

1)List out different OOPS principles and explain ?

ans:

- Polymorphism
- Encapsulation
- Inheritance
- Abstraction

Polymorphism:

It means a function which has the same name but can be used for a different purposes.

Ex- len() function is a function which can be used for measuring length for string or list or dictionary or set or tuples.

The len() function is python inbuilt function.

eg., lists = [1,2,3,4,5,65,7]

```
length = len(lists)    //7
```

Encapsulation:

It is of 3 types:

- protected
- private

protected:

The variables are wrapped in the class and that cannot be accessed outside class but it can be accessed inside the class.Its can be used by using underscore “\_”.

Ex- class Node:

```
def __init__(self):  
    self._a = 2
```

```
class Occured(Node):  
    def __init__(self):  
        print(" protected member of node class: ")  
        print(self._a)  
obj1 = Occured()  
obj2 = Node()
```

### private:

\_\_\_\_\_The variables are wrapped in the class same as protected and it cannot be accessed outside the class. It can be used by using double underscore “\_\_”.

Ex:

```
class Node:
    def __init__(self):
        self._a = 2
class Derived(Base):
    def __init__(self):

        Base.__init__(self)
        print(" private member of base class: ")
        print(self.__c)
obj1 = Node()
print(obj1.a)
```

### Inheritance:

It means passing down the values from parent to child. the values can be used in the child of the parents.

### Abstraction:

\_\_\_\_\_It means any idea which is not associated with any instance.

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## 2) List out Layers of TCP/IP Model and explain ?

- physical layer- It is basically wire which is used for making communication network.
- Data link layer- it is the layer where the data is transferred in packets it contains data and header and others more. The data is broken down and sent through packets with numbers from source and get assembled in the destination.
- network layer - its work basically is to find the address to send the packets to the destination address using the ip address.
- transport layer - its work is to check the errors of the data packets. It also takes care of the size, sequence and then transfer the data.

- session layer- it connects or terminates or authenticates or reconnects the destination computers to session layer and confirm the connection between themselves.
- presentation layer-it makes the data presentable so that it can be read or accepted by the application.
- application layer- this is the application where the data can be visually be seen.

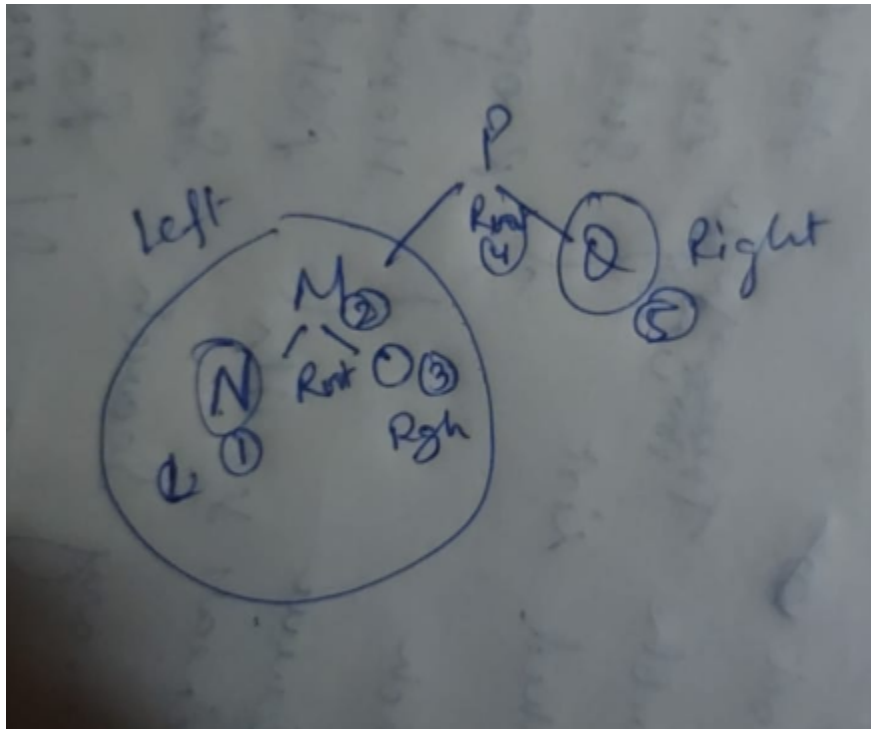
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Q3. Construct a binary tree by using postorder and inorder sequences given below.

Inorder: N, M, P, O, Q

Postorder: N, P, Q, O, M

ans-



In inorder the it follows left-root-right traversal

P's a root and its left is M,N,O

P's a root and its right Q

M's a root and its left is N

M's a root and its right is O

N->M->O->P->Q

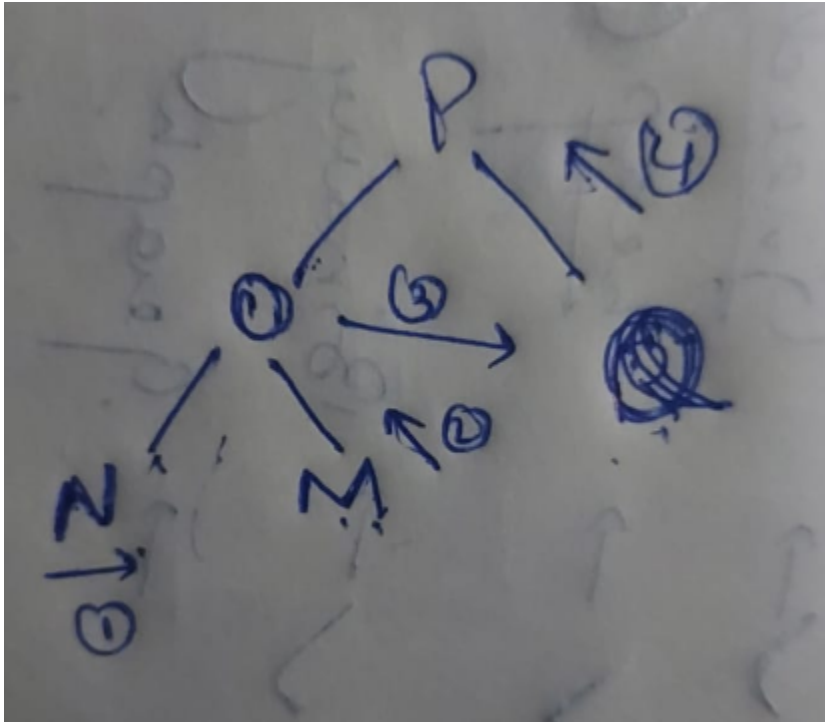
```
class Node:
```

```
    def __init__(self, root):
```

```

        self.val =root
        self.left = None
        self.right = None
root = Node(P)
root.left = Node(M)
root.left.left = Node(N)
root.left.right = Node(O)
root.right = Node(Q)

```



In postorder the it follows left-right-root traversal

P's a root and its left is M,N,O

P's a root and its right Q

O's a root and its left is N

O's a root and its right is M

N->M->O->Q->P

```

class Node:

```

```

    def __init__(self, root):
        self.val =root
        self.left = None
        self.right = None

```

```

root = Node(P)

```

```

root.left = Node(O)

```

```
root.left.left = Node(N)
root.left.right = Node(M)
root.right = Node(Q)
```

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Q5. Explain LRU cache and its implementation by taking some examples and explaining all steps.

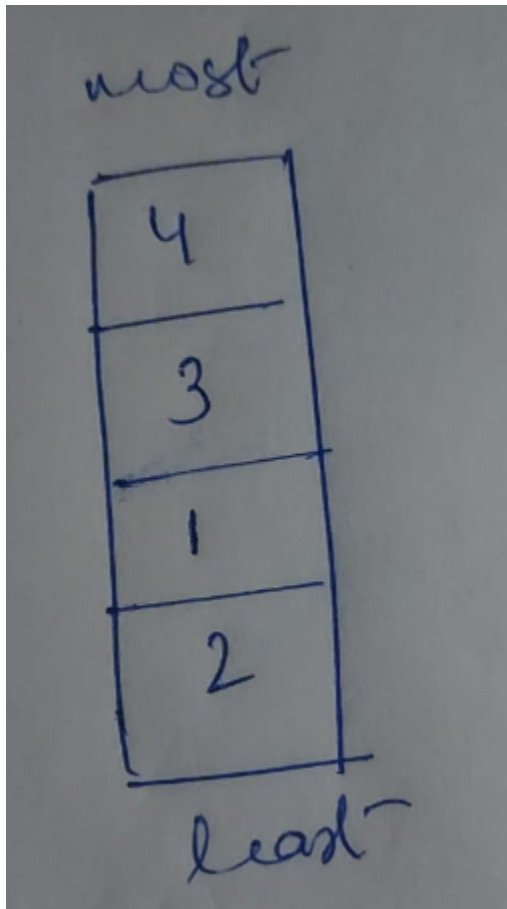
ans-

LRU Cache abbreviation Least recently used. It is to identify which item has not been used for long time.

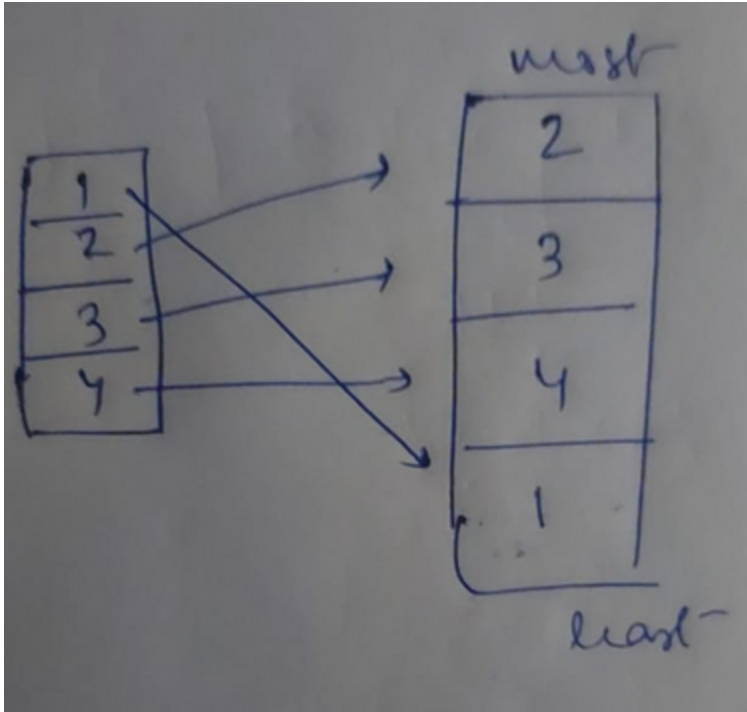
Suppose we have 4 items

if the user request for 4 then 3 then 1 then 2 and it gets the position for most recently used

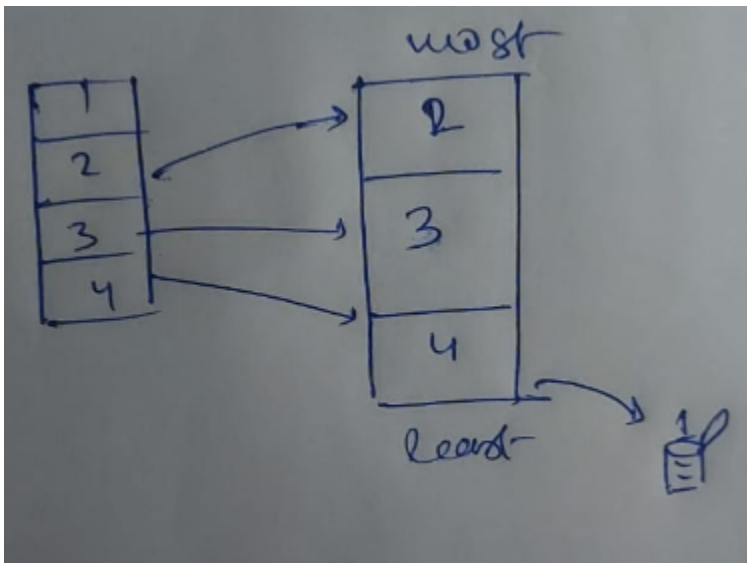
as the user demands the items gets listed like the image given below



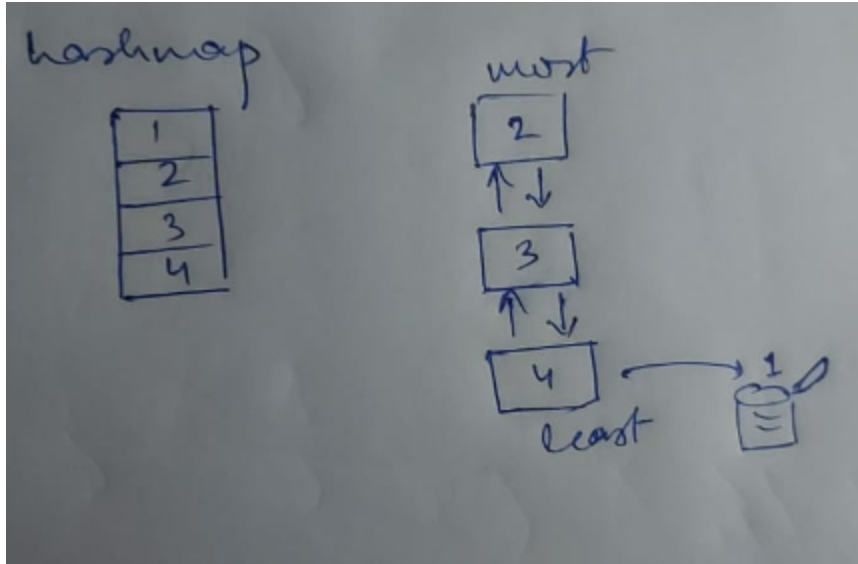
suppose if the user demands particular items most of the time then its move to the most recently used like the image given below



now if the database has only 3 space then the last one will be evicted like the image given below



it uses double linked list and hashmap to do this process like the image given below




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Q6. Explain virtual memory.

ans- It is the extra memory which is the part of the hard disk. The advantage of this virtual memory is if any program is not able to run in the main memory then this is used as the extended memory.

- All the memory is are translated into physical addresses on the runtime.
- when any process is running it doesn't need the whole memory to process it breaks down and free up the spaces.

When RAM runs low, virtual memory can move data from it to a space called a paging file. It allows for RAM to be freed up so that a computer can complete the task.

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Q7. Explain Deadlock and its characteristics.

ans-

It happens when two or more processes require some resource to complete their execution that is held by the other process.

- mutual exclusion- a resources which is held by one process at a time.
- hold and wait- a process that holds many resources and even request for more resources from other processes. which are holding them.
- No preemption- process which can only release a resources voluntarily.
- circular wait- process gets token to execute the resources for some time then releases the token.

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Q8. Explain NAT and ARP protocol ?

ans-

NAT-

- network address translation
- one to one or many to one relation

- it slows down the rate of depletion of available ip address by converting local ip to public ip address.

#### ARP-

- if is a network protocol to find out the hardware address from an IP address.
- The sending device uses ARP to translate IP addresses to MAC addresses.
- The device sends an ARP request message containing the IP address of the receiving device.