

Queue Solutions

Solution 1 :

Time Complexity : $O(n)$

Space Complexity: $O(n)$

```
import java.util.LinkedList;
import java.util.Queue;

public class Solution {
    static void generatePrintBinary(int n){
        Queue<String> q = new LinkedList<String>();
        q.add("1");
        while (n-- > 0) {
            String s1 = q.peek();
            q.remove();
            System.out.println(s1);
            String s2 = s1;
            q.add(s1 + "0");
            q.add(s2 + "1");
        }
    }

    public static void main(String[] args){
        int n = 10;
        generatePrintBinary(n);
    }
}
```

Solution 2 :

Time Complexity : $O(n)$

Space Complexity: $O(n)$

```
import java.util.*;
```

aksharma202121@gmail.com

```
class Solution{  
    static int minCost(int arr[], int n){  
        PriorityQueue<Integer> pq  
            = new PriorityQueue<Integer>();  
  
        for (int i = 0; i < n; i++) {  
            pq.add(arr[i]);  
        }  
  
        int res = 0;  
        while (pq.size() > 1) {  
            int first = pq.poll();  
            int second = pq.poll();  
            res += first + second;  
            pq.add(first + second);  
        }  
        return res;  
    }  
  
    public static void main(String args[]){  
        int len[] = { 4, 3, 2, 6 };  
        int size = len.length;  
        System.out.println("Total cost for connecting"  
            + " ropes is "  
            + minCost(len, size));  
    }  
}
```

Solution 3 :

Time Complexity : $O(n \log n)$
Space Complexity: $O(n)$

```
import java.util.*;
```

```
class Solution {  
    static class Job {  
        char job_id;  
        int deadline;  
        int profit;
```

aksharma202121@gmail.com

```
Job(char job_id, int deadline, int profit){  
    this.deadline = deadline;  
    this.job_id = job_id;  
    this.profit = profit;  
}  
  
static void printJobScheduling(ArrayList<Job> arr){  
    int n = arr.size();  
    Collections.sort(arr, (a, b) -> {  
        return a.deadline - b.deadline;  
    });  
    ArrayList<Job> result = new ArrayList<>();  
    PriorityQueue<Job> maxHeap = new PriorityQueue<>(  
        (a, b) -> { return b.profit - a.profit; });  
    for (int i = n - 1; i > -1; i--) {  
        int slot_available;  
        if (i == 0) {  
            slot_available = arr.get(i).deadline;  
        }  
        else {  
            slot_available = arr.get(i).deadline  
                - arr.get(i - 1).deadline;  
        }  
        maxHeap.add(arr.get(i));  
        while (slot_available > 0  
            && maxHeap.size() > 0) {  
            Job job = maxHeap.remove();  
            slot_available--;  
            result.add(job);  
        }  
    }  
  
    Collections.sort(result, (a, b) -> {  
        return a.deadline - b.deadline;  
    });  
  
    for (Job job : result) {  
        System.out.print(job.job_id + " ");  
    }  
}
```

aksharma2021@gmail.com

```
        System.out.println();
    }

public static void main(String[] args){
    ArrayList<Job> arr = new ArrayList<Job>();

    arr.add(new Job('a', 2, 100));
    arr.add(new Job('b', 1, 19));
    arr.add(new Job('c', 2, 27));
    arr.add(new Job('d', 1, 25));
    arr.add(new Job('e', 3, 15));

    System.out.println("Following is maximum "
                       + "profit sequence of jobs");
    printJobScheduling(arr);
}

}
```



Solution 4 :

Time Complexity : $O(n+k)$
Space Complexity: $O(k)$

```
import java.io.*;
import java.util.*;

import java.util.*;

class Solution {

    static class cell {
        int x, y;
        int dis;
        public cell(int x, int y, int dis){
            this.x = x;
            this.y = y;
            this.dis = dis;
        }
    }
}
```

aksharma202121@gmail.com

```
    }

}

static boolean isInside(int x, int y, int N){
    if (x >= 1 && x <= N && y >= 1 && y <= N)
        return true;
    return false;
}

static int minStepToReachTarget(
    int knightPos[], int targetPos[],
    int N){
    int dx[] = { -2, -1, 1, 2, -2, -1, 1, 2 };
    int dy[] = { -1, -2, -2, -1, 1, 2, 2, 1 };

    Vector<cell> q = new Vector<>();
    q.add(new cell(knightPos[0], knightPos[1], 0));
    cell t;
    int x, y;
    boolean visit[][] = new boolean[N + 1][N + 1];
    visit[knightPos[0]][knightPos[1]] = true;
    while (!q.isEmpty()) {
        t = q.firstElement();
        q.remove(0);
        if (t.x == targetPos[0] && t.y == targetPos[1])
            return t.dis;
        for (int i = 0; i < 8; i++) {
            x = t.x + dx[i];
            y = t.y + dy[i];
            if (isInside(x, y, N) && !visit[x][y]) {
                visit[x][y] = true;
                q.add(new cell(x, y, t.dis + 1));
            }
        }
    }
    return Integer.MAX_VALUE;
}

public static void main(String[] args){
    int N = 30;
```

aksharma202121@gmail.com

```
    int knightPos[] = { 1, 1 };
    int targetPos[] = { 30, 30 };
    System.out.println(
        minStepToReachTarget(
            knightPos, targetPos, N));
}
}
```

Solution 5 :

Time Complexity : $O(n)$

Space Complexity: $O(k)$

```
import java.util.Deque;
import java.util.LinkedList;
```

```
public class Solution {
```

```
    static void printMax(int arr[], int n, int k){
        Deque<Integer> Qi = new LinkedList<Integer>();
        int i;
        for (i = 0; i < k; ++i) {
            while (!Qi.isEmpty() && arr[i] >=
                    arr[Qi.peekLast()])
                Qi.removeLast();
            Qi.addLast(i);
        }
        for (; i < n; ++i) {
            System.out.print(arr[Qi.peek()] + " ");
            while ((!Qi.isEmpty()) && Qi.peek() <=
                    i - k)
                Qi.removeFirst();
            while ((!Qi.isEmpty()) && arr[i] >=
                    arr[Qi.peekLast()])
                Qi.removeLast();
            Qi.addLast(i);
        }
        System.out.print(arr[Qi.peek()]);
    }
}
```

aksharma202121@gmail.com

```
public static void main(String[] args){  
    int arr[] = { 12, 1, 78, 90, 57, 89, 56 };  
    int k = 3;  
    printMax(arr, arr.length, k);  
}  
}
```

APNA
COLLEGE

aksharma202121@gmail.com