

DSA through C++

Queue



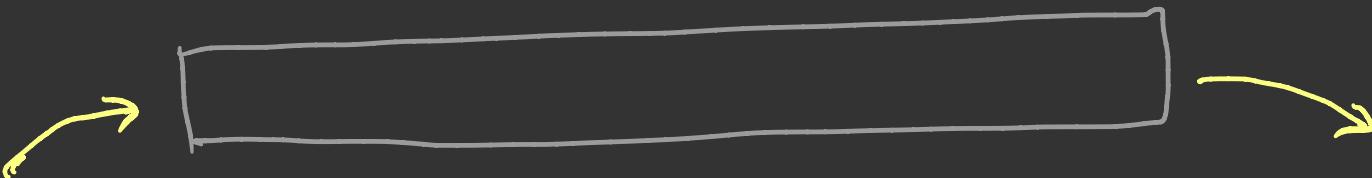
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Agenda

- ① what is Queue ?
- ② Operations on Queue
- ③ Ways to implement Queue

What is Queue ?

- Queue is a linear data structure.
- Working principle of queue is First in First out.

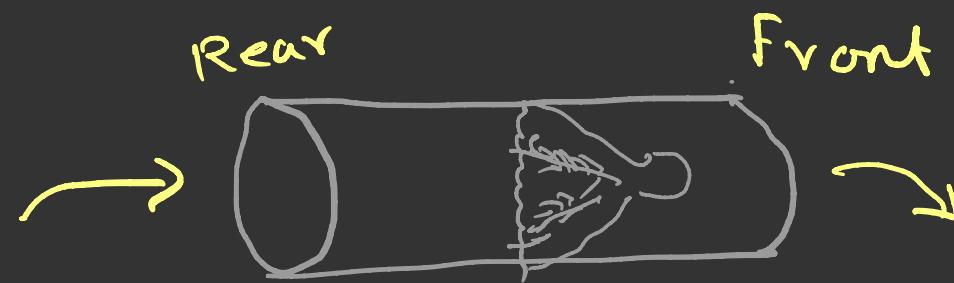
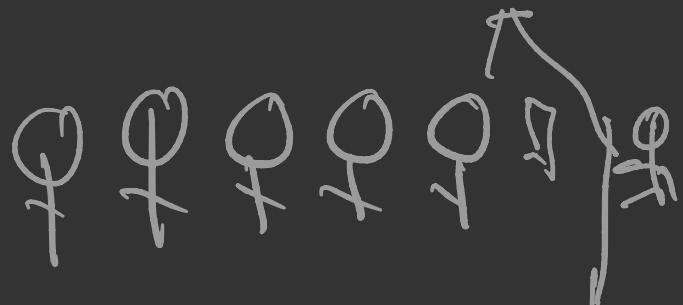


- In stack only one end is open for insertion and deletion
- In queue one end is for insertion and another end is for deletion



- Insertion is done on one end known as rear or back
- Deletion is done on another end known as Front

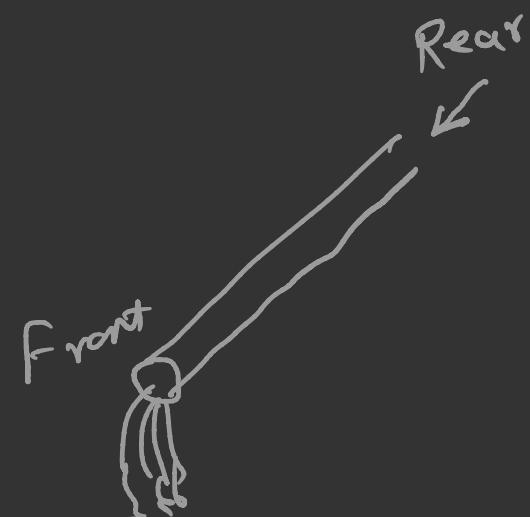
Real world examples



Batch
(100 students)

Exam for college or job

Ranking system = queue



Operations on Queue

Rear

Front



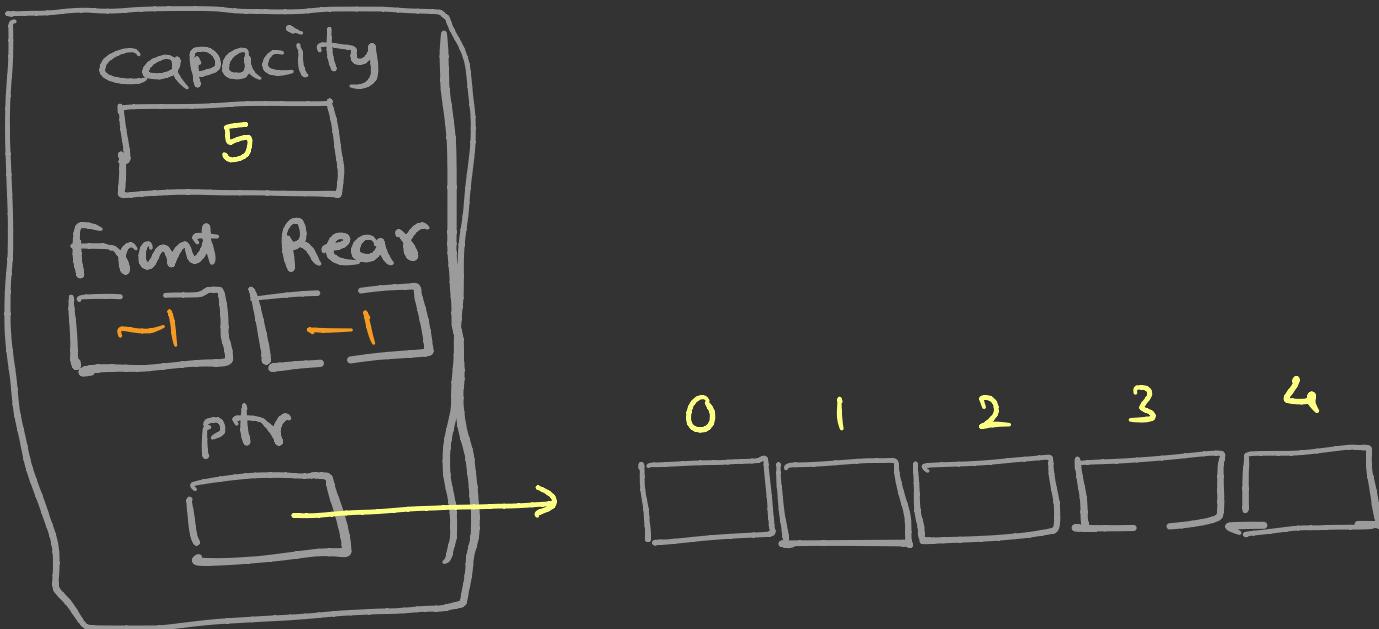
Operations

- ① Insertion enqueue
- ② Deletion dequeue
- ③ getFront
- ④ getBack

Ways to implement Queue

- ① using Arrays
- ② using Dynamic Arrays
- ③ using Linked List

Implementing Queue using Arrays



- ① $\text{Front} == -1$ queue is empty
- ② $\text{Rear} == -1$
- ③ Insertion
 - (A) $\text{Rear} = 0$
 - $\text{Front} = 0$
 - $\text{Rear}++$
 - $\text{ptr}[\text{Rear}] = \text{data}$
- ④ if queue is full
 $\text{then insertion not}$
 possible
- ⑤ $\text{if queue is not full}$
 and rear is last
 possible index
 - $\text{rear} = 0$
 - $\text{ptr}[\text{Rear}] = \text{data}$

③ Deletion

A) Front ++

B) Front == last possible index

Front = 0

C) Front == Rear $\neq -1$

Front = -1

Rear = -1

D) queue is empty