CS-2001
DATA STRUCTURE

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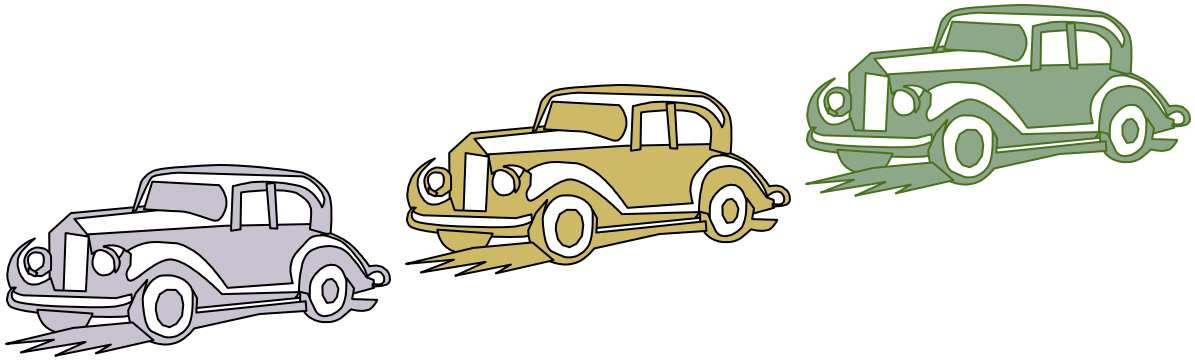
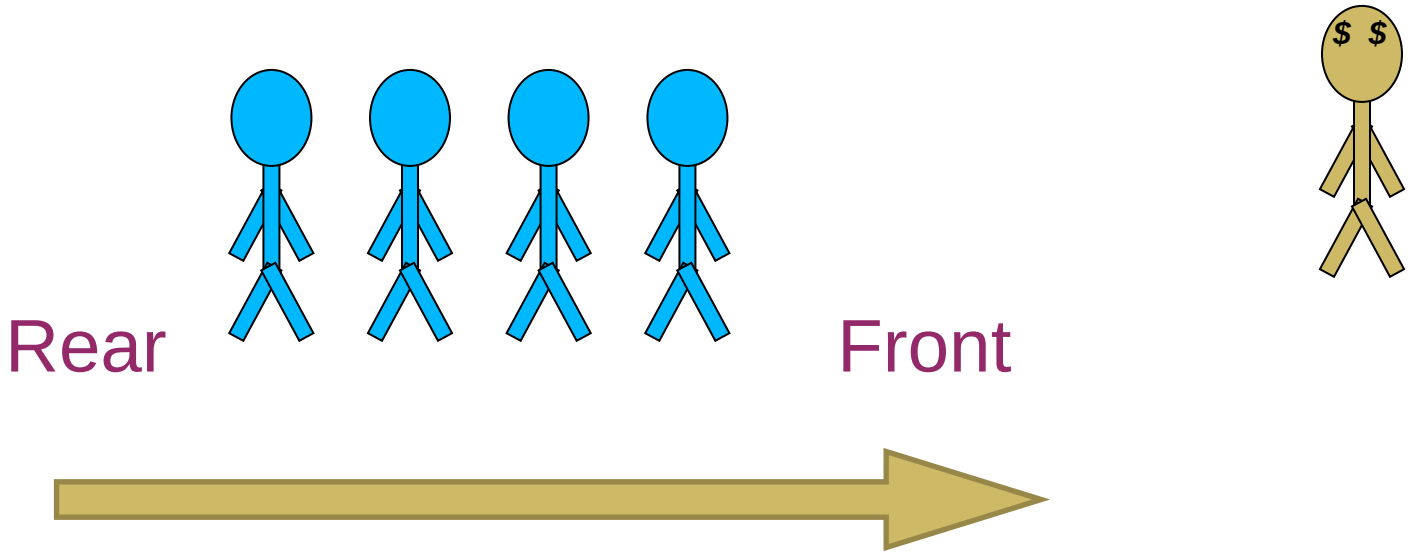


QUEUES

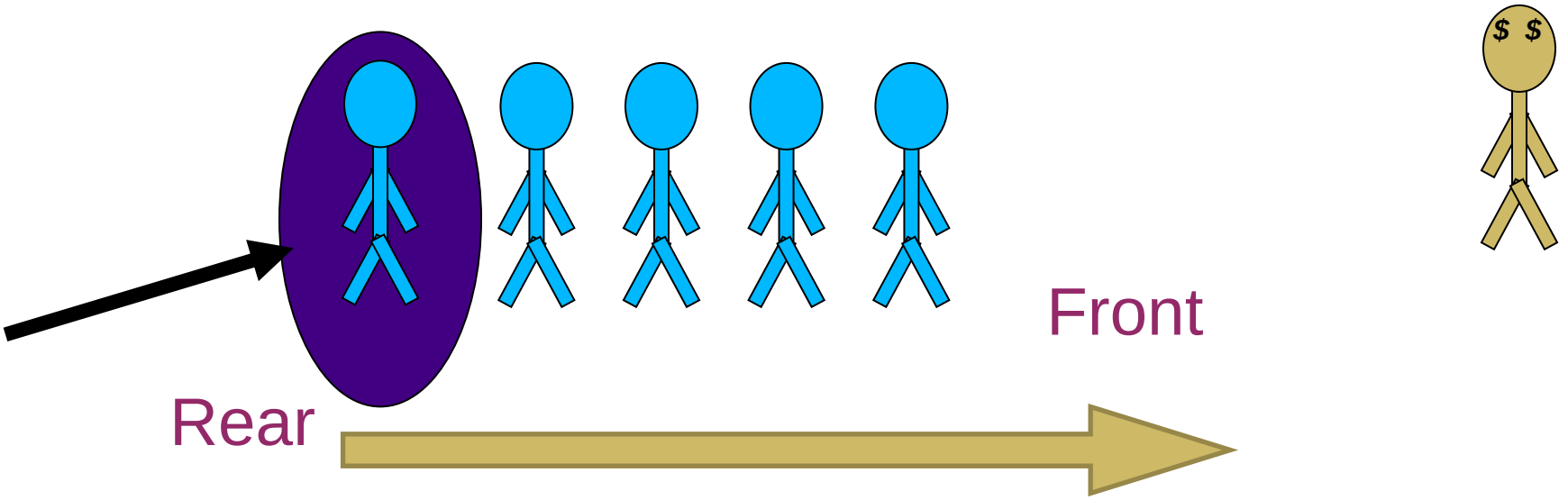
Queues

- A queue is like a line of people waiting for a bank teller.
- The queue has a **front** and a **rear**.



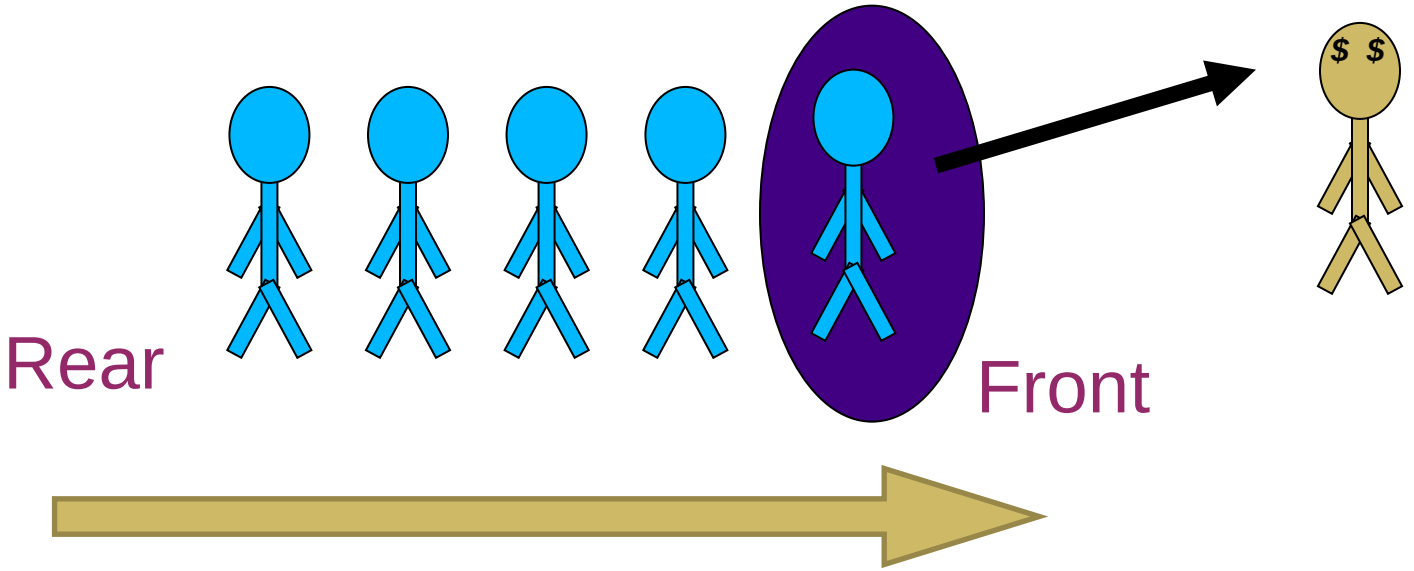
Queues

- New people must enter the queue at the **rear.**



Queues

- When an item is taken from the queue, it always comes from the front.



Common Operations

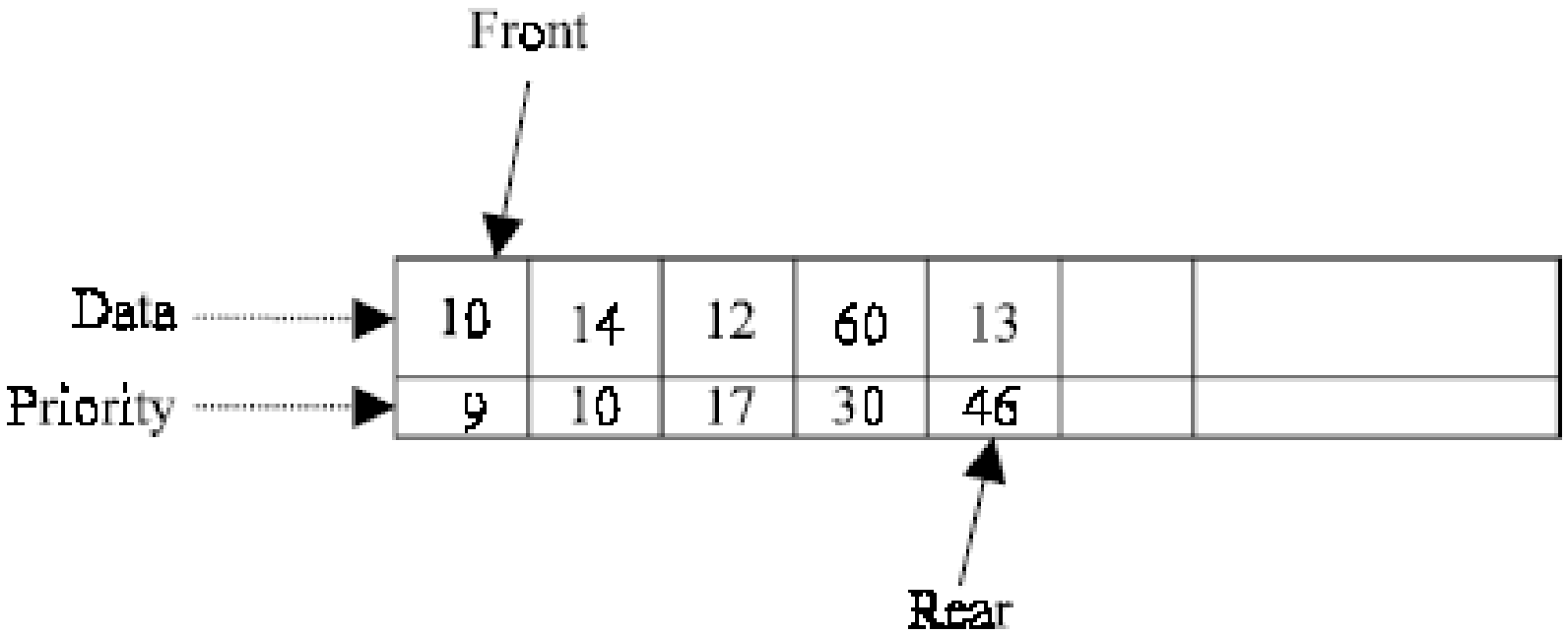
1. **MAKENULL(Q):** Makes Queue Q be an empty list.
2. **FRONT(Q):** Returns the first element on Queue Q.
3. **ENQUEUE(x, Q):** Inserts element x at the end of Queue Q.
4. **DEQUEUE(Q):** Deletes the first element of Q.
5. **EMPTY(Q):** Returns true if and only if Q is an empty queue.

PRIORITY QUEUE

Priority Queue

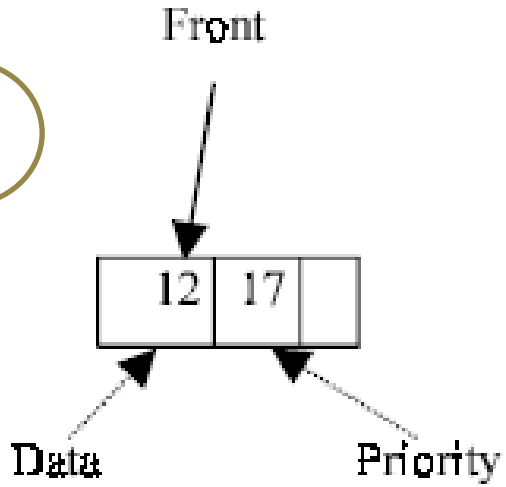
- ✓ Priority Queue is a queue where *each element is assigned a priority*.
- ✓ In priority queue, the elements are deleted and processed by following rules.
  - An element of higher priority is processed before any element of lower priority.
  - Two elements with the same priority are processed according to the order in which they were inserted to the queue.

Priority Queue

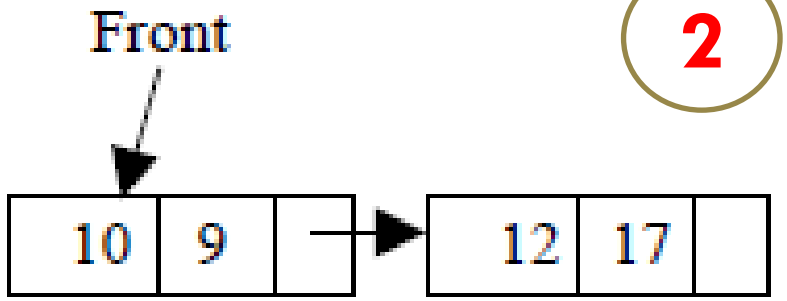


Priority Queue

1

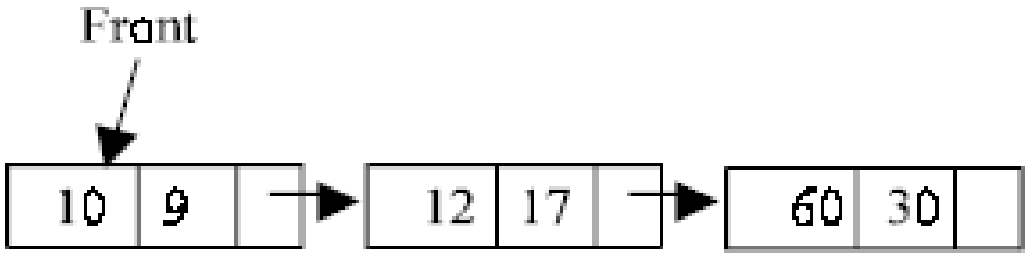


2



push(DATA =10, PRIORITY = 9)

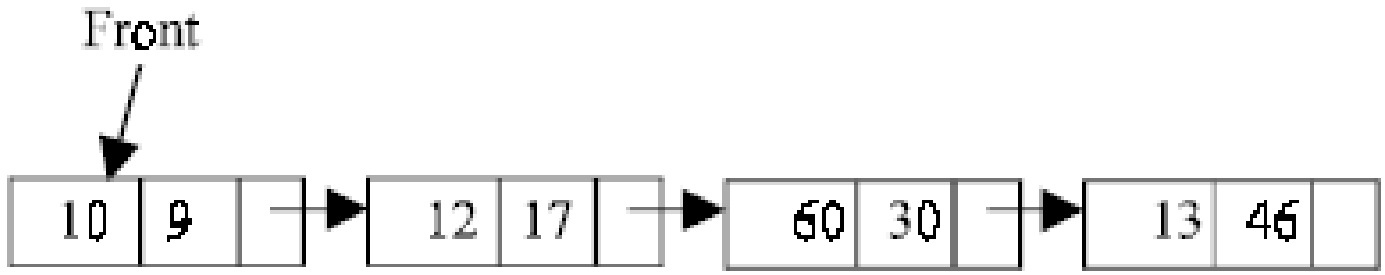
3



push(DATA = 60, PRIORITY = 30)

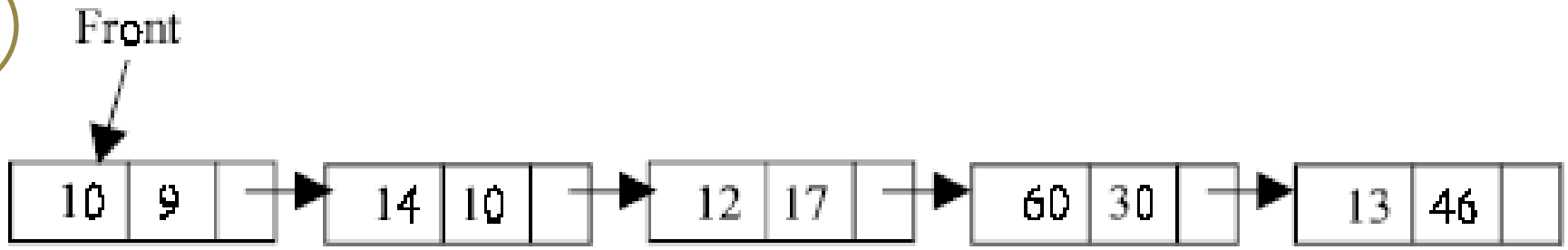
Priority Queue

4



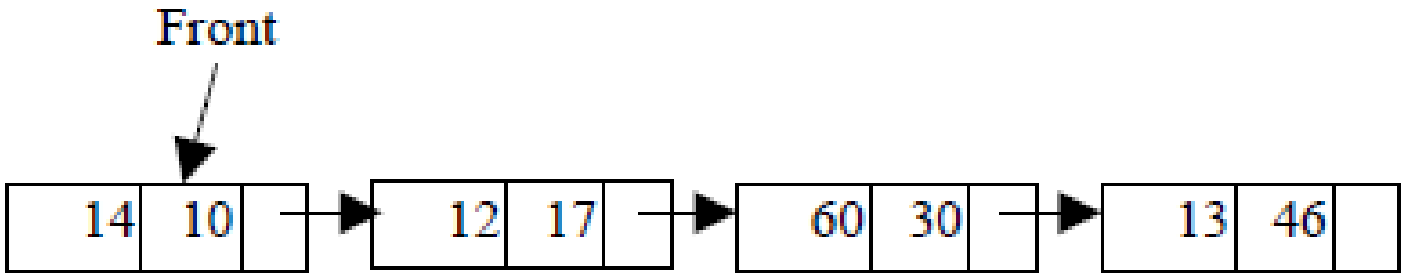
push(DATA = 13, PRIORITY = 46)

5

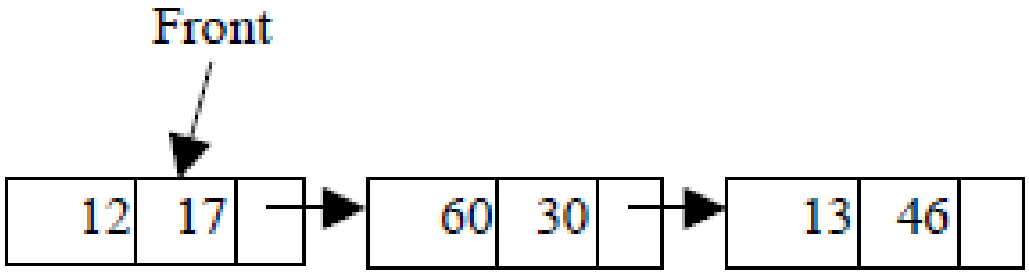


push(DATA = 14, PRIORITY = 10)

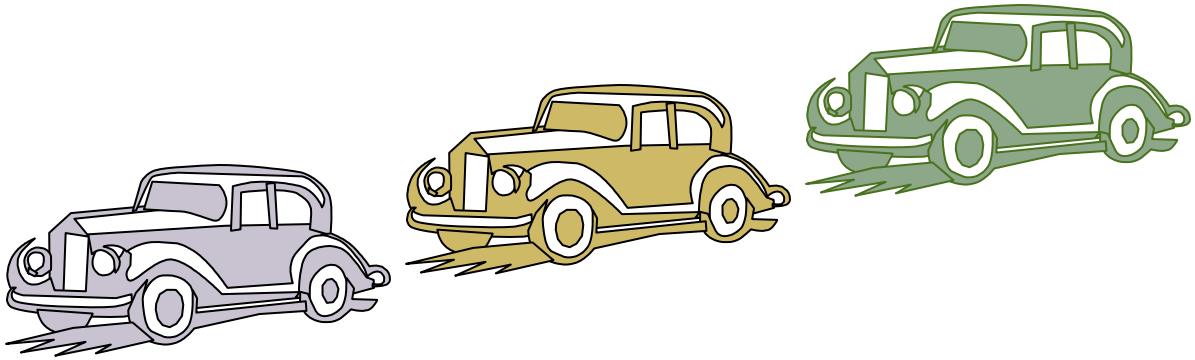
Priority Queue



x = pop() (*i.e.*, 10)



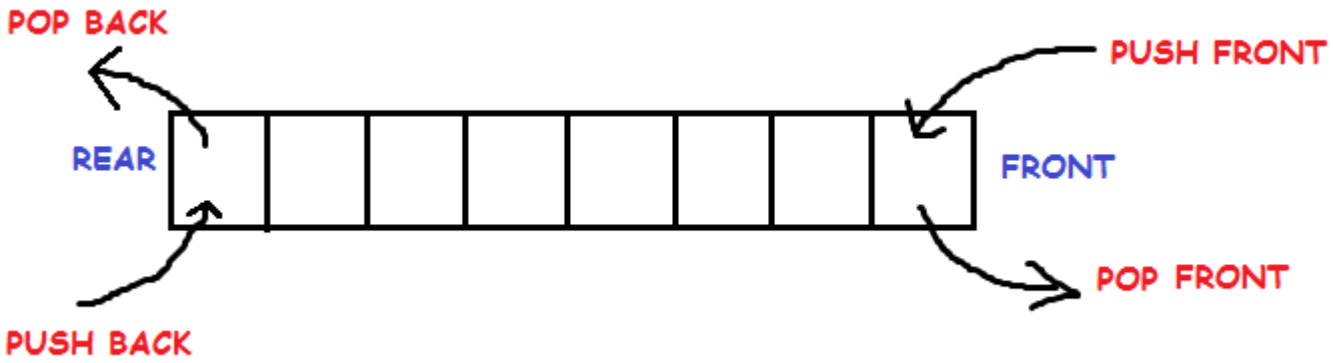
x = pop() (*i.e.*, 14)



DOUBLE ENDED QUEUE

Double Ended Queues

Double ended queue is a more generalized form of queue data structure which allows insertion and removal of elements from both the ends, i.e. , front and back.



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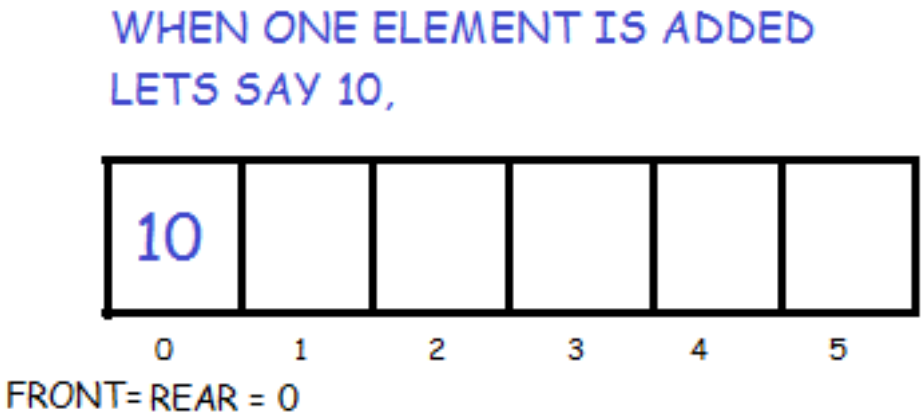

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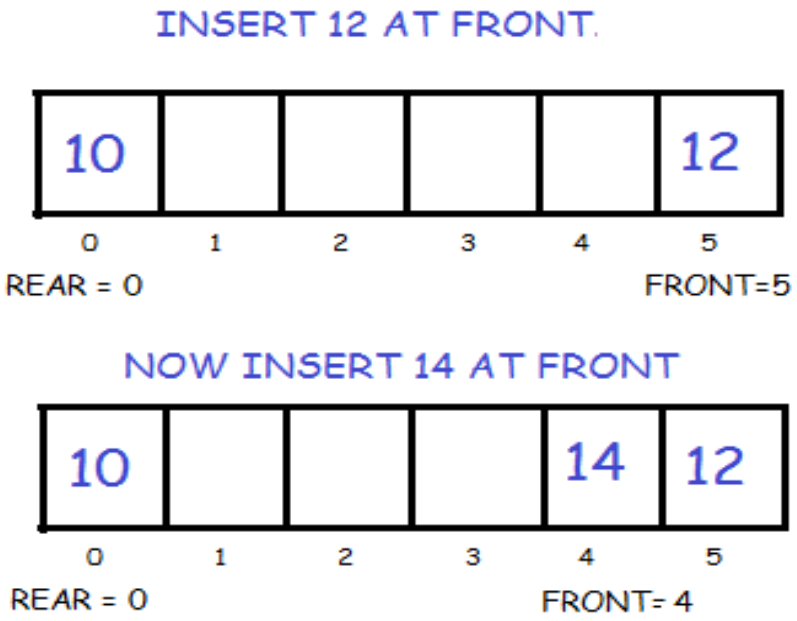

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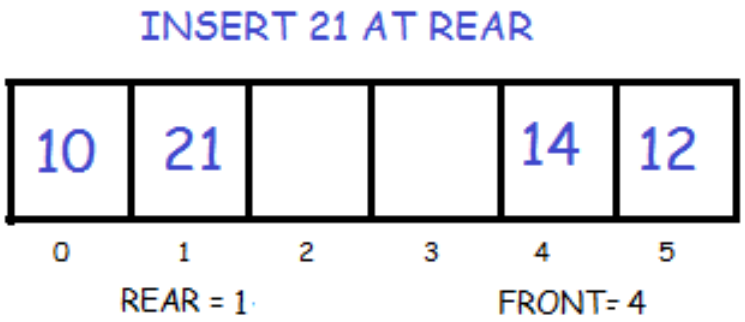

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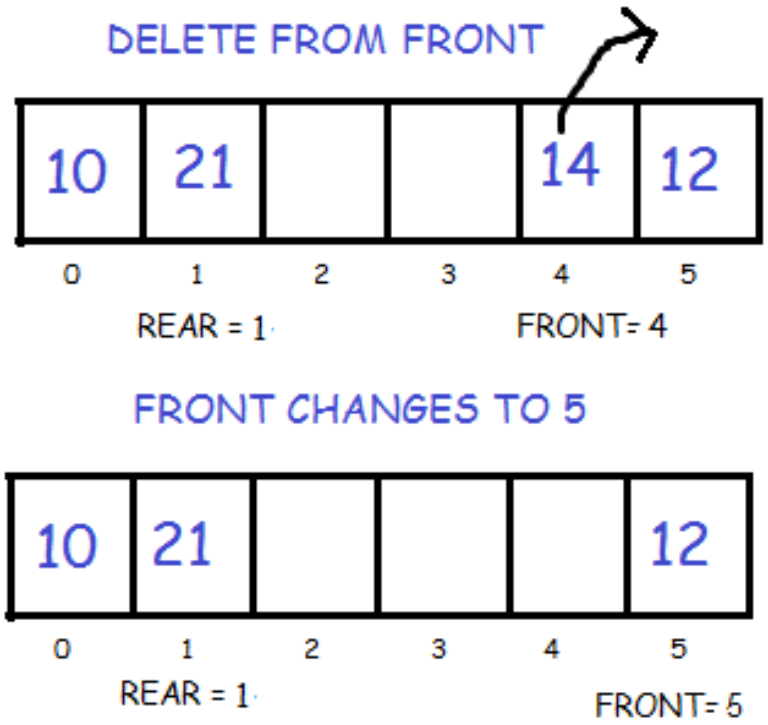

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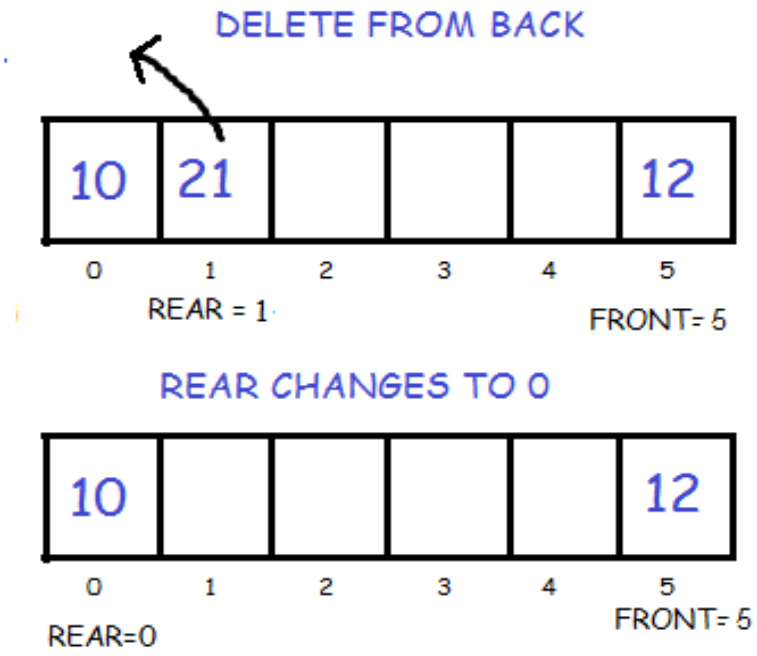

Reading Materials

- Chapter 8, Data Structures by Larry Nyhoff