# UIT2512---Operating Systems Practices Lab

## Implementation of SJF CPU Scheduling Algorithm (Non Preemptive & Preemptive) in Python

**Name:** Vasundhara.B

**Roll no:** 3122 21 5002 119

### Aim:

To write a python code to implement SJF CPU Scheduling Algorithm (Non Preemptive & Preemptive)

### CODE:

```
def preemptive(n,d,at,bt):
    i = 0
    ll = []
    for i in range(0, sum(bt)):
        l = [j for j in d  if j[1] <= i]
        l.sort(key=lambda x: x[0])
        d[d.index(l[0])][0] -= 1
        for k in d:
            if k[0] == 0:
                t = d.pop(d.index(k))
                ll.append([k, i + 1])
    ct = [0] * (n)
    tat = [0] * (n)
    wt = [0] * (n )
    for i in ll:
        ct[i[0][2]] = i[1]
    for i in range(len(ct)):
        tat[i] = ct[i] - at[i]
        wt[i] = tat[i] - bt[i]
    print('PID\tBT\tAT\tCT\tTAT\tWT')
    for i in range(len(ct)):
        print("{}\t{}\t{}\t{}\t{}\t{}".format("P"+str(i+1),bt[i], at[i], ct[i],
tat[i], wt[i]))
    print('Average Waiting Time = ', sum(wt)/len(wt))
    print('Average Turnaround Time = ', sum(tat)/len(tat))

def non_preemptive(d):
    d.sort(key=lambda x: x[1])
    s="|"+"_"*d[0][0]+"P"+str(d[0][2]+1)+"|"
    d[0].append(d[0][0])
```

```
    c=d[0][0]
    d.sort(key=lambda x: x[0])
    for i in d:
        if i[1]!=0:
            s+="_"*i[0]+"P"+str(i[2]+1)+"|"
            c+=i[0]
            i.append(c)

    print("GANTT CHART \n")
    print(s)
    tat = []
    WT = []
    d.sort(key=lambda x: x[2])
    print('\nPID\tAT\tBT\tCT\tTAT\tWT')
    for i in d:
        p="P"+str(i[2]+1)
        tt=i[3]-i[1]
        wt=tt-i[0]
        tat.append(tt)
        WT.append(wt)
        print(f"{p}\t{i[1]}\t{i[0]}\t{i[3]}\t{tt}\t{wt}")
    print('Average Waiting Time = ', sum(WT)/n)
    print('Average Turnaround Time = ', sum(tat)/n)

if __name__=="__main__":
    n = int(input('Enter no of processes: '))
    d = [0] * (n )
    at = [0] * (n )
    bt = [0] * (n )
    for i in range(n):
        at[i] = int(input('Enter the arrival time for process {} : '.format(i +
1)))
        bt[i] = int(input('Enter the burst time for process {} : '.format(i + 1)))
        d[i] = [bt[i], at[i], i]
    ch=int(input("Enter 1 for preemptive and 2 for non-preemptive:"))
    print()
    if ch==1:
        preemptive(n,d,at,bt)
    else:
        non_preemptive(d)
```

**OUTPUT:**

**(ii) NON - PREEMPTIVE SCHEDULING (QUESTION 1 FROM TUTORIAL 2)**

```
PS C:\Users\B Vasundhara\Documents\OS> python3 sjf.py
Enter no of processes: 5
Enter the arrival time for process 1 : 3
Enter the burst time for process 1 : 1
Enter the arrival time for process 2 : 1
Enter the burst time for process 2 : 4
Enter the arrival time for process 3 : 4
Enter the burst time for process 3 : 2
Enter the arrival time for process 4 : 0
Enter the burst time for process 4 : 6
Enter the arrival time for process 5 : 2
Enter the burst time for process 5 : 3
Enter 1 for preemptive and 2 for non-preemptive:2

GANTT CHART

|______P4|_P1|__P3|___P5|____P2|

PID     AT      BT      CT      TAT     WT
P1      3       1       7       4       3
P2      1       4       16      15      11
P3      4       2       9       5       3
P4      0       6       6       6       0
P5      2       3       12      10      7
Average Waiting Time =  4.8
Average Turnaround Time =  8.0
PS C:\Users\B Vasundhara\Documents\OS>
```

**(ii) PREEMPTIVE SCHEDULING (QUESTION 4 FROM TUTORIAL 2)**

```
PS C:\Users\B Vasundhara\Documents\OS> python3 sjf.py
Enter no of processes: 3
Enter the arrival time for process 1 : 0
Enter the burst time for process 1 : 9
Enter the arrival time for process 2 : 1
Enter the burst time for process 2 : 4
Enter the arrival time for process 3 : 2
Enter the burst time for process 3 : 9
Enter 1 for preemptive and 2 for non-preemptive:1

PID     BT      AT      CT      TAT     WT
P1      9       0       13      13      4
P2      4       1       5       4       0
P3      9       2       22      20      11
Average Waiting Time =  5.0
Average Turnaround Time =  12.333333333333334
PS C:\Users\B Vasundhara\Documents\OS>
```