Design and Analysis of Algorithm Lab9

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Efficient online bet:

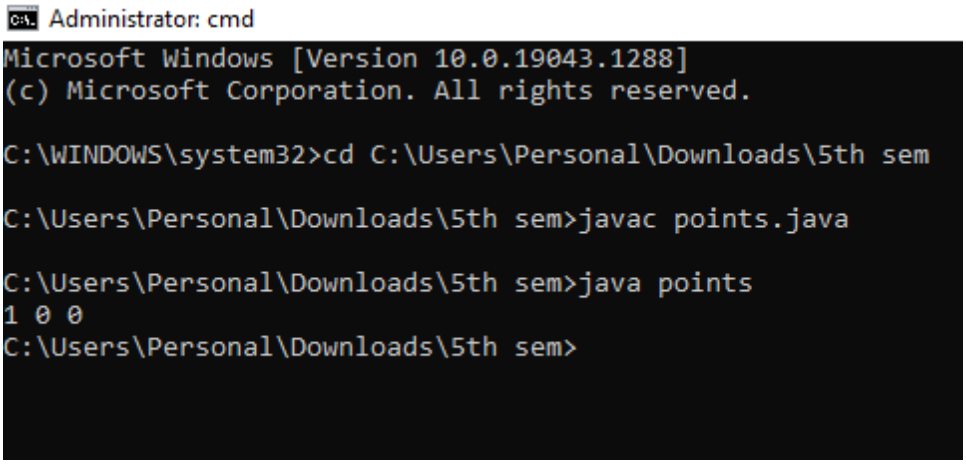
Code:

```
import java.util.*;
import java.lang.*;
 class points{
static void PrintArray(int n,int arr[])
{
for(int i = 0; i < n; i++)
{
System.out.print(arr[i] + " ");
}
}
static void NumberOfSegments(ArrayList<int[]> segments,int[] points, int s, int p)
{
ArrayList<int[]> pts = new ArrayList<>(),seg = new ArrayList<>();

for(int i = 0; i < p; i++)
{
pts.add(new int[]{points[i], i});
}

for(int i = 0; i < s; i++)
{
```

```
seg.add(new int[]{segments.get(i)[0], 1});
seg.add(new int[]{segments.get(i)[1] + 1, -1});
}
Collections.sort(seg, (a, b) -> b[0] - a[0]);
Collections.sort(pts, (a, b) -> a[0] - b[0]);
int count = 0;
int[] ans = new int[p];
for(int i = 0; i < p; i++)
{
int x = pts.get(i)[0];
while (seg.size() != 0 &&
seg.get(seg.size() - 1)[0] <= x)
{
count += seg.get(seg.size() - 1)[1];
seg.remove(seg.size() - 1);
}
ans[pts.get(i)[1]] = count;
}
PrintArray(p, ans);
}
public static void main(String[] args)
{
ArrayList<int[]>seg = new ArrayList<>();
seg.add(new int[]{2, 3});
seg.add(new int[]{0, 5});
seg.add(new int[]{7, 10});
int[] point = {1, 6, 11};
```

```
int s = seg.size();

int p = point.length;

NumberOfSegments(seg, point, s, p);

}

}
```

Output:



Asymptotic Analysis:

Online bet Efficient:-

```
Count (a1 ... an , a1 ... Pm)
{
  for i = 1 to n:
    [ai, left]
  for j = 1 to n:
    [aj, Right]
  for K = 1 to m:
    [Pk, Point]
  for i = 1 to m:
    arr[] = [ai, left] + [aj, Right] +
            [Pk, Point];
  Sort (arr[])
  for i = 1 to m:
    if (aj, left < Pk, Point > aj, Right)
      count ++
    else
      return 0;
```

```
return count;
}
```

for loop

$$T(n) = n+1 + n+1 + m+1 + m+1$$

$$= 2n + 2m + 4$$

$$= 2(n+m) + 4$$

$$T(n) = O(n+m)$$