test cases for a simple calculator program**

**Ans—**

Title: Develop test cases for a simple calculator program

🎯 Objective

To create structured test cases for a simple calculator program that performs basic arithmetic operations: addition, subtraction, multiplication, and division.

🧑‍💻 Tasks to Perform

1. Identify the calculator functions to be tested.
2. Define input values, expected output, and conditions.
3. Organize test cases into a test case table.

🧪 Calculator Functionalities to Test

* Addition (+)
* Subtraction (-)
* Multiplication (\*)
* Division (/)
* Handling of invalid inputs
* Division by zero

⚙️ Tools Required

* Calculator Program (Python/C/Java/Any Language)
* Word processor or spreadsheet software to document test cases

📝 Learning Outcome

After completing this lab, students will:

* Understand the importance of test cases in software quality assurance
* Be able to write effective test cases for simple programs
* Learn how to validate correct and incorrect input handling

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

**Ans—**

Title: Document a real-world case where a software application required critical maintenance

🎯 Objective

To understand the significance of software maintenance by analyzing a real-world case in which a software application required urgent or critical fixes due to bugs, performance issues, or changing requirements.

🧑‍💻 Tasks to Perform

1. Research a known software maintenance case.
2. Describe the problem, its cause, and the maintenance performed.
3. Summarize the outcome and lessons learned.

📄 Case Study: WhatsApp Outage – October 2022

🔹 1. Background

WhatsApp, the popular messaging application owned by Meta, faced a global outage on 25th October 2022. Users were unable to send or receive messages for over two hours.

🔹 2. Problem Description

* Messages were stuck on the “clock” icon.
* Groups and private chats were unresponsive.
* Web version also failed to connect.
* The issue impacted millions of users worldwide.

🔹 3. Cause

* Internal server configuration changes triggered a major communication breakdown between WhatsApp servers.
* Load balancing failed due to improper update deployment.

🔹 4. Maintenance Actions Taken

* The engineering team rolled back the latest deployment.
* Reconfigured server communication modules.
* Conducted an emergency round of system health checks and network traffic balancing.

🔹 5. Outcome

* Services were gradually restored within 2.5 hours.
* Meta issued a public apology and promised enhanced monitoring.
* Internal deployment processes were revised to include stricter testing phases.

⚙️ Tools Required

* Internet connection for research
* Word processor for report writing

📝 Learning Outcome

After completing this lab, students will:

* Gain awareness of real-world maintenance challenges
* Understand how maintenance impacts users and business reputation
* Learn best practices in error recovery and rollback strategy

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

**Ans—**

Title: Create a DFD for a hospital management system

🎯 Objective

To understand and visualize the flow of data within a Hospital Management System (HMS) by creating a Level 0 and Level 1 DFD that includes key entities, processes, and data stores.

🧑‍💻 Tasks to Perform

1. Identify key processes and external entities in the hospital system.
2. Create a Level 0 DFD (Context Diagram).
3. Expand into a Level 1 DFD showing detailed interactions.

📊 Level 0 DFD (Context Diagram)

External Entities:

* Patient
* Doctor
* Receptionist
* Admin

Processes:

* Hospital Management System

Data Flows:

* Patient provides registration details
* Doctor provides diagnosis
* Receptionist schedules appointments
* Admin manages records

Code---

[Patient] → (HMS) ← [Doctor]

[Receptionist] → (Hospital Management System) ← [Admin]

📈 Level 1 DFD (Detailed Process Breakdown)

Processes:

1. Patient Registration
2. Appointment Scheduling
3. Medical Diagnosis
4. Billing and Discharge
5. Report Generation

Data Stores:

* Patient Records
* Appointment Database
* Billing Info
* Medical History

Example Flow:

scss

code--

[Patient] → (1. Patient Registration) → [Patient Records]

[Receptionist] → (2. Appointment Scheduling) → [Appointment DB]

[Doctor] → (3. Medical Diagnosis) ↔ [Medical History]

(HMS) → (4. Billing & Discharge) → [Billing Info]

🧰 Tools Required

* Diagram tool (Draw.io / Lucidchart / Paper sketch)
* Word processor for documentation

📝 Learning Outcome

After completing this lab, students will:

* Understand the structure of DFDs and how to read/create them
* Learn to break down a real-world system into logical data processes
* Be able to model data flow for complex systems like healthcare software

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

**Ans—**

Title: Build a simple desktop calculator application using a GUI library

🎯 Objective

To design and develop a desktop calculator with basic arithmetic functionality (Addition, Subtraction, Multiplication, Division) using a Graphical User Interface (GUI) library such as Tkinter (Python), JavaFX (Java), or WinForms (C#).

🧑‍💻 Tasks to Perform

1. Design a calculator GUI with buttons for digits (0-9), operations (+, –, ×, ÷), clear, and equals.
2. Implement logic to handle button clicks and perform operations.
3. Display results and handle invalid inputs (e.g., division by zero).

🧱 Suggested Tech Stack

* Language: Python (Recommended)
* GUI Library: Tkinter

📐 Design Notes

* Use frames to organize buttons into rows
* Validate inputs and handle edge cases
* UI should be responsive and user-friendly

⚙️ Tools Required

* Python 3.x
* Tkinter (comes built-in with Python)
* Code editor (VS Code / PyCharm / IDLE)

📝 Learning Outcome

After completing this lab, students will:

* Understand GUI event handling and layout design
* Be able to create interactive desktop apps
* Learn how to integrate logic with GUI controls

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

**Ans—**

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

🎯 Objective

To understand the logical flow of user interactions in an online registration system and visualize the process using a flowchart diagram.

🧑‍💻 Tasks to Perform

1. Identify the sequence of steps a user follows in an online registration form.
2. Define decision points such as validation and duplication check.
3. Draw a flowchart using standard flowchart symbols.

🧾 Flowchart Logic Description

1. Start
2. Display Registration Form
3. User Inputs Details
4. Validate Required Fields
   * If Invalid → Show Error → Go to Step 3
   * If Valid → Proceed
5. Check If User Already Exists
   * If Yes → Show "User Exists" Message → End
   * If No → Proceed
6. Store User Data in Database
7. Show Registration Success Message
8. End

🔁 Flowchart (Text Representation)

code

[Start]

↓

[Display Registration Form]

↓

[User Enters Details]

↓

[Validate Inputs]

↓

┌───────────────┐

│ Inputs Valid? │

└──────┬────────┘

│Yes No

↓ ↙

[Check If User Exists] ← [Show Error]

↓

┌───────────────┐

│ User Exists? │

└──────┬────────┘

│Yes No

↓ ↙

[Show Exists Msg] ← [Store in Database]

↓

[End] ← [Show Success]

🧰 Tools Required

* Paper & Pen (for manual diagram)
* OR
* Diagram Tools (Draw.io, Lucidchart, Creately, etc.)

📝 Learning Outcome

After completing this lab, students will:

* Understand how to visualize decision-making in a system
* Learn flowchart components like decision, process, and input/output
* Gain experience mapping real-world processes into diagrams