

Assignment No: 5

Name: Kedar Kale

Roll No: SCETTY129

Topic: Write a program for an activity selection problem. Also find time space complexity.

Algorithm:

There are n different activities are given with their starting time and ending time. Select the maximum number of activities to solve by a single person. We will use the greedy approach to find the next activity whose finish time is minimum among rest activities, and the start time is more than or equal with the finish time of the last selected activity.

Begin

initially sort the given activity List

set $i := 1$

display the i th activity //in this case it is the first activity

for $j := 1$ to $n-1$ do

if start time of $act[j] \geq$ end of $act[i]$ then

display the j th activity

$i := j$

done

End

Time Complexity:

- 1) The time complexity for this problem for worse case when list is not sorted is $O(n \log n)$.
- 2) The time complexity for this problem for best case when list is sorted is $O(n)$.

Code:

```
#include<iostream>
using namespace std;

void printMaxActivities(int s[], int f[], int n)
{
    int i, j;

    cout<<"\nFollowing activities are selected n";

    i = 0;
    cout<<"\n"<<i;

    for (j = 1; j < n; j++)
    {

        if (s[j] >= f[i])
        {
            cout<<"\n"<<j;

        }
    }
}

int main(){
int start[50];
int finish[50];
int n,temp,i,j;

cout<<"\nEnter the no of activities::";
cin>>n;

cout<<"\nEnter the start time::";
for(i=0;i<n;i++){
cout<<"\nst:"<<i+1<<"::";
cin>>start[i];
}

cout<<"\nEnter the finish time::";
for(i=0;i<n;i++){
cout<<"\nft:"<<i+1<<"::";
cin>>finish[i];
}

for(i=0;i<n;i++)
{
    for(j=i+1;j<n;j++)
    {
```

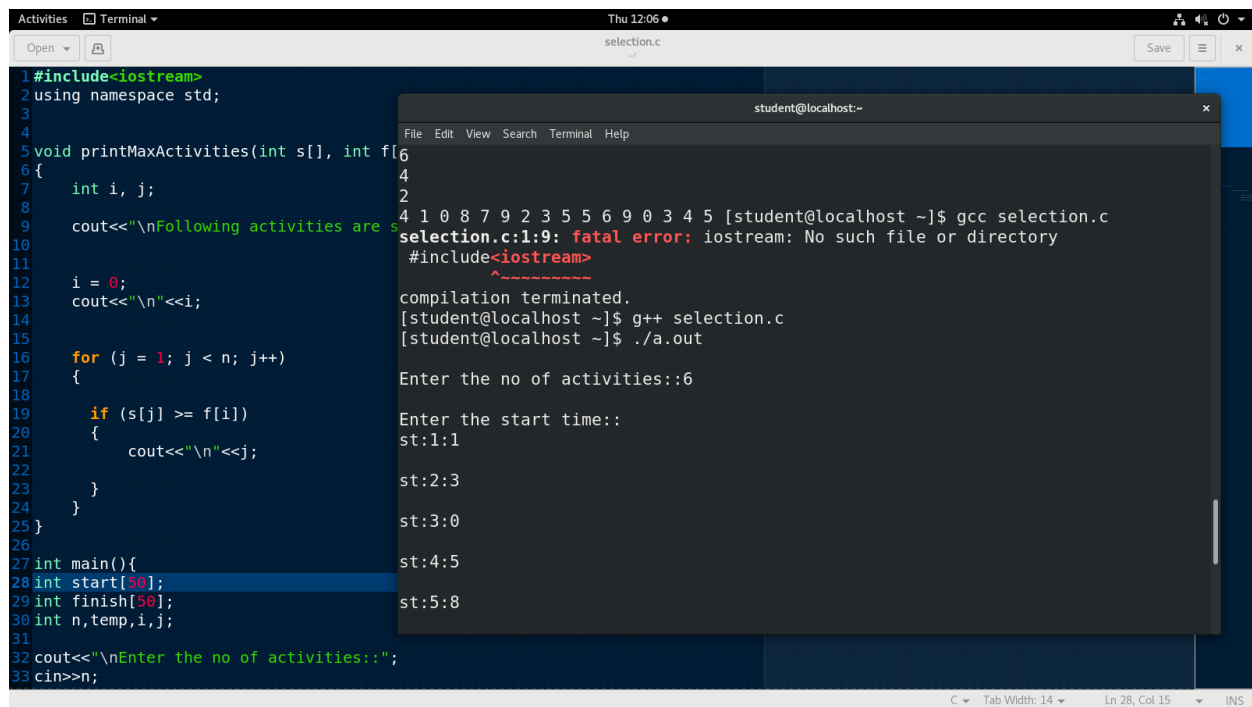
```

        if(finish[i]>finish[j])
        {
            temp  =finish[i];
            finish[i]=finish[j];
            finish[j]=temp;
        }
    }

    cout<<"\nStart Time is:";
    for(i=0;i<n;i++){
        cout<<start[i]<<" ";
    }
    cout<<"\nFinish Time is:";
    for(i=0;i<n;i++){
        cout<<finish[i]<<" ";
    }
    printMaxActivities(start, finish, n);
}

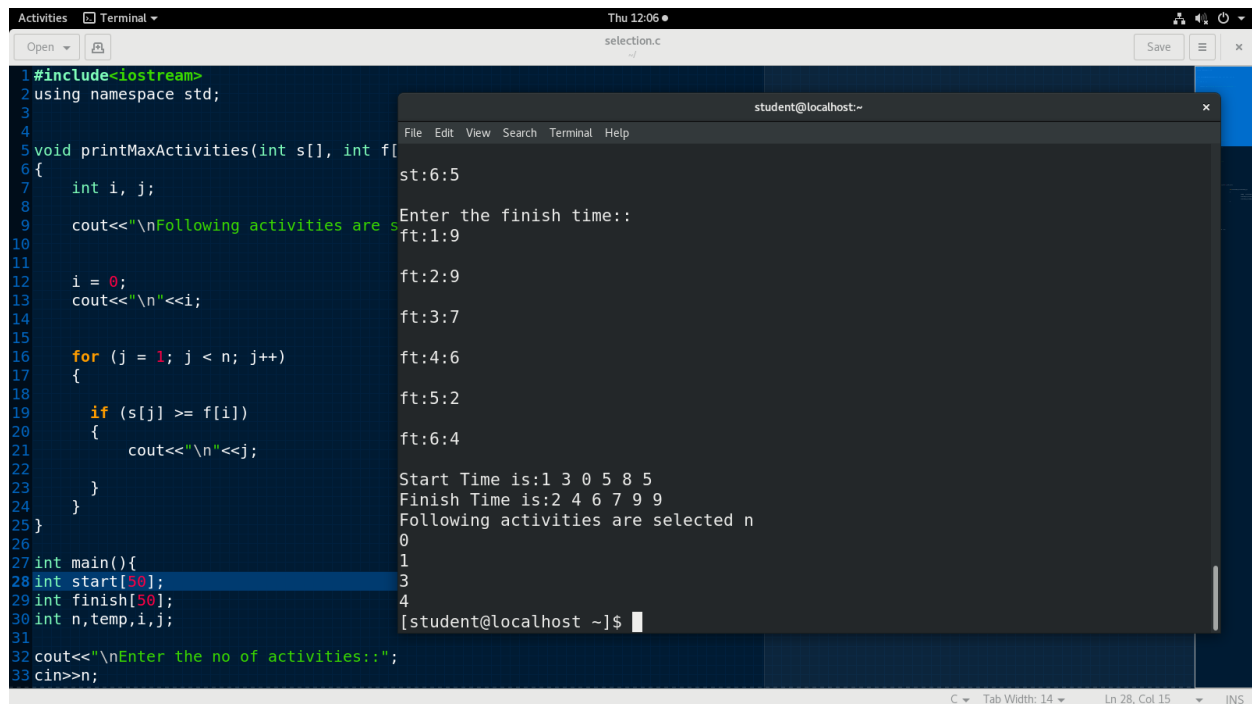
```

Input/Output:



```
1#include<iostream>
2using namespace std;
3
4
5void printMaxActivities(int s[], int f[6]
6{
7    int i, j;
8
9    cout<<"\nFollowing activities are s
10
11
12    i = 0;
13    cout<<"\n"<<i;
14
15    for (j = 1; j < n; j++)
16    {
17        if (s[j] >= f[i])
18        {
19            cout<<"\n"<<j;
20        }
21    }
22 }
23
24 }
25 }
26
27int main(){
28int start[50];
29int finish[50];
30int n,temp,i,j;
31
32cout<<"\nEnter the no of activities::";
33cin>>n;
```

student@localhost:~\$ gcc selection.c
selection.c:1:9: fatal error: iostream: No such file or directory
#include<iostream>
^~~~~~
compilation terminated.
[student@localhost ~]\$ g++ selection.c
[student@localhost ~]\$./a.out
Enter the no of activities::6
Enter the start time::
st:1:1
st:2:3
st:3:0
st:4:5
st:5:8



```
1#include<iostream>
2using namespace std;
3
4
5void printMaxActivities(int s[], int f[6]
6{
7    int i, j;
8
9    cout<<"\nFollowing activities are s
10
11
12    i = 0;
13    cout<<"\n"<<i;
14
15    for (j = 1; j < n; j++)
16    {
17        if (s[j] >= f[i])
18        {
19            cout<<"\n"<<j;
20        }
21    }
22 }
23
24 }
25 }
26
27int main(){
28int start[50];
29int finish[50];
30int n,temp,i,j;
31
32cout<<"\nEnter the no of activities::";
33cin>>n;
```

student@localhost:~\$
st:6:5
Enter the finish time::
ft:1:9
ft:2:9
ft:3:7
ft:4:6
ft:5:2
ft:6:4
Start Time is:1 3 0 5 8 5
Finish Time is:2 4 6 7 9 9
Following activities are selected n
0
1
3
4
[student@localhost ~]\$