



In
left root right

~~Pre~~
Pre
Root left right

Post
left ~~root~~
left right root





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Q. No. 2 Part (i) Following are the key aspects of usability.

→ **Effectiveness**: The extent to which user can complete thier task using the device or system.

→ **Effecency**: The minimal time and effort required to complete a task using the device of or system.

→ **Satisfaction**: User sense of comfort and positive experience while interacting with the system.

Q. No. 2 Part (ii)

Stack	Queue
→ Stock is the data structure in which the task that appears first is processed at last	→ Queue is the data structure in which the task that appears first is processed at first priority.
→ Works on the Principal LIFO (Last in first out)	→ Works on the principal FIFO (first in first out).
→ Example: In office, files are placed on table one by one over one another. Last file is opened first and vice versa.	Example: In Doctor's clinic patients who appeared first are treated on first priority.

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Q. No. 2 Part (iii)

Linked List: Linked list is the data structure that is used to store the data. There are three types of linked list

Advantages:

→ Data tranmission or Accessibility is faster
→ Can traverse data in both forword and reverse direction.
→ Size is not fixed.

Q. No. 2 Part (iv) **Learnability in HCI**

Following are the reasons why learnability is important in HCI.

→ Learnability mean that the device is easy to use and understand.
→ User can adopt the device in a very short time span through various tutorials, instruction etc.
→ Learnability help to brought wider audience to use the device or system directly effecting the success of device.
→ Learnability provide user with satisfaction.

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Q. No. 2 Part (v)

Symmetric	Asymmetric Encryption
Symmetric Encryption is the encryption that uses the single key for encryption & decryption	Asymmetric Encryption uses two seperate key public key for encryption & private key for decryption.
→ Security is slightly less than Asymmetric	→ It is more secure then Symmetric
→ Suitable for large data	→ No suitable for large data.
→ It is less time consuming then Asymmetric	→ More time consuming then Symmetric.

Q. No. 2 Part (vi) **Data Normalization**: Data normalization is the process of refining the data meon removing redundencies and repitition in data. With the help of normalized data, data sharing and viewing become eosy and efficent. It also reduces the chances of data loses as it make all the data linked together.

Types:

→ **1NF:** 1st Normal form is form where all the data cells are mode atomic.

→ **2NF:** 2nd Normal form is the form where the transitive dependency is removed from the data.

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Q. No. 2 Part (vii)

Test-Train Split: Test Train Split is the method use in model training.

→ Training data is used to train the data while testing data is used to test the model after been trained.

→ Usually a split of 70-30 (70% training data and 30% testing data) is made out of total data. but the ratio is to be choosen wisely.

→ If too much training data is provided model will overfit and if too little data is provided then model will underfit.

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Q. No. 2 Part (viii) **Operations of Queue:**

Enqueue: Add the element in Queue

Dequeue: Remove the element from Queue.

Top: Return first element without removing

Isfull: Check whether Queue is full.

IsEmpty: Check wheather Queue is Empty.

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Q. No. 2 Part (ix)

Advantages of Array: Following are the advantages of array.

→ Array stores the data in congtigues momery location

→ Data is accessible fastly

→ Doesnot require additional meta data.

Types of Array:

One-Dimension Array: One-Dimension Array is the simple array used to store data in linear form.

3D-Array: Three-Dimension array is the array that is accessible in the form of rows and column.

Q. No. 2 Part (x)

A/B testing: A/B testing is the testing of two different versions of same product.

→ Some users are made accessible to one version and some of other.

→ Testers response such as positive, negative, feedbacks are collected and analyze

→ After Andyzation the best version among two is choosen as final product that prores to be useable by the users.

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Q. No. 2 Part (xi)

Following is one of the chipher method used in cryptography.

Transposition Cipher: In this type of Cipher method, the arrangment of the letters in the text are rearranged, none of them are replaced by new letter

Example:

Simple: BOY is here
Encrypted: YIEREhSYBO

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Q. No. 2 Part (xii)

Ans: → Digital tools can provide charts and graphics that can help to understand complex topic
→ They can provide feature of creating presentation and infographics that can ease the process of data visualization and communication
→ They also help in data story telling that can ease the complex topics.

Example: Canva is a tools that can be used to create graphics for data communication. Another example is MS Power Point.

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Q. No. 2 Part (xiii)

Blockchain tecnology: Blockchain is a digital ledger that is used to ~~securely~~ safe store the data.

→ Data is stored in the form of blocks and various block are chained together.

→ Data stored in Blockchain is immutable mean data cannot be changed or altered ensuring data integrity.

Application: Crypto currency is the application of Blockchain. All the ~~cryptographies~~ transactions are stored in Blockchain

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Q. No. 2 Part (xiv)

Following are the ways IOT can be used to contral air pollution.

→ Iot sensors can be implemented across various part of the city to measure the level of pollutant gases.

→ Through IOT sensors data can be transmitted to monitoring and analysis deparment for the andysis of dotta collected by sensors.

→ Iot sensors can be equipped with air purifiers, that will continousely filter the air, improving air quality.

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Q. No. 3 (Page 1)

Human-Computer Interaction: Human computer Interaction is the process of development the system such that it can be easy for use for the human.

Common Issues:

→ Following are the common issues that occur in HCI

→ **Poor/Slow System Response:** Slow system response due to various reason is the issue faced by the user. The reason for slow system response can be high number of user (above @ system capacity), few resources, slow servers, etc. User will feel frustated and overall usability of system will be damaged. Negative feedbacks due to this reason can damage the overall reputation of the system or device.

Example: A store offers 75% Discount on every product. People rushes to that website and due to lack of good servers, website crashes, this will effect the

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Q. No. 3 (Page 2)

usuability and reputation of the store will be damaged.

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Poor-Error Handling: The device/system having too much error or lack the proper guidance to solve that particular error can never be successful in the market. User will be frustated due to lack of instruction or proper guidance. He/She will shift to somecther device, effecting the system ~~user capacity~~. overall reach among people. Therefore make sure no error occurs and if occur there will be proper guidance about solving them.

Example: A user enter wrong password at authentication phase but system doesnot k indicate any kind of sg message. While the user cannot figure out his/her mistake. This will result in user lose.

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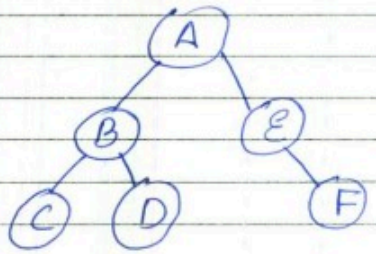
Q. No. 4 (Page 1)

Pre-Order: In pre-order the order of traversal is

- First Root Node
  - ~~Right~~
- Then left Node
- Then Right Node

Example:

Solution: ABCDEF

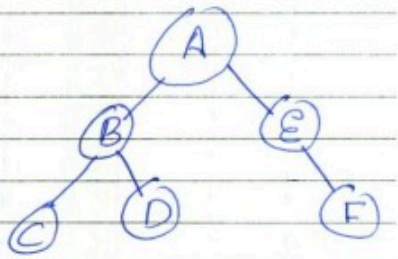


Post-Order:

- First left root
- Then Right root
- Then Root Node

Example:

C D B F E A



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Q. No. 4 (Page 2)

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Q. No. 4 (Page 3)

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Q. No. 5 (Page 1)

IOT in Health care: Health care industry is advancing very high due to involvement of IOT. The combined term is called Medical of things. Following are the use of IOT in Health care.

→ Patients are equipped with the sensor band that can automatically measure patient Heart Beat. Flow rate of blood etc.

→ IOT sensors can help call the doctor immediately whenever the patients is in need.

→ Hospitals are equipped with smart beds for the comfort of patients.

→ IOT sensors have also been used in medical ambulances to do the checkup of patient being taken to the hospital. In this way any big lose can be avoided.

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Q. No. 5 (Page 2)

→ In Hospitals, IoT sensors are used to keep track of patient medical history, medicine reports and other medical stuff.

IOT in Traffic Managment: IOt has also been involved in traffic managment to make the process easy. Following are ways IOT is helpful in Traffic Managment.

→ IOT sensors have been installed at traffic lights and other parts of cities, so traffic officers have live traffic reports.

→ IOT sensors helps to redirect traffic on busy roads. This is helpful in traffic load congestion

→ IOT sensors are used to keeps the roads safe from traffic violaters by giving them E-challans etc.

→ Through IOT sensors and RFID the wait at tolls and gated

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entrance has been reduced.

→ IOT sensors are also used in Pakistan in Government Safe city cameras.

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Q. No. 6 (Page 1)

Functional Programming: Functional Programming is the programming method where large programs are divided into small modules. It is also called moduler programming.

Pros:

→ Make the logic of program simpler and easy to understand
→ Easy to track and debug the code

Cons:

→ Not suitable for beigners
→ Difficult to keep the exact logic or track of lengthy program
→ Involves overhead complexities.

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