Queue

“...using Single Linked List”

Prerequisite: Single Linked List

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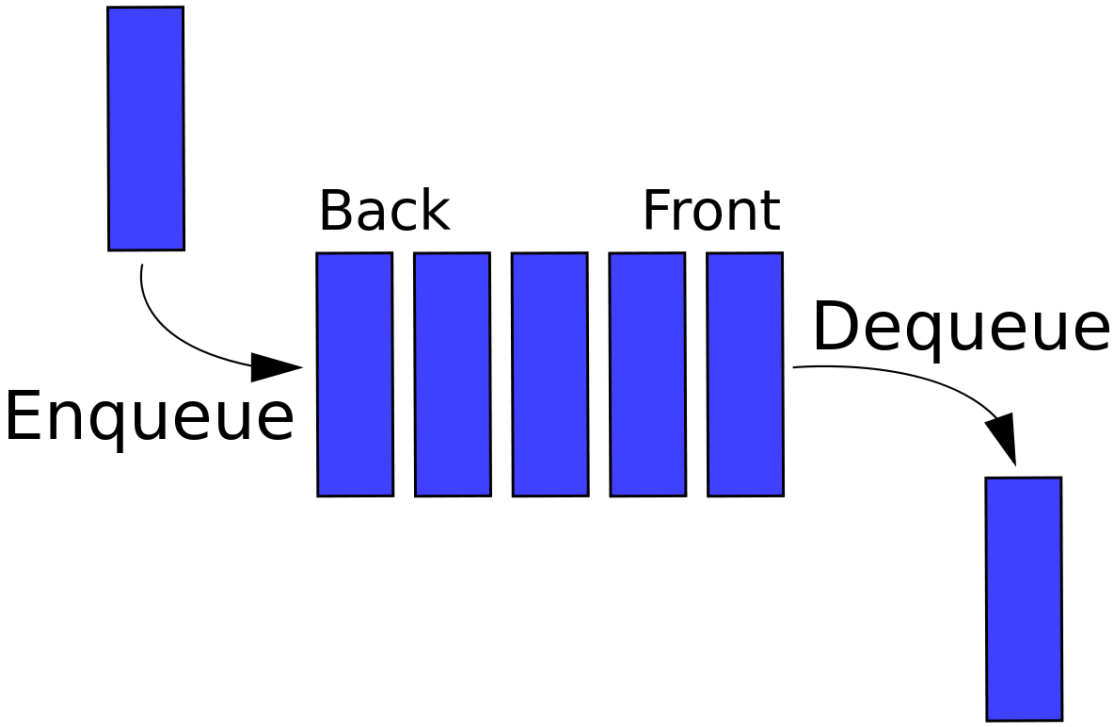
Properties of Queue



Application of Queue

1. Any kind of line in booth (Bank, shopping mall, hospital etc.)
2. Scheduling task
3. Printer Jobs
4. Keyboard buffer
5. One way Traffic

Properties of Queue

1. Non-primitive Linear (Sequential) Data Structure
2. Insert/Delete Behavior : FIFO
3. Supported operations are-
    i. Enqueue
    ii. Dequeue
    iii. isEmpty
    iv. isFull
    v. makeEmpty

Operations

Time complexity in big O notation

Algorithm	Average	Worst case
Space	O(*n*)	O(*n*)
Search	O(*n*)	O(*n*)
Enqueue	O(1)	O(1)
Dequeue	O(1)	O(1)

Variation of Queue

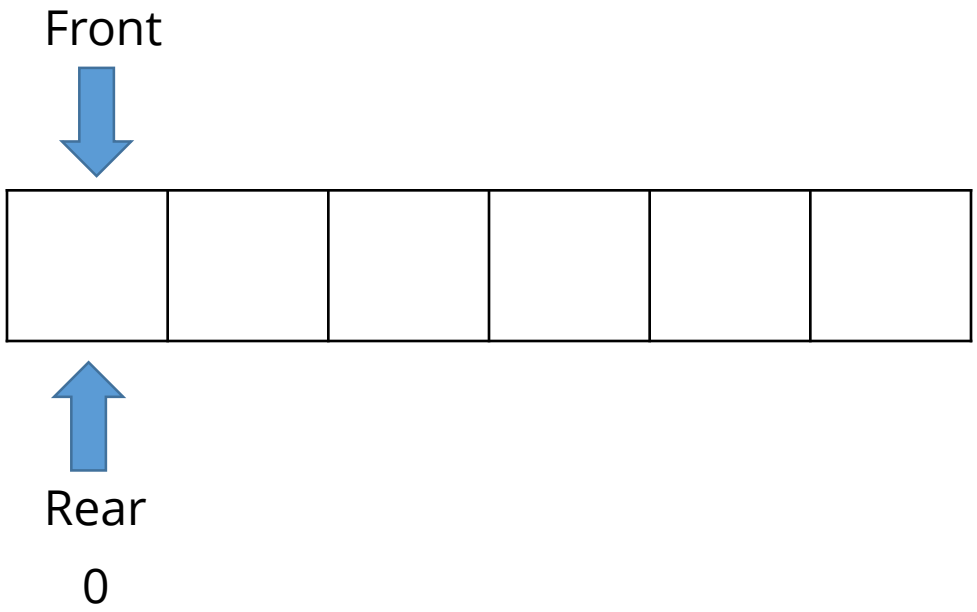
1. Linear Queue
2. Circular Queue (Also known as **Ring Buffer**)
3. Double Ended Queue
4. Priority Queue

Implementation of Queue

1. Using Array
2. Using Linked List

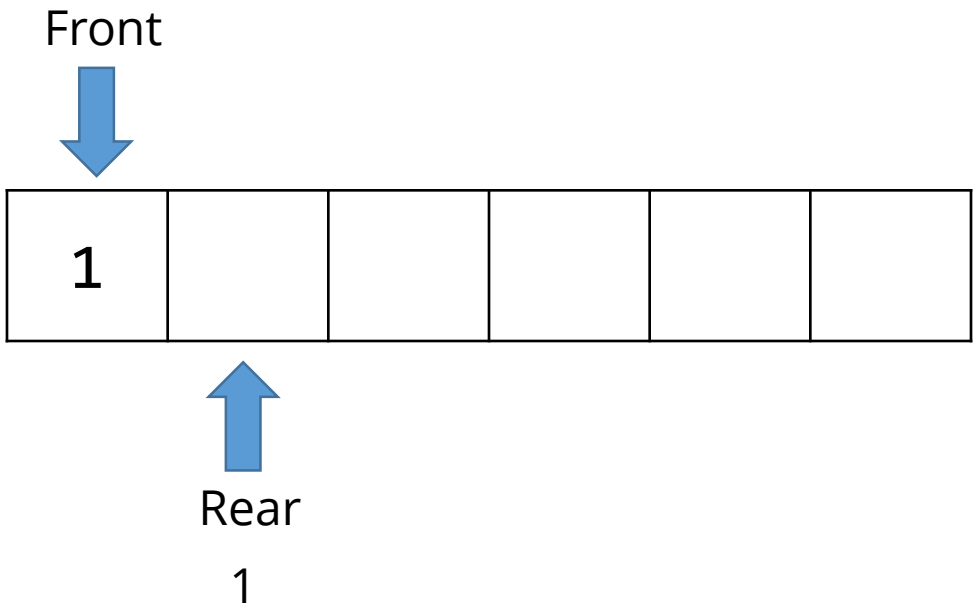
Implementation Using Array

Capacity = 6
Length = 0



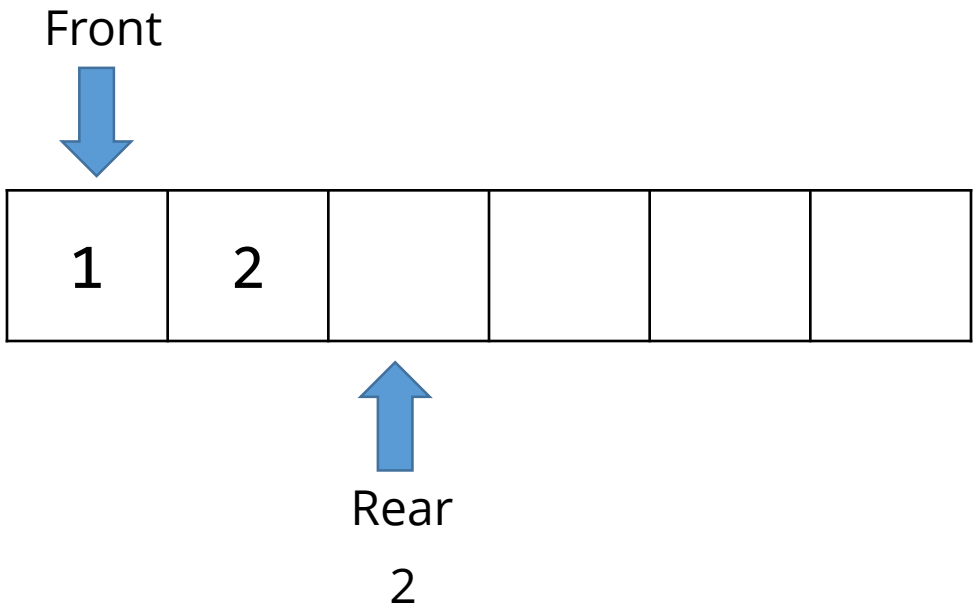
Implementation Using Array

Capacity = 6
Length = 1



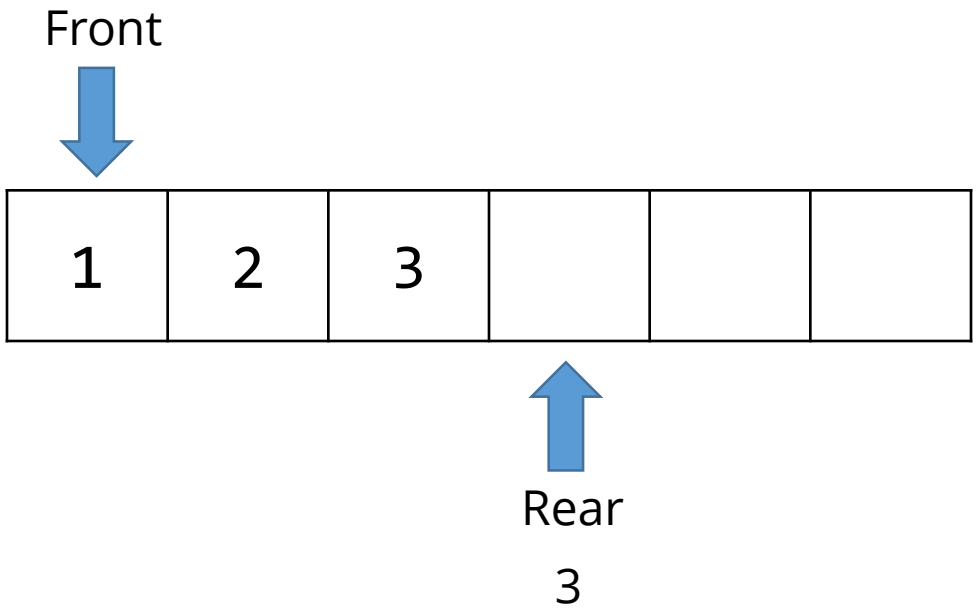
Implementation Using Array

Capacity = 6
Length = 2



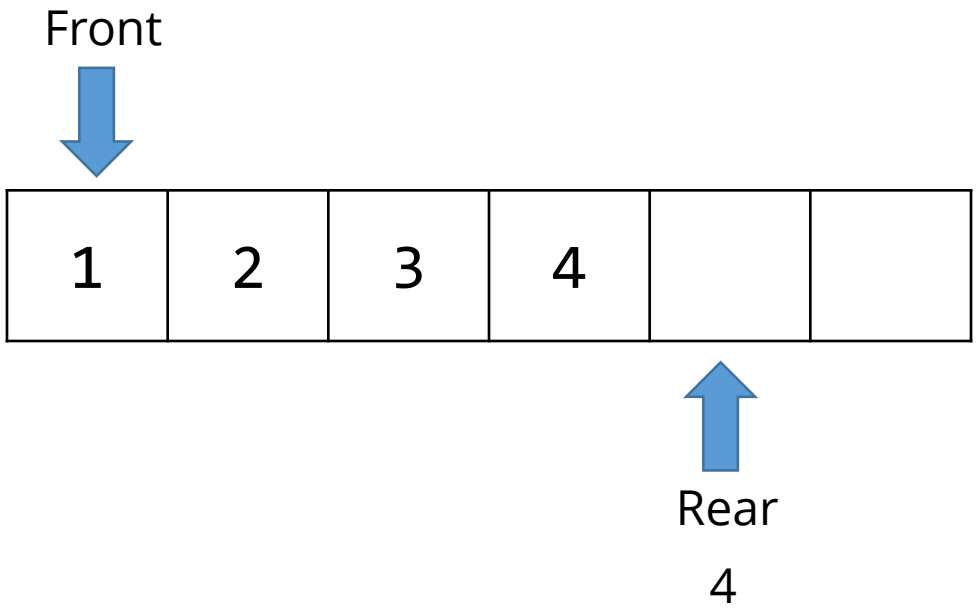
Implementation Using Array

Capacity = 6
Length = 3



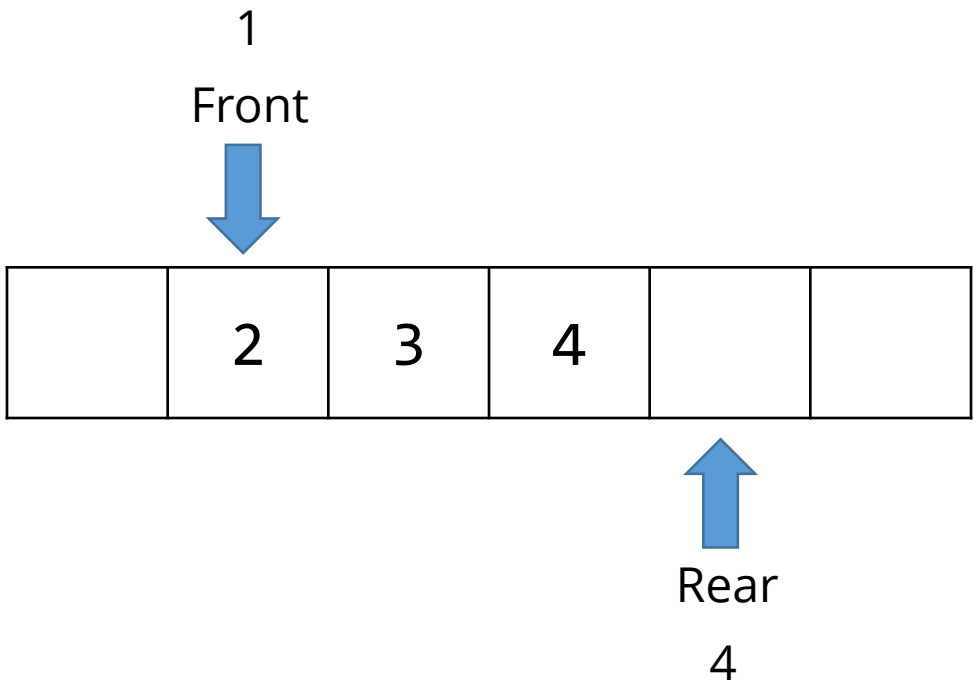
Implementation Using Array

Capacity = 6
Length = 4



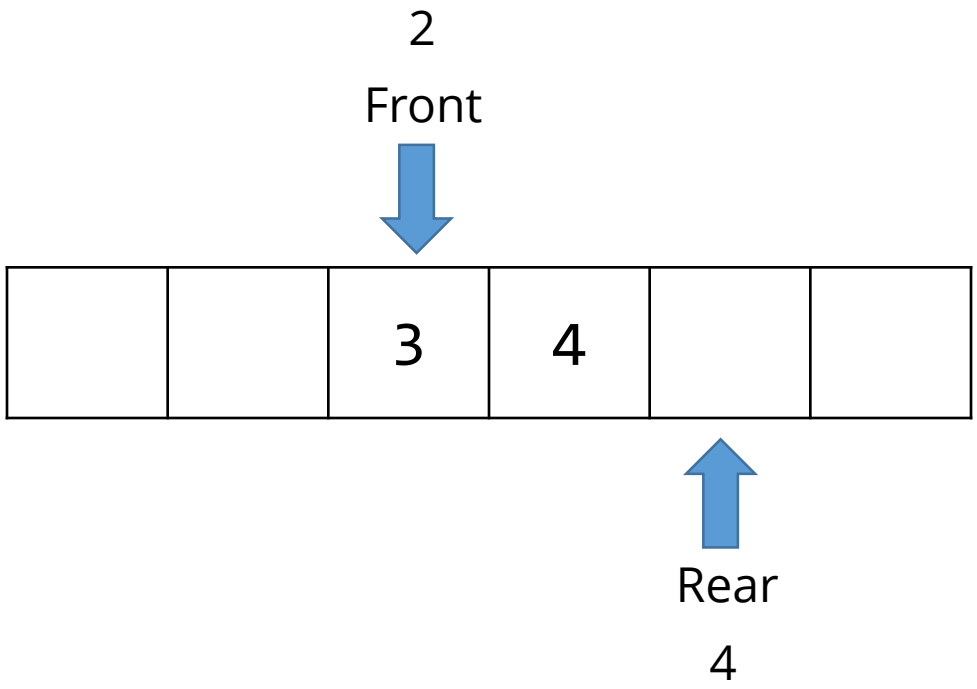
Implementation Using Array

Capacity = 6
Length = 3



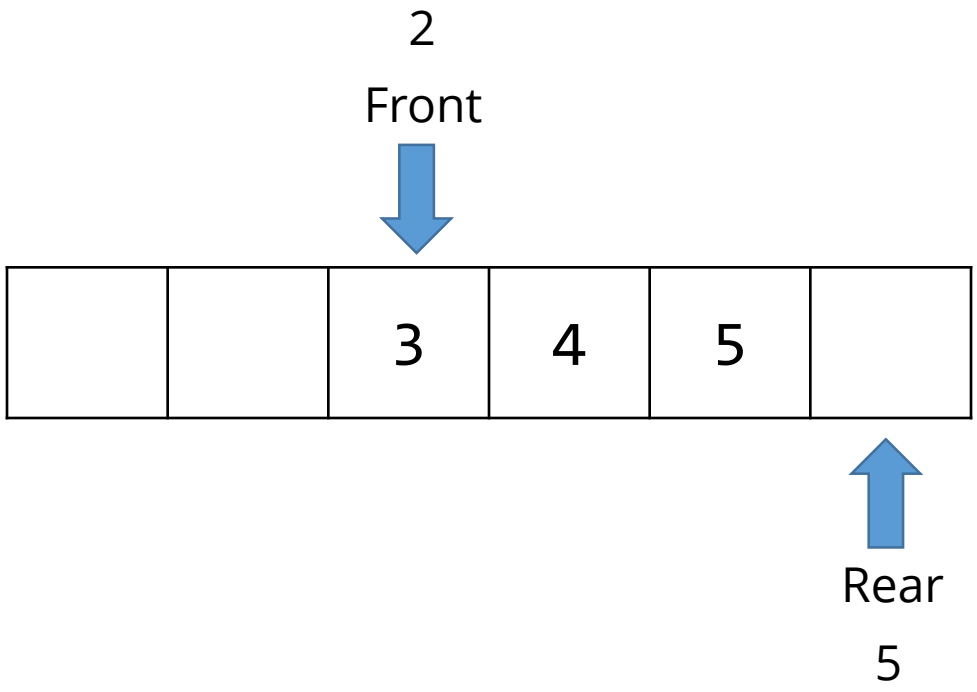
Implementation Using Array

Capacity = 6
Length = 2



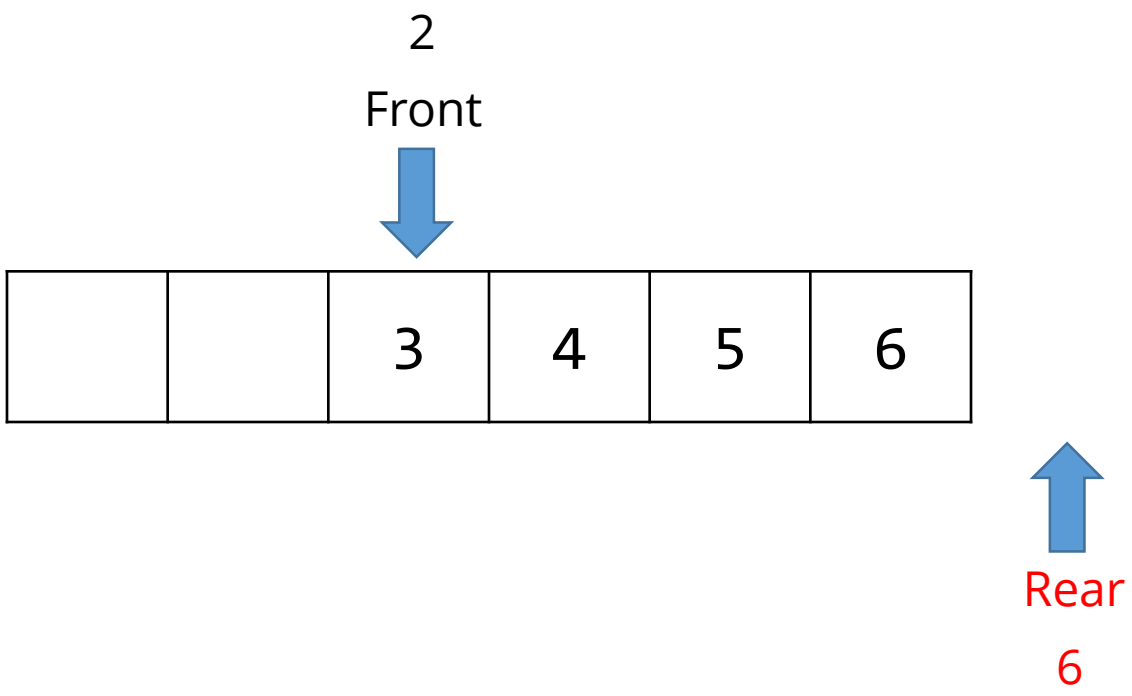
Implementation Using Array

Capacity = 6
Length = 3



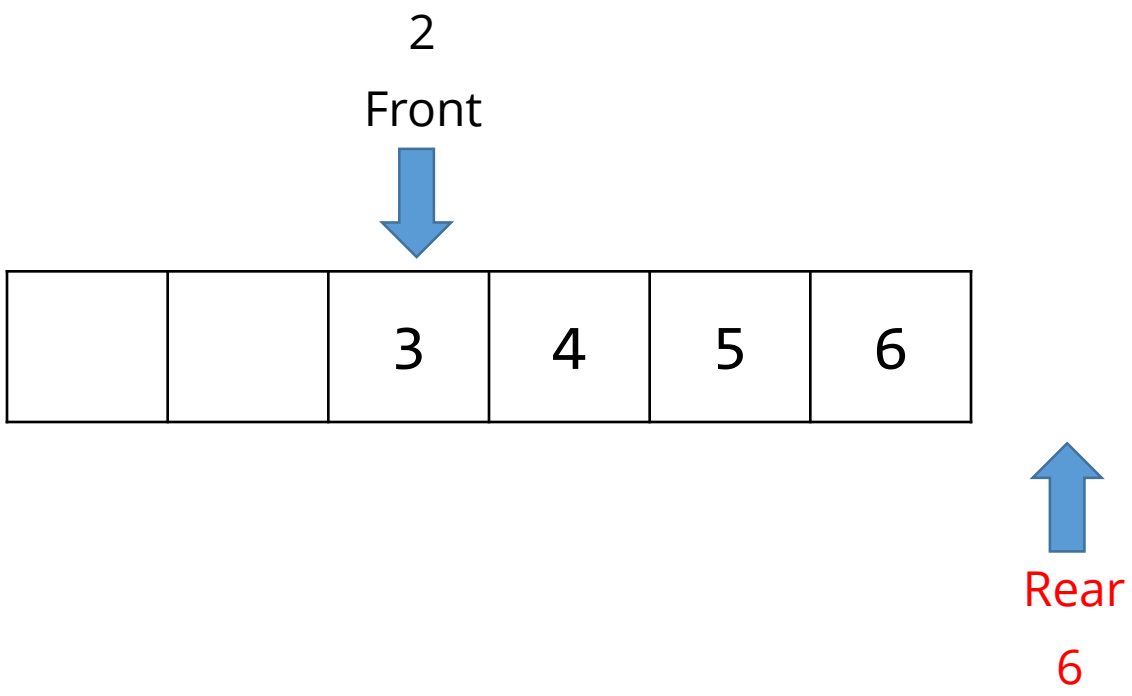
Implementation Using Array

Capacity = 6
Length = 4



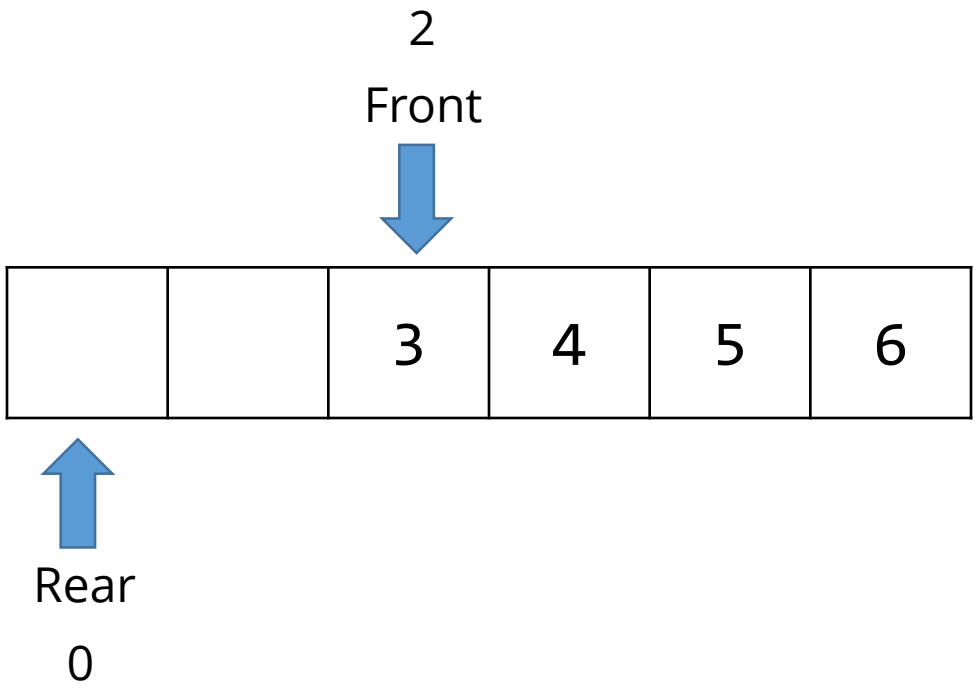
Implementation Using Array

Capacity = 6
Length = 4



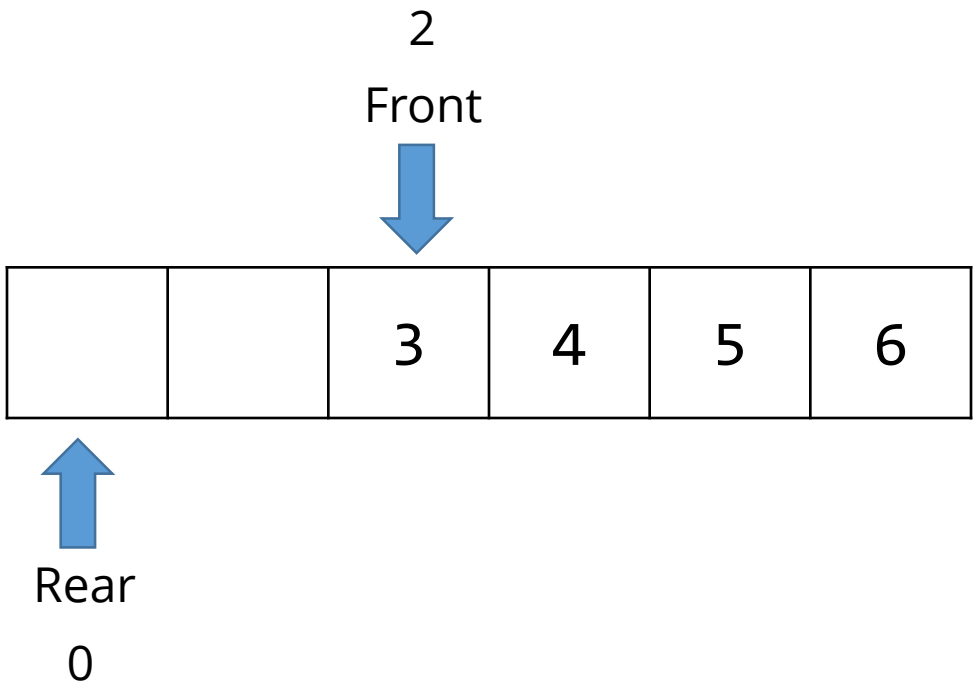
Implementation Using Array

Capacity = 6
Length = 4



Implementation Using Array

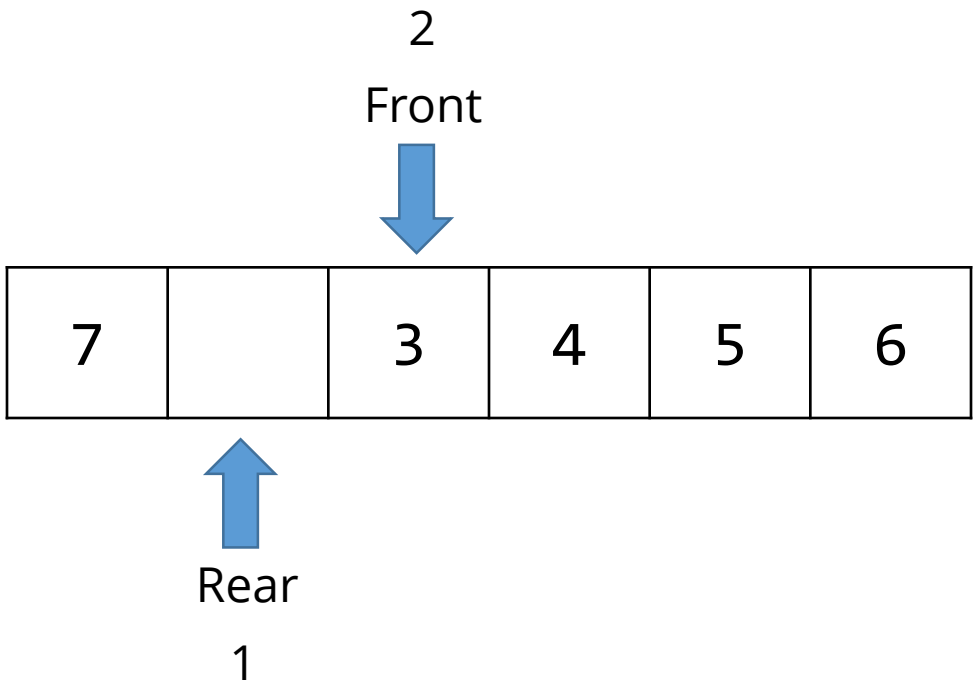
Capacity = 6
Length = 4



Rear = (Rear + 1) mod capacity

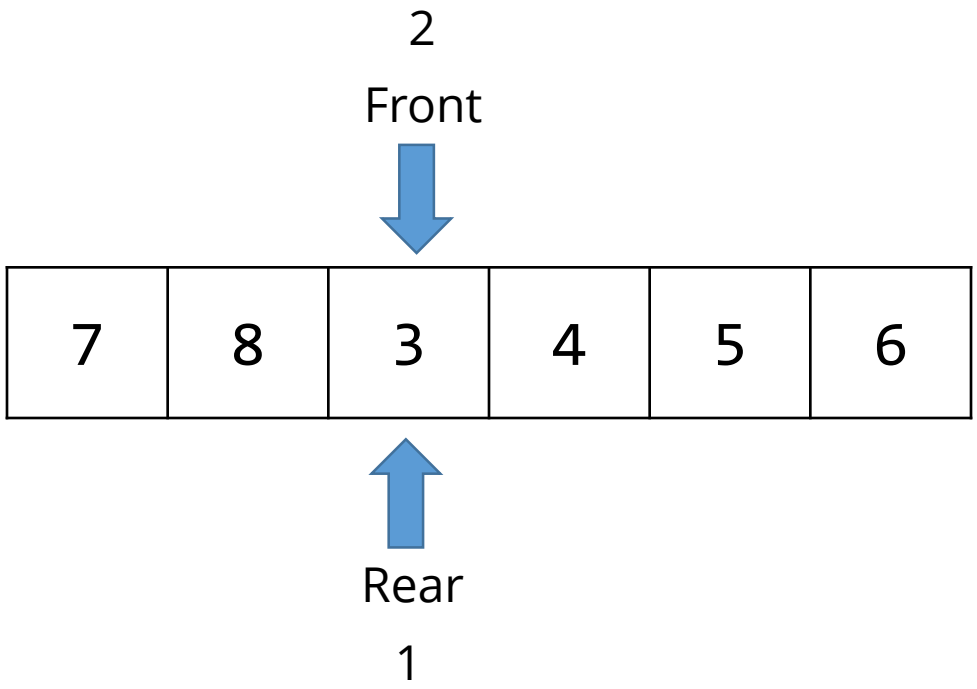
Implementation Using Array

Capacity = 6
Length = 5



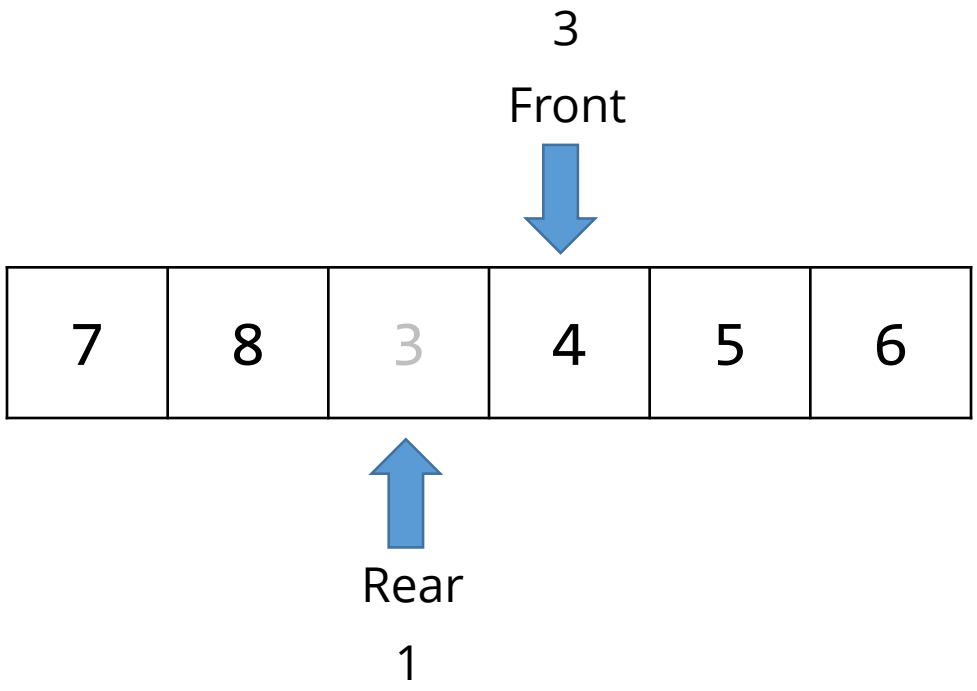
Implementation Using Array

Capacity = 6
Length = 6



Implementation Using Array

Capacity = 6
Length = 5



Implementation Using Linked List

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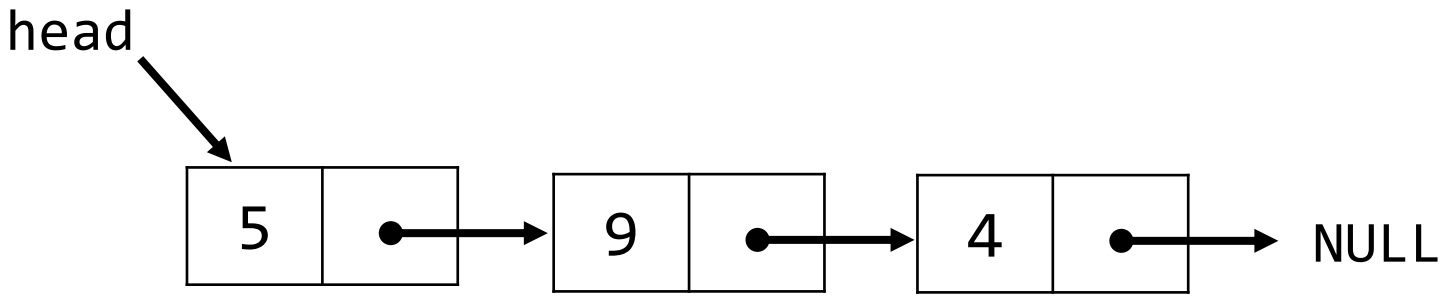

Implementation Using Linked List