

TWO MARKS QUESTIONS AND ANSWERS

1. What is the difference between a PUSH and a POP?

Pushing and popping applies to the way data is stored and retrieved in a stack. A push denotes data being added to it, meaning data is being “pushed” into the stack. On the other hand, a pop denotes data retrieval, and in particular, refers to the topmost data being accessed.

2. What is FIFO?

FIFO stands for First-in, First-out, and is used to represent how data is accessed in a queue. Data has been inserted into the queue list the longest is the one that is removed first.

3. What is LIFO?

LIFO is a short form of Last In First Out. It refers how data is accessed, stored and retrieved. Using this scheme, data that was stored last should be the one to be extracted first. This also means that in order to gain access to the first data, all the other data that was stored before this first data must first be retrieved and extracted.

4. Define Stack.

Stack is an ordered collection of elements in which insertions and deletions are restricted to one end called the TOP end. Stacks are also referred as Last –In- First- Out (LIFO) Lists.

5. Define a queue

Queue is an ordered collection of elements in which insertions are restricted to one end called the rear end and deletions are restricted to other end called the front end. Queues are also referred as First-In-First-Out (FIFO) Lists.

6. What are the types of queues?

- **Linear Queues** – The queue has two ends, the front end and the rear end. The rear end is where we insert elements and front end is where we delete elements. We can traverse in a linear queue in only one direction ie) from front to rear.
- **Circular Queues** – Another form of linear queue in which the last position is connected to the first position of the list. The circular queue is similar to linear queue has two ends, the front end and the rear end. The rear end is where we insert elements and front end is where we delete elements. We can traverse in a circular queue in only one direction ie) from front to rear.
- **Double-Ended-Queue** – Another form of queue in which insertions and deletions are made at both the front and rear ends of the queue.

7. What is the minimum number of queues needed when implementing a priority queue?

The minimum number of queues needed in this case is two. One queue is intended for sorting priorities while the other queue is used for actual storage of data.

8. Differentiate STACK from ARRAY.

Stack follows a LIFO pattern. It means that data access follows a sequence wherein the last data to be stored when the first one to be extracted. Arrays, on the other hand, does not follow a particular order and instead can be accessed by referring to the indexed element within the array.

9. Why we need cursor implementation of linked lists?

Many languages such as BASIC and FORTRAN do not support pointers. If linkedlists are required and pointers are not available, then an alternative implementation must be used known as cursor implementation.

10. Mention the advantages of representing stacks using linked lists than arrays

- It is not necessary to specify the number of elements to be stored in a stack during its declaration, since memory is allocated dynamically at run time when an element is added to the stack
- Insertions and deletions can be handled easily and efficiently
- Linked list representation of stacks can grow and shrink in size without wasting memory space, depending upon the insertion and deletion that occurs in the list
- Multiple stacks can be represented efficiently using a chain for each stack

11. Mention the advantages of representing stacks using linked lists than arrays

- It is not necessary to specify the number of elements to be stored in a stack during its declaration, since memory is allocated dynamically at run time when an element is added to the stack
- Insertions and deletions can be handled easily and efficiently
- Linked list representation of stacks can grow and shrink in size without wasting memory space, depending upon the insertion and deletion that occurs in the list
- Multiple stacks can be represented efficiently using a chain for each stack

12. Define a priority queue

Priority queue is a collection of elements, each containing a key referred as the priority for that element. Elements can be inserted in any order (i.e., of alternating priority), but are arranged in order of their priority value in the queue. The elements are deleted from the queue in the order of their priority (i.e., the elements with the highest priority is deleted first). The elements with the same priority are given equal importance and processed accordingly.

13.State the difference between queues and linked lists

The difference between queues and linked lists is that insertions and deletions may occur anywhere in the linked list, but in queues insertions can be made only in the rear end and deletions can be made only in the front end.

14.Define a Deque

Deque (Double-Ended Queue) is another form of a queue in which insertions and deletions are made at both the front and rear ends of the queue. There are two variations of a deque, namely, input restricted deque and output restricted deque. The input restricted deque allows insertion at one end (it can be either front or rear) only. The output restricted deque allows deletion at one end (it can be either front or rear)

15.What is the need for Priority queue?

In a multiuser environment, the operating system scheduler must decide which of the several processes to run only for a fixed period of time. One algorithm uses queue. Jobs are initially placed at the end of the queue. The scheduler will repeatedly take the first job on the queue, run it until either it finishes or its time limit is up and place it at the end of the queue if it does not finish. This strategy is not appropriate, because very short jobs will soon to take a long time because of the wait involved in the run.

Generally, it is important that short jobs finish as fast as possible, so these jobs should have precedence over jobs that have already been running. Further more, some jobs that are not short are still very important and should have precedence. This particular application seems to require a special kind of queue, known as priority queue. Priority queue is also called as Heap or Binary Heap.