Module 1 – Overview of IT Industry

1. **What is a Program?**

A Program is a set of instructions that we give to computer so that it will do a given particular task. A program contains code which is written in any programming language which is compiled into machine readable form and then executed.

* Write a simple "Hello World" program in two different programming languages of your choice.

In C language

#include <stdio.h>  
int main() {  
 printf("Hello, World!\n");  
 return 0;  
}

In Python

print("Hello, World!")

1. **What are the key steps involved in the programming process?**

The programming process generally involves understand the problem, design a solution, write code, test, and document the program.

1. **What are the main differences between high-level and low-level programming languages?**

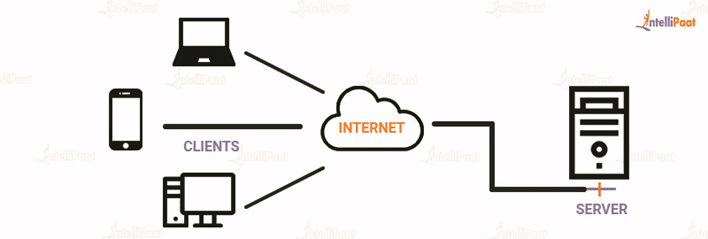
High-level Programming:- It is designed to make it easier for humans to understand and read code. It requires interpreter to convert human language into machine readable code.

Low-level Programming:- It is closer to machine instructions and require more precise control. They are directly executed by CPU so no need for intermediator.

1. **Describe the roles of the client and server in web communication.**

In web communication, the client initiates requests for services and this requests are of two types GET & POST , while the server responds to those requests by providing the requested content. This a request-response pattern.

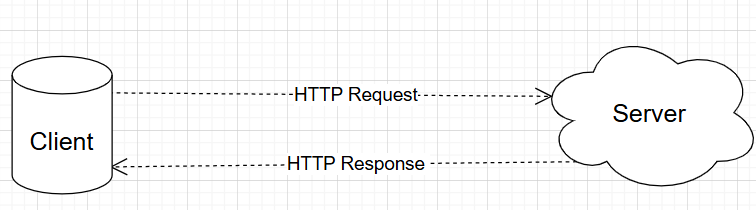
**Lab Ex:-** Research and create a diagram of how data is transmitted from a client to a server over the internet.



1. **Explain the function of the TCP/IP model and its layers.**

The TCP/IP model is a four-layer framework that defines how data is transmitted over networks, ensuring reliable communication between devices. It consists of four layers: Application, Transport, Internet, and Network Access (or Physical). Each layer performs specific functions that contribute to the overall communication process.

**Lab Ex:-** Design a simple HTTP client-server communication in any language.



1. **Explain Client Server Communication.**

In Client-Server communication clients (typically user applications or devices) request services or data from servers. The server processes these requests and sends back responses.

1. **How does broadband differ from fiber-optic internet?**

Broadband is a general term for high-speed internet. In contrast, fiber optic internet is a specific type of broadband that uses thin glass or plastic fibers to transmit data, offering faster speeds and lower latency.

**Lab Ex:-** Research different types of internet connections (e.g., broadband, fiber, satellite) and list their pros and cons.

1. Fiber Optic

* Pros:- Fastest speed (1 Gbps or higher)

Stable connection.

High bandwidth, great for multiple devices.

* Cons:- More expensive than other types.

1. Cable Internet

* Pros:- Good speed,upto 1.5 Gbps

Widely available in urban areas.

* Cons:- Shared connection, speed may drop during peak hours.

1. Satellite Internet

* Pros:- Available almost everywhere, especially in remote areas.
* Cons:- Slowest speeds of all types.

Weather-sensitive, signal can drop.

Very expensive.

1. **What are the differences between HTTP and HTTPS protocols?**

HTTP (Hypertext Transfer Protocol) is the standard, transmitting data in plain text, while HTTPS (Hypertext Transfer Protocol Secure) is a more secure version of HTTP that encrypts data before transmission. This encryption protects sensitive information like passwords and credit card details from being intercepted. HTTPS provides a secure channel for data transfer, while HTTP does not.

1. **What is the role of encryption in securing applications?**

Encryption plays a crucial role in application security by ensuring the confidentiality, and authenticity of data. It converts data into an unreadable format (ciphertext) that can only be accessed with the correct key. This protects sensitive information from unauthorized access, even if it's intercepted or stolen.

1. **What is the difference between system software and application software?**

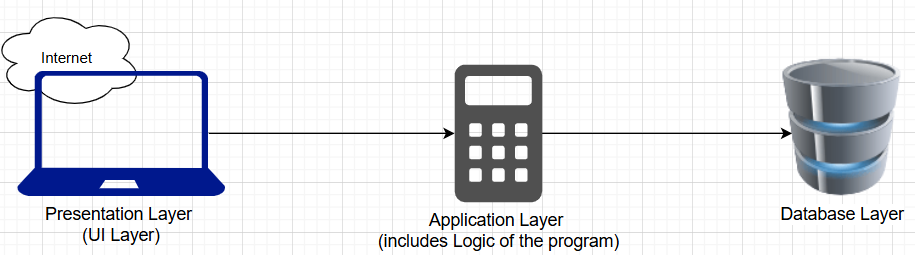
**System Software:** Manages and controls the computer's hardware and resources. It acts as an interface between hardware and application software. Examples include operating systems (like Windows or Linux), calculator, etc..

**Application Software:** Designed for users to perform specific tasks.  Examples include word processors (like Microsoft Word), web browsers (like Chrome), and image editors (like Photoshop). It interacts directly with the user to perform their desired functions.

1. **What is the significance of modularity in software architecture?**

* Modularity involves breaking down a complex system into smaller, independent modules that can be developed, tested, and deployed separately. This modular approach offers numerous benefits, including improved code organization, enhanced collaboration, increased flexibility, and reduced development time.
* Modularization makes code easier to understand, maintain, and update by organizing it into logical, self-contained units.
* Modules can be reused in different projects or systems, saving development time and effort.

**Lab Ex:-** Design a basic three-tier software architecture diagram for a web application.



1. **Why are layers important in software architecture?**

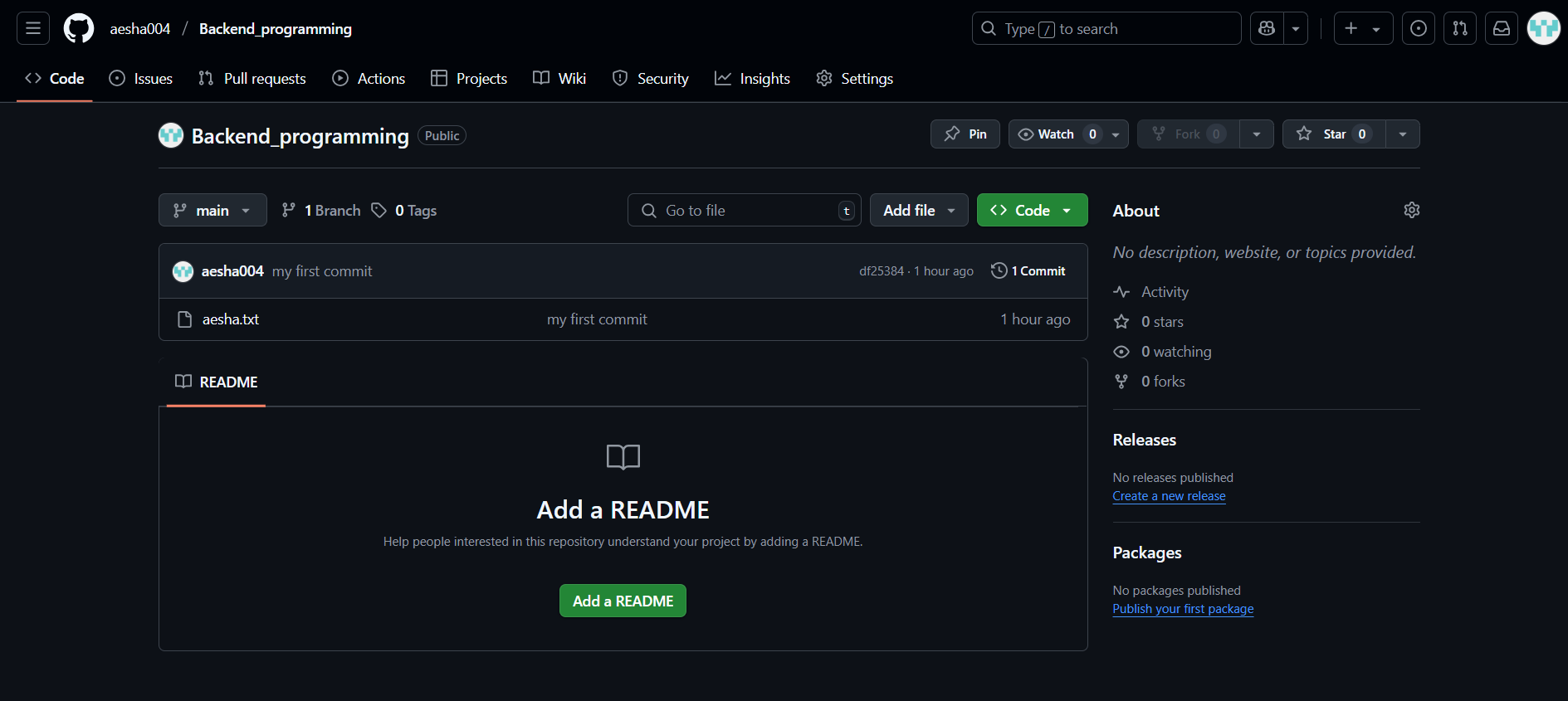
Layers are like distinct sections or compartments within a software application, each responsible for a specific type of task. This organization helps make software easier to understand, modify, and maintain, as well as enabling independent development and testing.

1. **Explain the importance of a development environment in software production.**

A development environment is crucial in software production as it provides a controlled, isolated space for developers to build, test, and debug code without impacting the live application or users.

1. **What is the difference between source code and machine code?**

Source code is the human-readable text written by programmers using a programming language like Python or Java, while machine code is the binary instructions (0s and 1s) that a computer's CPU directly executes.



First sample file push to repository

**Lab Ex:-** Create a Github repository and document how to commit and push code changes.

* To initialized a empty git repository

Cmd >git init

* To check status of working repository.

Cmd >git status

* To add files to the repository on github.

Cmd >git add .

* To save the staged changes with a descriptive message.

Cmd >git commit -m “commit message”

* To connects your local repository to remote repository.

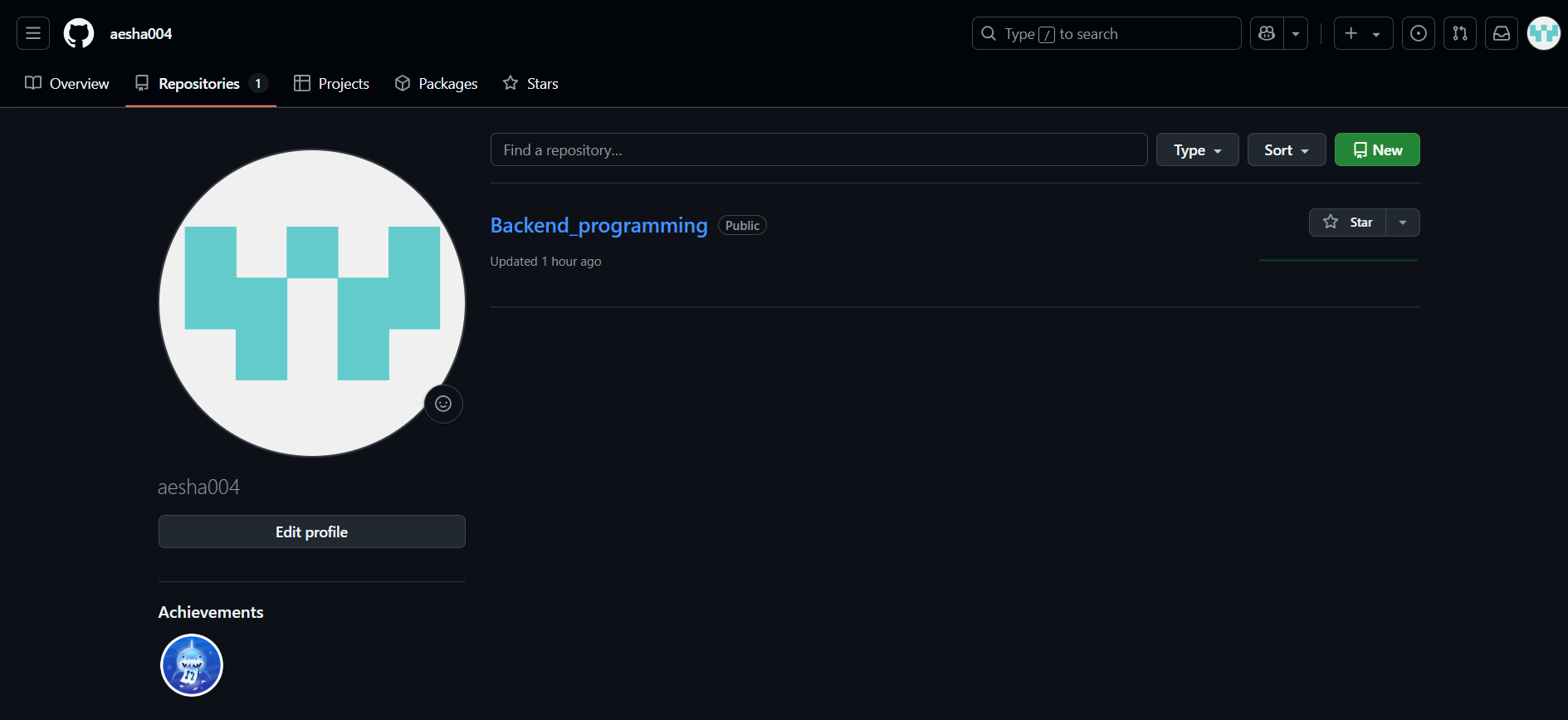
Cmd >git remote add origin [https://github.com/aesha004/Backend programming.git](https://github.com/aesha004/Backend%20programming.git)

* To push local changes to remote repository.

Cmd >git push -u origin main

1. **What are the benefits of using Github for students?**

By using GitHub, students can effectively manage code, track changes, and collaborate with others on projects, ultimately building valuable experience and showcasing their skills.



Created student profile and a repository to work on

1. **What is the role of application software in businesses?**

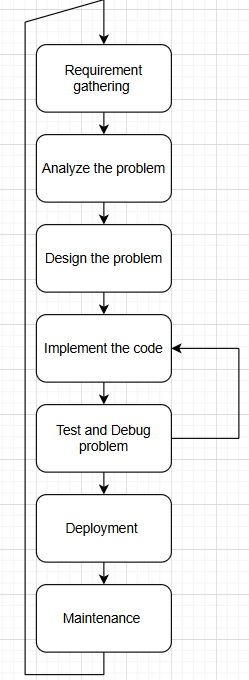
Application software helps businesses do their daily tasks more easily and efficiently. It includes programs that are made for specific business needs like:

* Managing data (e.g., Excel or database software)
* Creating documents (e.g., Microsoft Word)
* Communicating (e.g., email, chat apps)
* Handling sales and inventory (e.g., billing software)
* Marketing and customer service (e.g., CRM tools like Salesforce)

In short, application software helps businesses save time, stay organized, improve communication, and work faster.

1. **What are the main stages of the software development process?**
2. Requirement Gathering and planning
3. Analysis
4. Design
5. Implementation
6. Testing
7. Deployment
8. Maintenance

**Lab Ex:-** Create a flowchart representing the Software Development Life Cycle (SDLC).



1. **Why is the requirement analysis phase critical in software development?**

The requirement analysis phase is critical in software development because it is the foundation for a successful project by ensuring that the software being built meets the needs of users. It involves identifying, documenting, and analyzing requirements to avoid costly errors and delays later in the development process.

**Lab Ex:-** Write a requirement specification for a simple library management system.

Functional Requirements:-

* Book Management
* Add new books to the system.
* Edit book details
* Delete books
* Check availability status of book.
* User Management
* Add /edit/delete user accounts
* Track number of books issued per user.

1. **What are the key elements of system design?**

Key elements of system design include architecture, data flow, scalability, performance, security, and reliability.

1. **What are the key differences between web and desktop applications?**

**Web Applications:-**

Accessibility : Accessible from any device with a web browser and internet connection.

Installation: No installation required, users access them through a browser.

Features: May have fewer features or a less rich user interface compared to desktop applications.

Examples: Gmail, Google Docs, social media platforms.

**Desktop Applications:-**

Accessibility: Installed and used on a specific computer.

Installation: Requires installation on the user's computer.

Features: Can offer a wider range of features and a more robust user interface.

Examples: Microsoft Office, Adobe Photoshop, games.

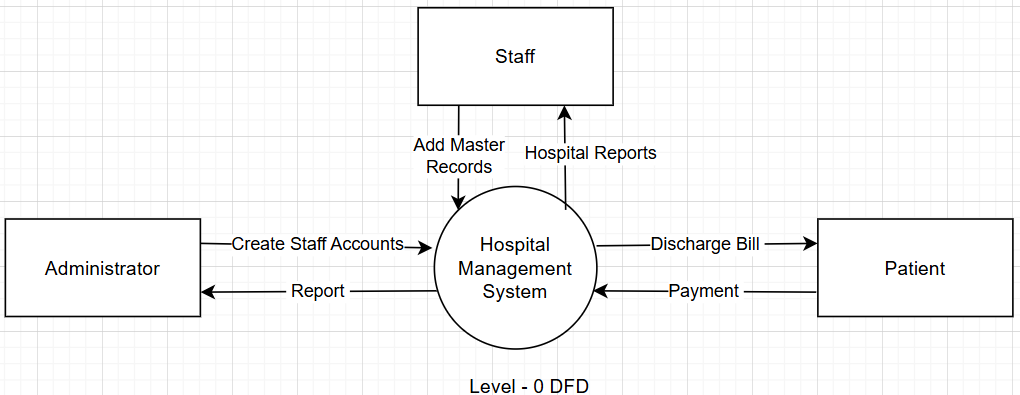
1. **What role does UI/UX design play in application development?**

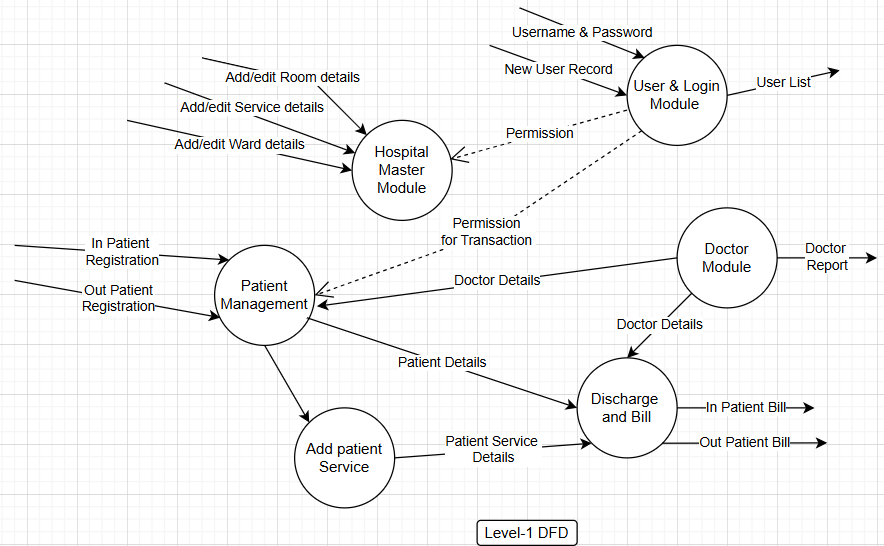
* **UI/UX design** plays a very important role in application development because it focuses on how the app **looks** and **feels** to users.
* **UI (User Interface)** is how the app **looks** — the buttons, colors, layout, and design.
* **UX (User Experience)** is how the app **works** — how easy and smooth it is for users to use the app.
* It helps users **find what they need quickly** .
* It keeps users engaged and coming back.

1. **What is the significance of DFDs in system analysis?**

* **DFDs (Data Flow Diagrams)** are important in system analysis because they show **how data moves** through a system in a simple and clear way.
* They help developers and stakeholders understand the overall structure of the system before building it.
* DFDs are useful for planning and communication between team members.
* Make complex systems easy to understand.

**Lab Ex:-** Create a DFD for a hospital management system.





1. **How do flowcharts help in programming and system design?**

* Flowcharts act like a **visual guide** that explains how a program or system works — from start to finish.
* Flowcharts makes logic easy to understand before writing code.
* Flowcharts are used to design and represent algorithms, which are step-by-step instructions for solving a problem.

**Lab Ex:-** Draw a flowchart representing the logic of a basic online registration system.

