**Module 1 – Overview of IT industry**

1.) Explain in your own words what a program is and how it functions

-> a program is a set of instructions. typically, the program is put into a storage area accessible to the computer. The computer gets one instruction and performs it and then gets the next instruction.

2.) What are the key steps involved in the programming process?

-> here are the steps of programming:

* Analysing
* Designing
* Coding
* debugging and testing
* implementing and maintaining

3.) What are the differences between high-level language and low - level programming languages?

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| **High-level language** | **low -level language** |
| - These are programmer-friendly languages that are manageable, easy to understand, debug, and widely used in today’s times. | - These are machine-friendly language, it is difficult to understand for human beings. |
| - It is very easy to debug these languages. | - A programmer cannot easily debug these languages. |
| - high-level languages do not depend on machines. | - Low-level languages are machine-dependent. |
| - High-level languages are human-friendly | - Low-level languages are machine-friendly. |
| - High-level languages require the use of a applier or an interpreter for their translation into the machine code. | - Low-level language requires an assembler for directly translating the instructions of the machine language. |

4.) describe the roles of the client and server in web communication.

-> roles of client and server:

* Client

- “sometimes on “

- Initiates a request to the server when interested

- for ex: Web browser or your laptop or cell phone

- Doesn’t communicate directly with other clients.

- Needs to know the server’s address.

* Server

- “always on “

- Services requests from man y client hosts.

- for ex: web server for the [www.example.com](http://www.example.com) website

- Doesn’t initiate contract with the clients.

- needs a fixed, well-known address

5.) explain the function of the TCP/IP model and its layers.

-> TCP/IP determines how computers transfer data from one device to another. This data needs to be kept accurate that the receiver gets the same information that the sender originally sent.

-> There are 4 layers of TCP/IP model:

1. Network Access layer

-The network access layer, also known as the data link layer, handles the physical infrastructure that lets computers communicate with one another over the internet.

1. transport layer

- The transport layer provides a reliable data connection between two communicating devices.

1. Internet layer

- The internet layer, also known as the network layer of traffic to ensure data is sent speedily and accurately.

1. Application layer

-The application layer is the group of applications that kept the user access the network. For most of us that means email, massaging apps, and cloud storage programs.

6.) Explain client server communication.

-> A service is an abstraction of computer resources and a client does not have to be concerned with how the server performs while fulfilling the request and delivering the response. The client sends a request and the server returns a response.

7.) How does broadband differ from Fiber-optic internet?

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| Broadband internet | Fiber-optic internet |
| - Umbrella term (includes DLS, cable, fibres, etc.)   |  | | --- | |  |  |  | | --- | |  | | - Specific type of broadband using Fiber optic cables |
| - Coaxial cable, phone line, wireless, satellite | - Fiber optic cables (glass strands & light signals) |
| - widely available, especially cable/DLS. | - Growing availability, mostly urban/suburban areas |
| - typically, much lower than download | - Often symmetrical (equal to download) |
| - can be affected by distance, whether, or usage | - Very stable and consistent |

8.) What are the difference between HTTP and HTTPS protocols?

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| HTTP | HTTPS |
| - HTTP stands for hypertext transfer protocol | - HTTPS stands for hypertext transfer protocol security |
| - older text-based websites | - all modern websites |
| - Default port 80 | - default port 443 |
| - less secure | - more secure than HTTP |
| - not required | - required |

9.) What is the role of encryption in securing applications?

-> The primary purpose of encryption is to protect the confidentiality of digital data started on computer systems or transmitted over the internet or other computer networks. Encryption works by encoding “plaintext” into “ciphertext”, typically through the use of cryptographic mathematical models known as algorithms.

10.) What is the difference between system software and application software?

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| System software | Application software |
| - computer s/w designed to provide a platform to other s/w | - s/w designed to perform a group of coordinated functions, tasks or activities for user |
| - runs from start to till the end | - runs when user require |
| - developed using language like c, c++ | - developed using languages like java, c, c++ |
| - e.g. device drivers, operating system | - e.g. paint, word processor |
| - general purpose s/w | - specific purpose s/w |

11.) What is the significance of modularity in software architecture?

-> At its core, modularity aims to improve software development by partitioning complex problems into more manageable sub-problems. firstly, it allows for better code organisation and readability. By dividing a complex system into smaller modules, developers can create a more logical and structured codebase.

12.) Why are layers important in software architecture?

-> layered architecture is a software design pattern that is widely used in modern software development. Helps to promote modularity and separation of concerns, making it easier for teams to work independently without stepping on each other’s toes. A well-known method is with the use of layers, separating the infrastructure of the application into in dividual sections and having each one responsible for its own tasks.

There are five layers of software architecture:

* Presentation layer
* Application layer
* Business layer
* Persistence layer
* Database layer

13.) Explain the importance of a development environment in software production.

-> These environments provide developers with a workspace that features programming software and other resources and process required to develop source code for an application. It should encompass the complete set of hardware and software that are needed to create, manage, and maintain software throughout the software development lifecycle.

14.) What is the difference between source code and machine code?

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| Source code | Machine code |
| -human readable code written by programmer | -binary code that the computer can execute |
| -written in programming languages | -written in binary or hexadecimal |
| - need to compiled or interpreted | - its already executable |
| - easy for human read, write and debug | - hard for human read, write and debug |
| -e.g. print (“hello world”) | - e.g. 10110000 01100001 |

15.) Why is version control important in software development?

-> With version control, every change made to the code base is tracked. This allows software developers to see the entire history of who changed what at any given time and roll back from the current version to an earlier version if they need to.it enables teams to work in distributed and manage changes and versions of code and artifacts, and resolve merge conflicts and related anomalies.

16.) What are the benefits of using GitHub for students?

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* + Track changes to your code
  + Restore previous version if needed
  + Work safely without losing progress
  + Work on group project easily
  + Use pulls requests and code reviews

17.) What are the differences between open-source and proprietary software?

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| Open-source | Proprietary software |
| - software with source code that anyone can inspect, modify, and enhance | - software owned by an individual or a company cannot be altered by users |
| - software owned by an individual or a company cannot be altered by users | - often requires purchase or subscription fees |
| - high level of control over software operations and modifications. | -limited control, provided by the company that owns the software. |
| - typically has a community of developers and users for support. | - support is provides by the company |
| - open-source licenses (e.g., GPL, Apache, MIT). | - proprietary licenses, often with restrictions on use, copying, and distributions. |

18.) How does GIT improve software collaboration in a software development team?

-> in today’s fast-paced software development landscape collaboration is key. this is where GitHub comes into play.it is collaborative network, a tool for version control using Git, and a hub for sharing and developing software. It is more than just a code repository.

19.) What is the role of Application software in business?

-> Application functions refer to the specific tasks or operation that a software application can perform. The importance of it to meet the unique needs of business. It is make easy complex activities like data analysis, reporting, data entry, storage etc.

20.) What are the main stages of the software development process?

-> There are seven stages of the software development process:

* Planning
* Requirements analysis
* design
* Coding
* Testing
* Deployment
* Maintenance

21.) Why is the requirement analysis phase critical in software development?

-> Requirement analysis is a crucial stage in software development where the needs and expectation of stakeholders are identified and documented. Here’s why requirement analysis is so important:

* Avoiding scope creep
* Improve communication & collaboration
* Better project planning
* Reduced development costs
* Minimizing risks & errors

22.) What is the role of software analysis in the development process?

-> It is a process of collecting and interpreting facts, identifying the problems, and decomposition of a system into its components. It helps ensure that software system meets the requirements of the stakeholders.

23.) What are the key elements of system design?

-> Key elements of system design:

* Architecture
* Database Design
* Caching
* Security
* Load balance

24.) Why is software testing is important?

-> Testing identifies defects and flaws in the software early in the development lifecycle when they are less expensive tom fix. The later is bug is found, the costlier it becomes to resolve.it reduce project risks like software quality, security etc.

25.) What types of software maintenance are there?

-> There are 4 types of maintenance:

* Corrective Software Maintenance
* Preventative Software Maintenance
* Perfective Software Maintenance
* Adaptive Software Maintenance

26.) What are the key differences between web and desktop application?

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| Web application | Desktop application |
| - Runs in a browser, generally, platform-independent | - OS-dependent (Windows, macOS, Linux, etc.) |
| - usually needs internet connection   |  | | --- | |  |  |  | | --- | |  | | - Can work offline |
| - HTML, CSS, JavaScript, PHP, etc. | - C++, java, Python, C#, etc. |
| - limited by browser capabilities | - Richer and more customizable UI |
| - Gmail, Facebook, Trello | - Microsoft word, Adobe Photoshop, VCL media Playes |

27.) What are the advantages of using web application over desktop applications?

-> Advantages are below:

* Great for remote work, collaboration and on-the-go access.
* No need to develop separate versions for each platform.
* Bug fixes, new features
* Most of the processing happens on the server side.
* A single codebase can serve all users.

28.) What role does UI/UX design play in application development?

-> The focus of UI design should be on creating a clear flow for the user. User interface refers to the mobile application. user experience (UX) focuses on users’ overall experience while interacting with a mobile app. UI/UX designers are true advocates for the end-users.

29.) What are the differences between native and hybrid mobile apps?

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| Native App | Hybrid App |
| - A native app is a type of application specifically built for a particular operating system or platform, such as iOS or Android | - Hybrid mobile apps are a type of software applications that combines elements of both native and web applications |
| - Development time is longer | - Development time is shorter |
| - The cost of development is higher. | - The cost of development is generally lower. |
| - the cost of development is generally lower. | - May have slightly lower performance |
| - example: iOS mail app, developed in Swift for iPhones. | - example: the Iconic framework used to develop the Instagram app. |

30.) What is the significance of DFDs in system analysis?

-> A data flow diagram (DFD) is a graphical or visual representation that uses a standardized set of symbols and notations to describe a business’s operations through data movement. When used through an entire development process, they first document the results of business analysis.

31.) What are the pros and cons of desktop applications compared to web application?

-> desktop application are programs installed and run directly on a user’s device, offering high performance and responsiveness since they utilize the system local resources. One major benefit is that they can function offline, making them useful in environments with limited or unreliable internet access.

32.) How do flowcharts help in programming and system design?

-> flowcharts simplify complex systems by breaking them down into clear, easy-to-understand steps. In programming, they help developers plan the structure and logic of a perform before writing any code. This can make it it easier to identify potential issues.