EXPERIMENT - 3
Operating Systems Lab

AIM
Write a program to perform priority scheduling.

Syeda Reeha Quasar
14114802719
6C7

EXPERIMENT – 3

Aim:
Write a program to perform priority scheduling.

Theory:
Priority scheduling is a non-preemptive algorithm and one of the most common scheduling algorithms in batch systems. Each process is assigned first arrival time (less arrival time process first) if two processes have same arrival time, then compare to priorities (highest process first). Also, if two processes have same priority then compare to process number (less process number first). This process is repeated while all process get executed.

Implementation –

1. First input the processes with their arrival time, burst time and priority.

2. First process will schedule, which have the lowest arrival time, if two or more processes will have lowest arrival time, then whoever has higher priority will schedule first.

3. Now further processes will be schedule according to the arrival time and priority of the process. (Here we are assuming that lower the priority number having higher priority). If two process priority are same then sort according to process number.
   Note: In the question, They will clearly mention, which number will have higher priority and which number will have lower priority.

4. Once all the processes have been arrived, we can schedule them based on their priority.

Example:
Input :

process no-> 1 2 3 4 5

arrival time-> 0 1 3 2 4

burst time-> 3 6 1 2 4

priority-> 3 4 9 7 8

Output :

Process_no	arrival_time	Burst_time	Complete_time	Turn_Around_Time	Waiting_Time
1	0	3	3	3	0
2	1	6	9	8	2
3	3	1	16	13	12
4	2	2	11	9	7
5	4	4	15	11	7

Average Waiting Time is : 5.6

Average Turn Around time is : 8.8

Source Code:

```bash
#! /bin/bash

> input.txt

function priorityScheduling {
   awt=0
   totalwt=0
   totaltat=0
   atat=0
   declare -a  wt
   declare -a  tat

   sh sortfile.sh
   IFS=$'\n'
   i=1
   for line in $(cat ./output.txt)
   do
      IFS=" "
      var=($line)
      priority[i]=${var[0]}
      Btime[i]=${var[1]}
      p[i]=${var[2]}
      i=$((i+1))
   done

   echo -e "Process\t   Burst Time   \tWaiting Time\tTurnaround Time \t Priority"
   for ((i=1;i<=number;i++))
   do
      wt[i]=0;
      tat[i]=0;
      for ((j=0;j<i;j++))
      do
         wt[i]="$((wt[i]+Btime[j]))"    #calculate waiting time
      done
      totalwt="$((totalwt+wt[i]))"    #calculate total waiting time
      tat[i]="$((Btime[i]+wt[i]))"    #calculate turnaround time
      totaltat="$((totaltat+tat[i]))"    #calculate total turnaround time
      echo -e "${p[i]}\t\t  ${Btime[i]}\t\t   ${wt[i]}\t\t\t${tat[i]} \t\t ${priority[i]}"
   done

   awt=$(echo 'scale=2;' "$totalwt" / "$number" | bc -l)    #calculate average waiting time
   atat=$(echo 'scale=2;' "$totaltat" / "$number" | bc -l)   #calculate average turnaround time
   echo -e "\n"
   echo "Total waiting time =" "$totalwt"
   echo "Average waiting time =" "$awt"
   echo "Total Turnaround Time =" "$totaltat"
   echo "Average Turnaround Time =" "$atat"
}
```

```
#Accepts user input for Number of Processes and Input Validation
echo "Enter the number of processes -- "
read -r number

while [[ "$number" -le 1 ]] || [[ -z "$number" ]]
do
    echo "Error: No. of process cannot be blank or less than 2"
    echo "Please try again."
    echo "Enter the number of processes -- "
    read -r number
done

declare -a Btime
declare -a  p
declare -a priority
declare -a data

#Accepts user input for Burst Time and Input Validation
for (( i=1; i<=number; i++ ))
do
    echo "For process ------- $((i))"
    echo "Enter Priority of the process:"
    read -r "priority[i]"
    echo "Enter Burst Time of the process:"
    read -r "Btime[i]"

    while [[ "${Btime[i]}" -lt 1 ]] || [[ -z "${Btime[i]}" ]]
    do
        echo "Error: Input valid priority or burst time for the process or Inputs cannot be blank"
        echo "Please try again."
        echo "Enter Priority of the process:"
        read -r "priority[i]"
        echo "Enter Burst Time of the process:"
        read -r "Btime[i]"
    done
    p[i]=$((i))
    echo $(echo ${priority[i]} ${Btime[i]} ${p[i]}) >> input.txt
done

echo -e "CPU burst Time for processes in nano second --" "${Btime[@]}"
echo -e "Process Number for CPU burst time        --" "${p[@]}"
echo ""
echo "Calculation for Priority Scheduling for processes entered are as follows: "
priorityScheduling
```

Output:

```
reeha@Reeha:/mnt/e/sem 6/Operating Systems$ ./priority.sh
Enter the number of processes --
3
For process ------- 1
Enter Priority of the process:
1
Enter Burst Time of the process:
1
For process ------- 2
Enter Priority of the process:
23
Enter Burst Time of the process:
2
For process ------- 3
Enter Priority of the process:
3
Enter Burst Time of the process:
3
CPU burst Time for processes in nano second -- 1 2 3
Process Number for CPU burst time          -- 1 2 3

Calculation for Priority Scheduling for processes entered are as follows:
Process     Burst Time          Waiting Time   Turnaround Time      Priority
2                2                   0                 2               23
3                3                   2                 5               3
1                1                   5                 6               1


Total waiting time = 7
Average waiting time = 2.33
Total Turnaround Time = 13
Average Turnaround Time = 4.33
```

```
reeha@Reeha:/mnt/e/sem 6/Operating Systems$ ./priority.sh
Enter the number of processes --
5
For process ------- 1
Enter Priority of the process:
23
Enter Burst Time of the process:
43
For process ------- 2
Enter Priority of the process:
12
Enter Burst Time of the process:
34
For process ------- 3
Enter Priority of the process:
54
Enter Burst Time of the process:
23
For process ------- 4
Enter Priority of the process:
12
Enter Burst Time of the process:
53
For process ------- 5
Enter Priority of the process:
65
Enter Burst Time of the process:
77
CPU burst Time for processes in nano second -- 43 34 23 53 77
Process Number for CPU burst time          -- 1 2 3 4 5

Calculation for Priority Scheduling for processes entered are as follows:
Process     Burst Time          Waiting Time   Turnaround Time          Priority
5                77                  0                 77               65
3                23                  77                100              54
1                43                  100               143              23
4                53                  143               196              12
2                34                  196               230              12


Total waiting time = 516
Average waiting time = 103.20
Total Turnaround Time = 746
Average Turnaround Time = 149.20
```