Module-1 Theory Questions

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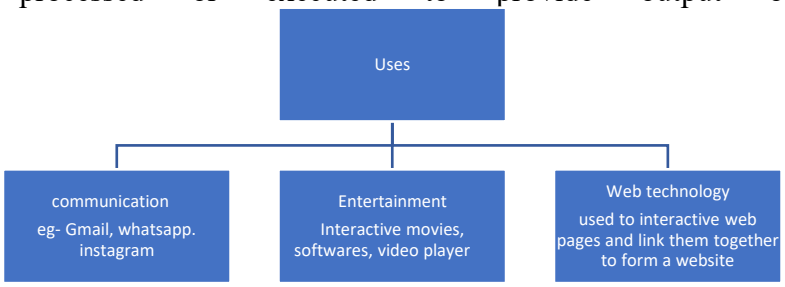
1. ***What is program and how it is used?***

A computer program is set of instructions that are used to execute particular task to get particular results. The basic concepts are required to be cleared to execute a program. The computer program is generated by programmers or software engineers. The code is then processed or executed to provide output of program.



Thus, the uses are programs are very vast and it is very helpful to the human world.

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

The steps in programming process are – a) Problem Defination
b) Problem analysis
c) Algorithm
d) Coding
e) Maintenance

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

Low level language	High level language
Easy to understand for machine but hard for humans [binary language]	Hman readable and easier to understand, but need a compiler to make it understandable for machine.
Non portable	Portable
High execution speed	Low speed
Uses binary code and mnemonics	Uses syntax and sementics
Eg: Assembly language, Machine language	Eg- Java, python, C++

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

Client:

- Initiates the communication by sending request to server.
- Typically a web browser on a user's computer that request webpages from a server.
- Displays the received information from the server.

Server:

- Listens the incoming request from clients.
- Process the request and retrieves the necessary data
- Sends back requested data to client
- Can handle multiple client requests.

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

The TCP/IP model is a part of the Internet Protocol Suite. This model acts as a communication protocol for computer networks and connects hosts on the Internet. It is a concise version of the OSI Model and comprises four layers in its structure.

the TCP/IP model is structured with four different layers. These four layers are:

1. Network Access Layer
2. Internet Layer
3. Host to Host Layer
4. Application Layer

6. ***Explain Client Server Communication***

In an Operating System, Client Server Communication refers to the exchange of data and Services among multiple machines or processes. In Client client-server communication System one process or machine acts as a client requesting a service or data, and Another machine or process acts like a server for providing those Services or Data to the client machine. This Communication model is widely used for exchanging data among various computing environments like Distributed Systems, Internet Applications, and Networking Application communication. The communication between Server and Client takes place with different Protocols and mechanisms.

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

Broadband Internet is also called high-speed internet. Much faster than 3G and 4G internet and much quicker than your old dial-up internet connection. Broadband is standard all over the world and fast enough for a user to use his/her Skype, YouTube, etc. DSL broadband is delivered over copper wire. Broadband Internet divides the line into two frequencies, one for data & one for voice.

Fiber optic broadband operates on fiber optic cables to transmit data. Opting for this technology means the internet services are extremely fast, reliable and secure. Much faster than wired or wireless internet, you can stream your favourite albums and instantly upload and download high-resolution photos from your favourite social media sites. Whatever you do over broadband, you can do it over fibre too, but much faster. Fiber optic streams and downloads are much faster than broadband connections.

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

Hypertext transfer protocol (HTTP) is a protocol or set of communication rules for client-server communication. When you visit a website, your browser sends a HTTP request to the web server, which responds with an HTTP response. The web server and your browser exchange data as plaintext. In short, HTTP protocol is the underlying technology that powers network communication. As the name suggests, hypertext transfer protocol secure (HTTPS) is a more secure version or an extension of HTTP. In HTTPS, the browser and server establish a secure, encrypted connection before transferring data.

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

Encryption is used to protect data from being stolen, changed, or compromised and works by scrambling data into a secret code that can only be unlocked with a unique digital key.
Encrypted data can be protected while at rest on computers or in transit between them, or while being processed, regardless of whether those computers are located on-premises or are remote cloud servers.

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

In the era of Digitalization and Modernization, Software is the very crucial support that allows hardware to perform various useful tasks. There are two categories of software; System Software and Application Software, these types perform different work which is why it is crucial to understand the difference. \

Application software is created to help users to perform specific tasks directly and System software acts as a mediator between hardware and user applications. Computer Software is a sort of program that allows clients to work on different assignments or use them to work on their System. It tells the working and responsibilities of the System.
Basically, Software is a set of instructions or commands that tells a user how to do and what to do. In this article, we will look into these topics in detail along with their differences.

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

Modularity in software architecture is highly significant because it promotes several key benefits that improve both the development process and the maintainability of software systems.

It increases the efficiency, flexibility, scalability and also improve collaration.

12. Why are layers important in software architecture?

Layers help to create a well-structured, manageable, and scalable system. They supports maintainability, allow independent testing, and provide flexibility for future changes. The clear separation of concerns that layers provide enables developers to focus on individual components, making it easier to build, long-lasting applications. It helps in security concerns, increase collaboration, flexibility, reusability etc.

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

The development environment in software production helps in building, testing and deploying applications. It increases productivity, consistency, quality assurance, collaboration, debugging, CI/CD support, resource management, cloud resource management etc.

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

Source code is written by programmers, human reasdable while machine code are numerical code that machine codes, machine code is done by CPU, has codes in binary form and can directly be accessed by computer. Whereas source code is in HTML, python also can modified by humans

Source code → Compeller → assembly code → assembler → Machine code

15. Why is version control important in software development?

Version control helps in collaration, code integrity, change in code, error recovery, continuous integration, continuous integration. Version control keeps record of any change done in the database. The developers can so can access and history of changes in the whole software..

16. What are the benefits of using Github for students?

Github can help students in various form-

- Get practical experience
- Open source document
- Collaborate with others,
- Improve software development
- Github library
- Get job oppurtunities
- Project management

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

Open source software- the source code is easily free and accessible by everyone. The programmer can change as well as update the code for free. It comes free of cost, allow us to learn the development of software, anyone can easily access, modify the code.

Example- android, ubuntu, firefox etc.

Proprietary software- it is a software where the source code is not available in internet it is owned by individual. The source code is also protected, it cannot be installed without license.it is not flexible because it has restrictions.

Example- Windows, macOS, skype Microsoft office

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

Git is open source code and improves collaboration in develop team. It allows to work on collaboration by editing code .the developers can work on different codes and then merge it into main codebase. One the review the code, have good transparency as well as version control.

19. What is the role of application software in businesses?

The applicatiom software is very useful in business. It improves communication between employees, allows large data management, also allows project management, inventory management. Thus it increases flexibility, data handling and good human resource management.

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

The six stages are –

a) Planning

b) Designing

c) Defining

d) Building

e) Testing

f) Deployment

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

The requirement analysis phase is much needed because it lays the platform for the whole project. It helps to give clear communication between developers, stakeolders. It gives perfect quality assurance for the best performance of final software, developers get a timeline and cost estimation as well.

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

Understanding the requirement of software, ensuring the need of stakeholders,finding issues, coming up with the solution are some of the role of software analysis. Good quality, sufficient design, clear communication are some of the pros of software analysis.

23. What are the key elements of system design?

The process of specifying a computer system’s architecture, components, modules, interfaces, and data is known as system design. The key elements are requirement analysis, architecture, dataflow/control flow,database design, security, scalability, API design, monitoring, CI/CD etc.

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24. Why is software testing important?

Customer satisfaction, high quality performance, security, quality and reliability are few benefits of software testing. Unless and until the software wont be tested we can never get the functional feedback regarding it.

25. : What types of software maintenance are there?

The types of software maintenance are corrective, adaptive, perfective, preventive.

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

Web applications	Desktop application
Can be handled in browser by internet	Can be installed on laptop
Have less features	Rich in features
Comparatively slow	Fast as it uses all the resources of computer
Cant work offline	Can easily be assessed offline

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

The advantages of web applications are accessibility, easy maintenance, updation, scalability, data security, more collaboration, more flexible and convenient over desktop application.

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

The role of a UI/UX designer is to ensure that the application, or software is user-friendly and visually appealing for the user. Better interaction, user retention, effective interaction, saves data/ resources, making loyal customers etc are few of the advantages of UI/UX design

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

The native apps arebuild on specific platform as Android/iOS . it is written in languages specific to the platform. It uses UI interface for smooth performance. have faster performance
Whereas hybrid apps are under HTML, CSS. It combine native app+ web apps. Medium performance power, camera or GPS, through APIs, plug-ins, and bridge.

Example- Amazon, Instagram, twitter.

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

It is visual representation of data moves through the system. The advantages are as follows- Good communication, system analysis and design, identifying bugs, documentation and maintenance, security and troubleshooting.

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

The pros are as follows- faster performance, offline capability, more secure, more access over upgradation

The cons are as follows – platform specific, require installation for working, manual updates and distribution of user base can be complex.

32. ***: How do flowcharts help in programming and system design?***
It provide visual representation, developers can easily plan & understand, good planning and design, debugging and troubleshooting, identify potential issues, improve code efficiency, easy documentation, improved collaboration.