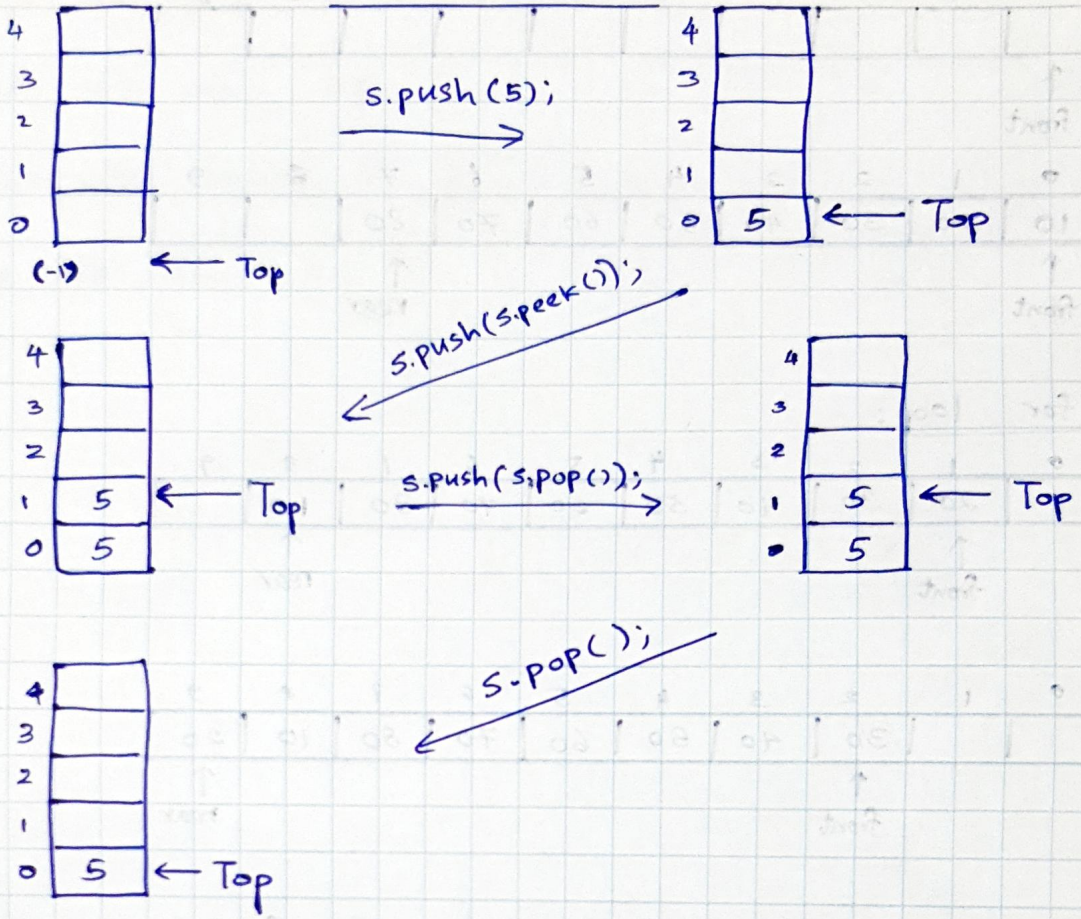
2019 - October

1. (a) (i)



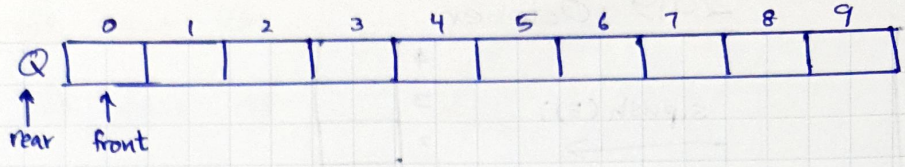
(ii)

```
public void push (int j) {
    if (top == maxSize-1)
        System.out.println("Stack is full");
    else {
        StackArray [++top] = j;
    }
}
```

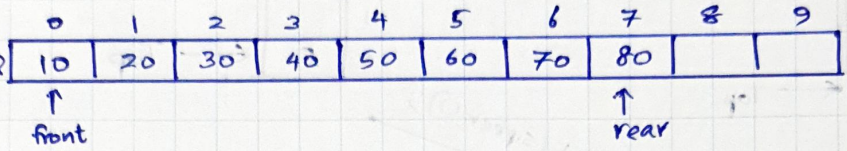
(iii)

```
StackX S2 = new StackX(5);
while (!S1.isEmpty()){
    int temp = S1.pop();
    if (temp % 2 == 0){
        S2.push(temp);
    }
}
while (!S2.isEmpty()){
    S1.push(S2.pop());
}
```

(b) (i)

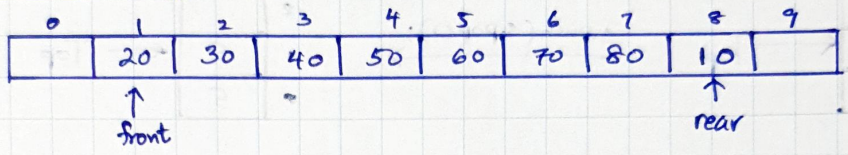


after 1st for loop

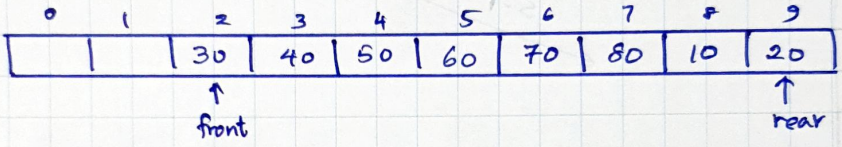


2nd for loop:

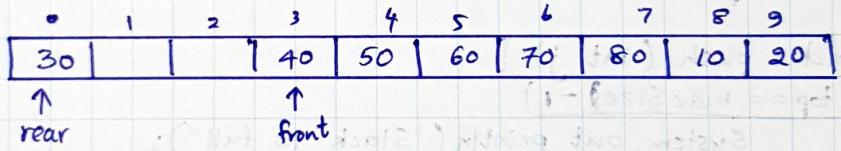
When i=1;



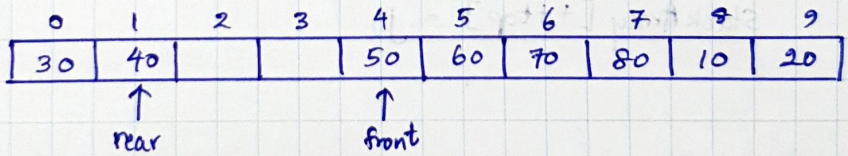
When i=2;



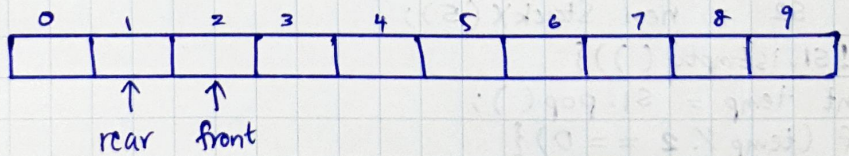
When i=3;



When i=4;



(ii)



(iii)

```
public int getSize(){
    return nItems;
}
```

(c)

```
while (!myQueue.isEmpty()){
    myStack.push(myQueue.remove());
}
while (!myStack.isEmpty()){
    myStack
    myQueue.Pnsert(myStack.pop());
}
```

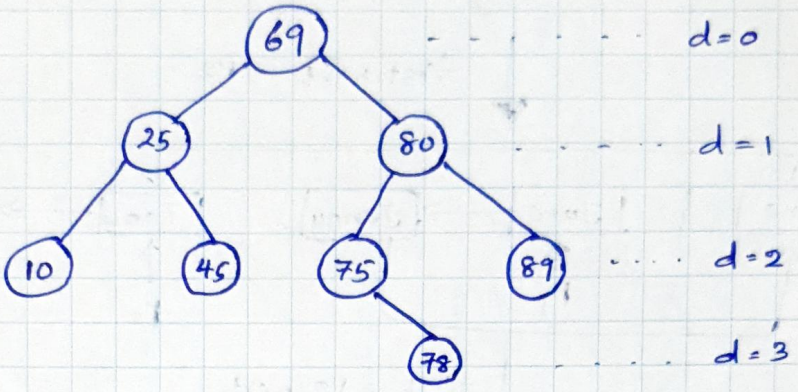
2. (a) (i) Node with value 75

(ii) Node with value 45

(iii) Nodes with values 69, 25, 80, 75

(iv) Node with value 45

(v)



(vi) No, since the last level is not filled from left to right.

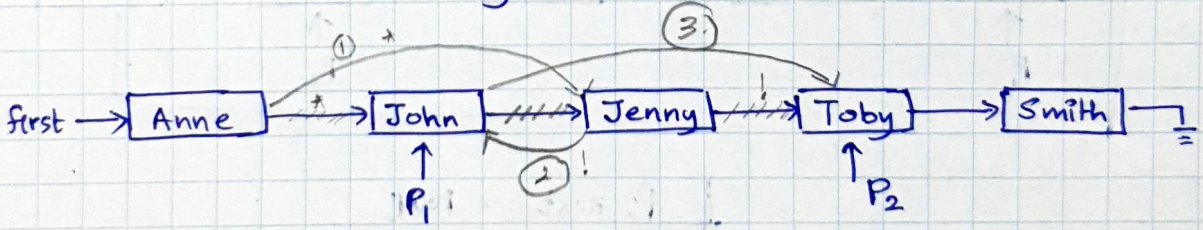
(b) (i)
```
Student highestStudent = studentMarks.maximum();
highestStudent.displayDetails();
```

(ii)
```
Student lowestStudent = studentMarks.minimum();
lowestStudent.displayDetails();
```

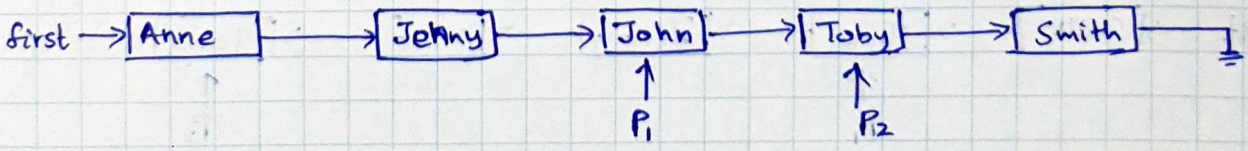
(iii)
```
studentMarks.descendingOrder();
```

(c) (i)

A ⇒

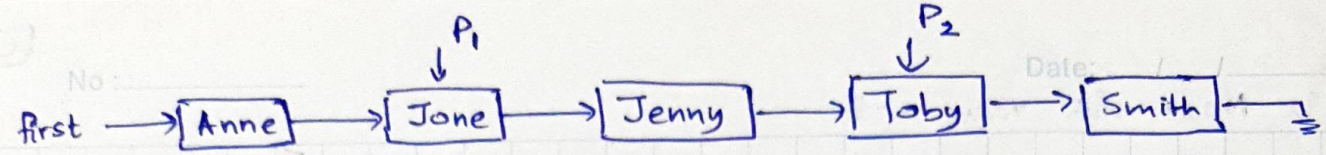


B ⇒

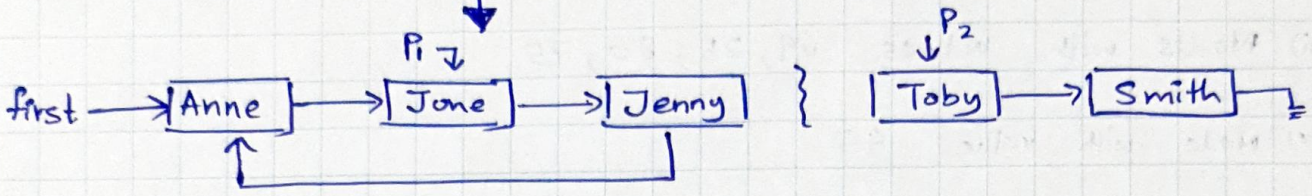



```
first.next = P1.next;   — (1) *
first.next.next = P1;   — (2) !
P1.next = P2;           — (3)
```

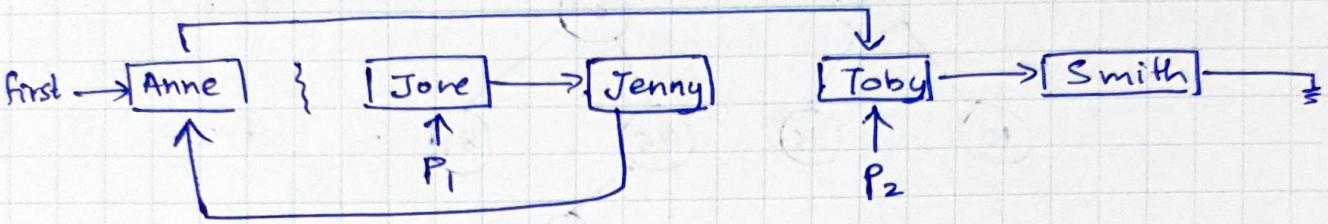
(ii)



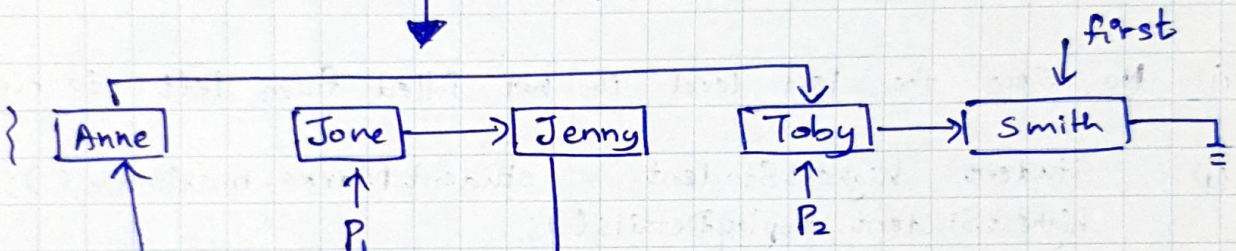
P1.next.next = first



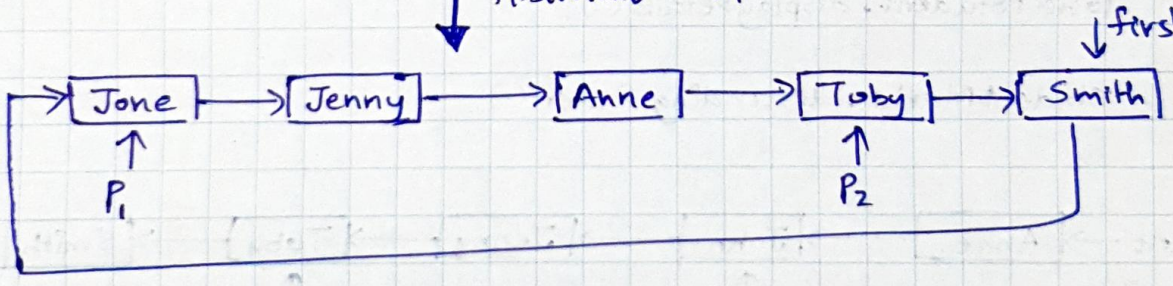
first.next = P2



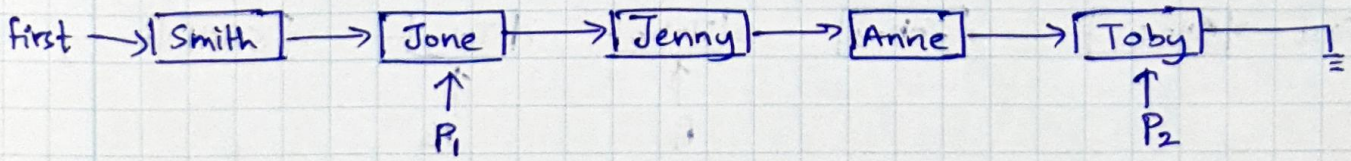
first = P2.next



first.next = P1



P2.next = NULL



(d) (i)

```
public Book isAvailable(int bookNo){
    Book current = first;
    while (current != null){
        if (current.bookNo == bookNo)
            return current;
        else
            current = current.next;
    }
    return null;
}
```

(ii)

```
public void lending(int bookNo){
    Book check = isAvailable(bookNo);
    if (check == null)
        System.out.println("There is no book with that number");
    else {
        check.numberOfCopies -= 1;
        System.out.println("The number of copies has been updated");
    }
}
```