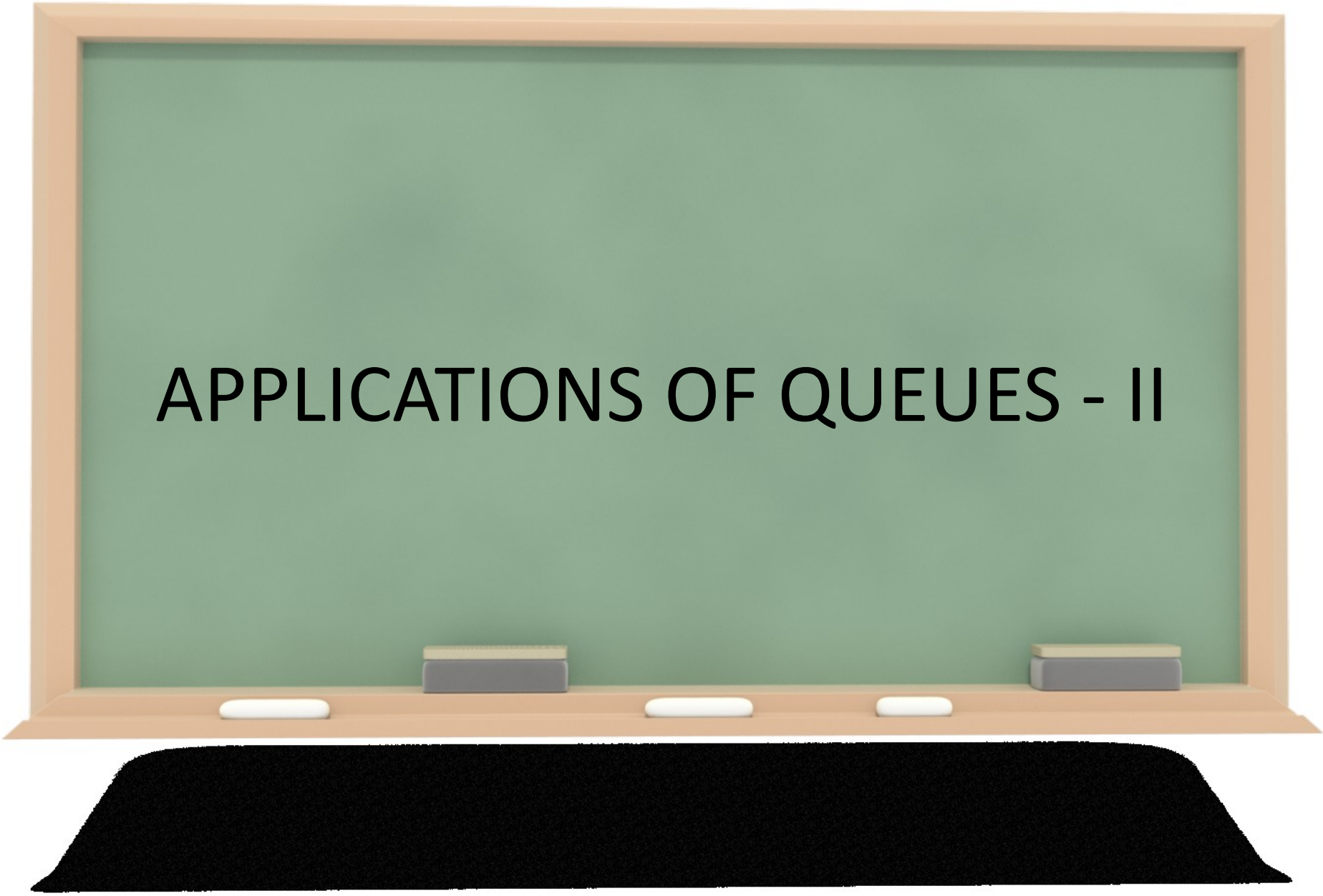
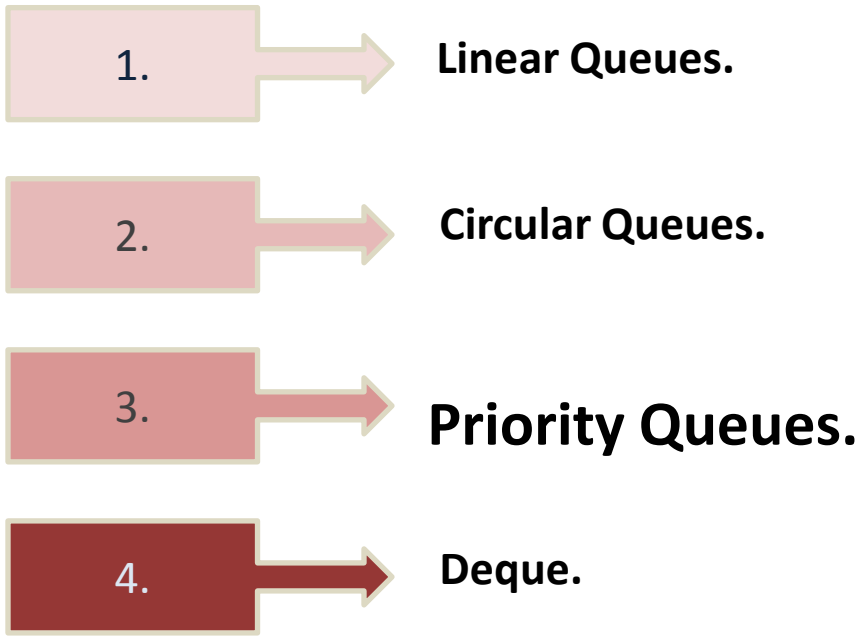
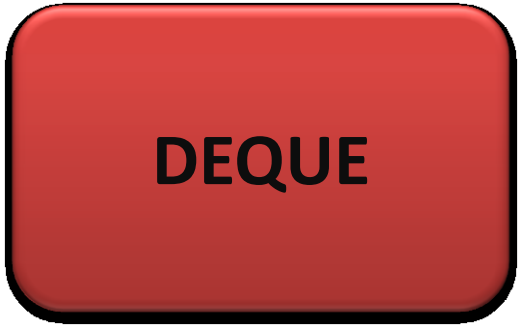

APPLICATIONS OF QUEUES - II

TYPES OF QUEUES



- A *priority queue* is a queue in which insertion or deletion of items from any position in the queue are done based on some property (such as *priority* of task).
  - The main objective is to serve first the items with higher priority.



METHODS OF IMPLEMENTATION

METHOD 1 :

- A common method of implementation of a priority queue is to open as many queues as there are priority factors.
- A low priority queue will be operated for deletion only when all its high priority predecessors are empty.

METHOD 2 :

IMPLEMENTATION

METHOD 1:

- **ENQUEUEING**

1. Each distinct priority will have a separa queue to have its respective elements.

2. Thus when enqueing an item, we nee both the item and its priority to enqueu it in the respective queue.

3. The items will be enqueued into the respective queue based on their priority.

Cont.,

METHOD 1:

- **DEQUEUEING**

1.A *dequeue* command checks for items in the queue with the highest priority.

2.Once it is found non-empty, the item from it will be dequeued based on the FIFO concept.

3.If the queue is empty, it moves to the next non-empty queue in the order and performs the operation.

Cont.,

METHOD 1:

- The “Queue Overflow” warning will b thrown only when all the queues ar found full.
- The “Queue Underflow” warning w be thrown only when all the queue are found empty.
- The implementation depends upon the application (TRADE OFF)

APPLICATIONS

METHOD 1:

1. **O.S Job Scheduling.**

2. **Sharing a single runway of an airport for both landing and take-off of flights.**

APPLICATION

O.S JOB SCHEDULING:

A B C D

X Y Z

M N O

APPLICATIONS

2. Sharing a single runway of an airport for both landing and take-off of flights.

METHODS OF IMPLEMENTATION

METHOD 1 :

- A common method of implementation of a priority queue is to open as many queues as there are priority factors.
- A low priority queue will be operated for deletion only when all its high priority predecessors are empty.

METHOD 2 :

- Another method of implementation could be to sort the elements in the queue according to the descending order of priorities every time an insertion takes place.
- The top priority element at the head of the queue is the one to be deleted.

IMPLEMENTATION

METHOD 2:

- Despite of having separate queues fo every distinct priority, here we use on one queue.

- We store the items in the queue in th descending order of priority, thu making it possible with a single queue

IMPLEMENTATION

METHOD 2:

- **ENQUEUE:**

- Here too, the priority of the item is als needed to enqueue the item.

- The items are enqueued in the queu based on their priorities.

- The items are enqueued at the rigl.. place so that the queue retains its descending order.

IMPLEMENTATION

METHOD 2:

- **DEQUEUE:**

- The dequeue operation is performe the same method as done in the linea queue.

- As it is the item with the highe priority which is at the *front* end, it obviously the element with the highest priority that is being pushed out.

IMPLEMENTATION

METHOD 2:

- The “Queue Overflow” warning will b thrown when the queue is found fu (physically or procedurally).
- The “Queue Underflow” warning w be thrown only when the queue empty.

APPLICATIONS

METHOD 2:

1. Sorting.

2. O.S Job sharing .

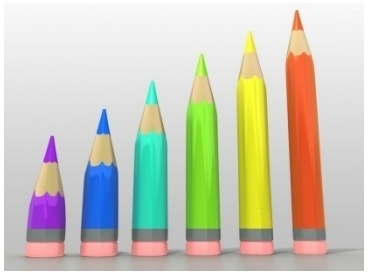
APPLICATION

SORTING:

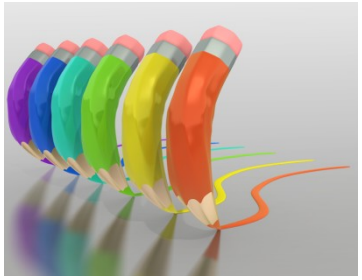
{(A,4),(B,2),(C,5),(D,1),(E,3)}

C B E D

ADVANTAGES



- **METHOD 1:**
  - Doesn’t incur any expensive operation (queue movement).
- **METHOD 2:**
  - Consumes lesser memory.



- A *priority queue* is a queue in which insertion or deletion of items from any position in the queue are done based on some property (such as *priority* of task).
  - The main objective is to serve first the items with higher priority.

PRIORITY QUEUE

- A *deque* (Double Ended Queue) is a linear list in which all insertions and deletions are made at the end of the list.

DEQUE

DEQUE

- A deque is therefore more general than a queue and is a sort of FLIFLO (first in last in or first out last out). Two way insertion or deletion.

- Thus while one speaks of the top or bottom of a stack, or front or rear of a queue, one refers to the *right end* or *left end* of a deque.

- A deque has two variants: *input restricted deque* and *output restricted deque*.

METHODS OF IMPLEMENTATION

TYPE 1 : INPUT RESTRICTED DEQUE

- An input restricted deque is one where insertions are allowed at one end only while deletions are allowed at both ends.

TYPE 2 : OUTPUT RESTRICTED DEQUE

- An output restricted deque allows insertions at both ends of the deque but permits deletions only at one end.

DEQUE

IMPLEMENTATION

DEQUE

APPLICATION