Preemptive Priority Scheduling

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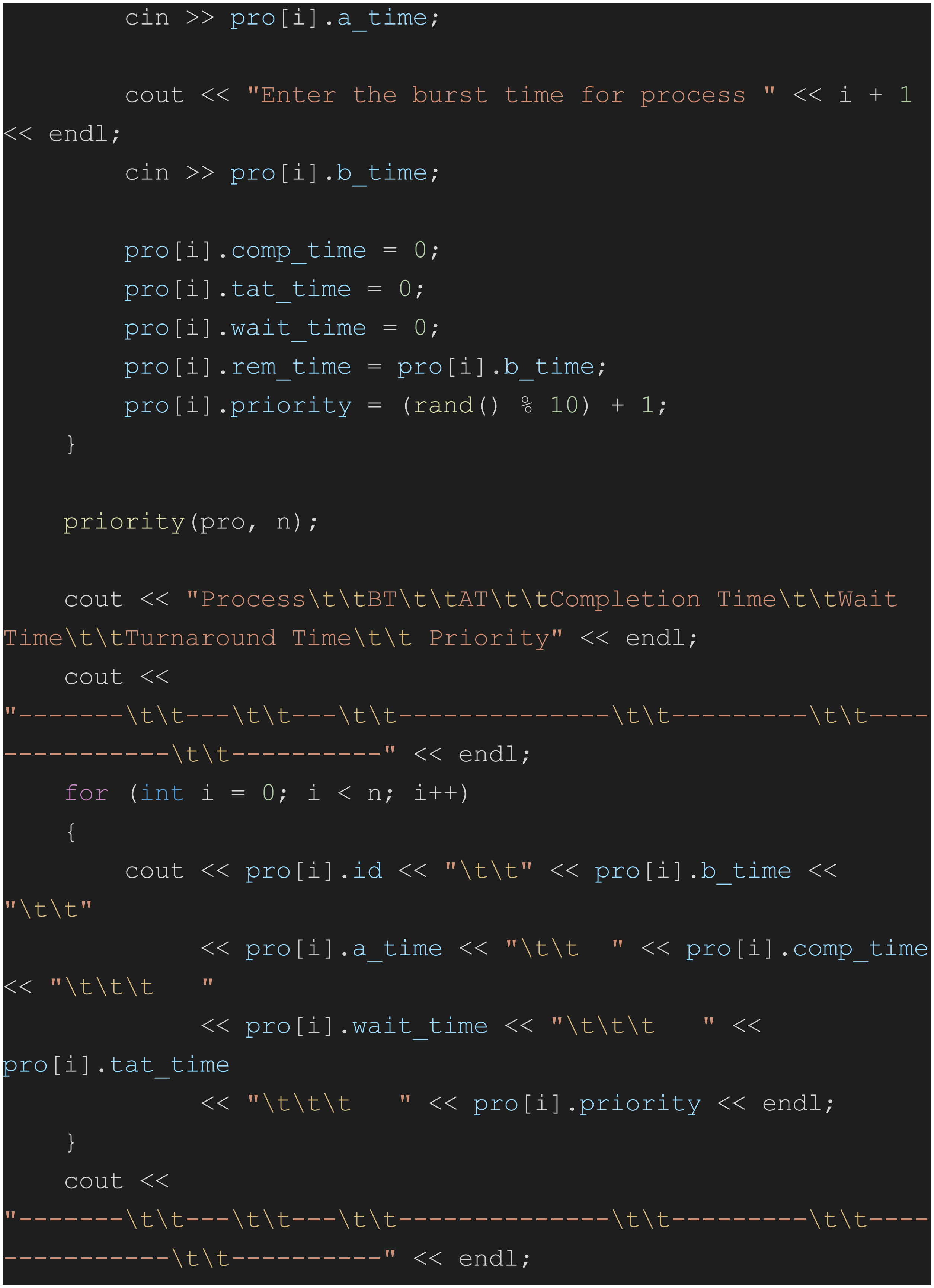
Implement Preemptive Priority Scheduling

- **In this, the user should give the burst time and arrival time.**
- **The priority of the process should be assigned randomly (generate a random number between 1 and 10, assuming that lowest integer indicates the highest priority.**

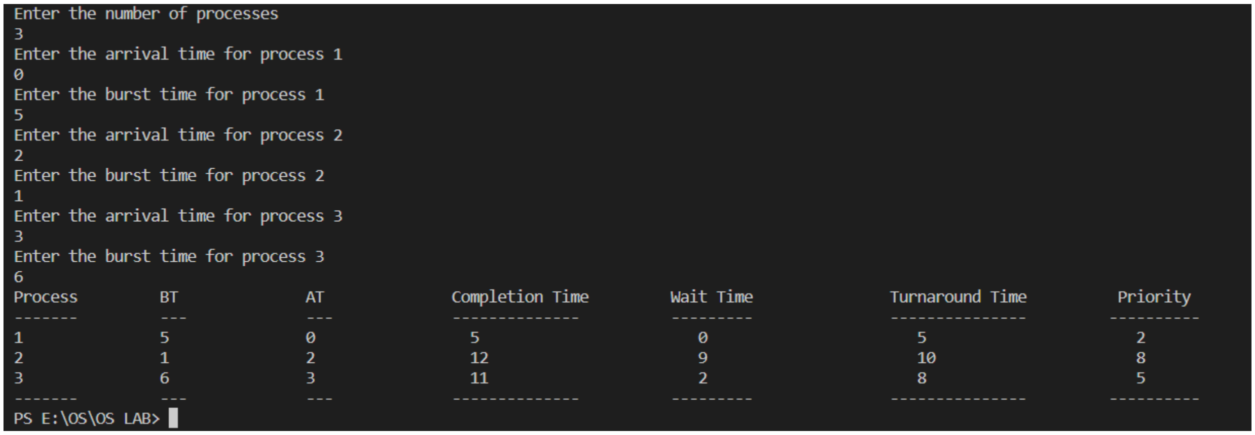
```
#include <bits/stdc++.h>
using namespace std;

struct process
{
    int id, a_time, b_time, comp_time, wait_time, tat_time,
priority, rem_time;
    process *next;
};

bool compare(process p1, process p2)
{
    return p1.a_time < p2.a_time;
}

void priority(process pro[], int n)
{
    for (int i = 0; i < n; i++)
    {
        int min = i;
        for (int j = i + 1; j < n; j++)
        {
            if (compare(pro[j], pro[min]))
            {
                min = j;
            }
        }
        swap(pro[min], pro[i]);
    }

    int total_time = 0;
    for (int i = 0; i < n; i++)
    {
        total_time += pro[i].b_time;
    }

    int current_time = 0;
    while (current_time <= total_time)
    {
        int highest_priority_idx = -1;
        int highest_priority = INT_MAX;

        for (int i = 0; i < n; i++)
        {
            if (pro[i].a_time <= current_time && pro[i].rem_time > 0 && pro[i].priority < highest_priority)
            {
                highest_priority_idx = i;
                highest_priority = pro[i].priority;
            }
        }

        if (highest_priority_idx == -1)
        {
            current_time++;
            continue;
        }

        pro[highest_priority_idx].rem_time--;

        if (pro[highest_priority_idx].rem_time == 0)
        {
            pro[highest_priority_idx].comp_time =
current_time + 1;
            pro[highest_priority_idx].tat_time =
pro[highest_priority_idx].comp_time -
pro[highest_priority_idx].a_time;
            pro[highest_priority_idx].wait_time =
pro[highest_priority_idx].tat_time -
pro[highest_priority_idx].b_time;
        }

        current_time++;
    }
}

int main()
{
    int n;
    cout << "Enter the number of processes " << endl;
    cin >> n;
    process pro[n];

    for (int i = 0; i < n; i++)
    {
        pro[i].id = i + 1;
        cout << "Enter the arrival time for process " << i +
1 << endl;
```



```
        cin >> pro[i].a_time;

        cout << "Enter the burst time for process " << i + 1
<< endl;
        cin >> pro[i].b_time;

        pro[i].comp_time = 0;
        pro[i].tat_time = 0;
        pro[i].wait_time = 0;
        pro[i].rem_time = pro[i].b_time;
        pro[i].priority = (rand() % 10) + 1;
    }

    priority(pro, n);

    cout << "Process\t\tBT\t\tAT\t\tCompletion Time\t\tWait
Time\t\tTurnaround Time\t\t Priority" << endl;
    cout <<
"-------\t\t---\t\t---\t\t--------------\t\t----------\t\t----
-----------\t\t----------" << endl;
    for (int i = 0; i < n; i++)
    {
        cout << pro[i].id << "\t\t" << pro[i].b_time <<
"\t\t"
             << pro[i].a_time << "\t\t  " << pro[i].comp_time
<< "\t\t\t   "
             << pro[i].wait_time << "\t\t\t   " <<
pro[i].tat_time
             << "\t\t\t   " << pro[i].priority << endl;
    }
    cout <<
"-------\t\t---\t\t---\t\t--------------\t\t----------\t\t----
-----------\t\t----------" << endl;
```

```
    return 0;
}
```

OUTPUTS



```
Enter the number of processes
3
Enter the arrival time for process 1
0
Enter the burst time for process 1
5
Enter the arrival time for process 2
2
Enter the burst time for process 2
1
Enter the arrival time for process 3
3
Enter the burst time for process 3
6
Process         BT              AT              Completion Time         Wait Time               Turnaround Time          Priority
-------         ---             ---             --------------          ---------               ---------------         ----------
1               5               0                 5                        0                       5                       2
2               1               2                 12                       9                       10                      8
3               6               3                 11                       2                       8                       5
-------         ---             ---             --------------          ---------               ---------------         ----------
PS E:\OS\OS LAB> 
```