EXPERIMENT - 8

Operating Systems Lab

AIM

Write a program to implement CPU scheduling for the shortest job first.

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Aim:

Write a program to implement CPU scheduling for shortest job first.

Source Code:

```
#! /bin/bash

function shortestjobfirst {
#Initializing Bash variables
awt=0
totalwt=0
totaltat=0
atat=0
temp=0
declare -a  wt
declare -a  tat
#sorting burst time in ascending order using selection sort
for ((i = 0; i<${number-1}; i++))
do

   for((j = 0; j<${number-i-1}; j++))
   do

      if [[ "${Btime[$j]}" -gt "${Btime[$j+1]}" ]];
      then
         # swaping Burst time array
         temp=${Btime[$j]};
         Btime[$j]=${Btime[$j+1]};
         Btime[$j+1]=$temp;

         #swaping process positon
         temp=${p[$j]};
         p[$j]=${p[$j+1]};
         p[$j+1]=$temp;
      fi
   done
done
   echo -e "Process\t    Burst Time    \tWaiting Time\tTurnaround Time"
   for ((i=1;i<=number;i++))
   do
      wt[i]=0;
      tat[i]=0;
      for ((j=0;j<i;j++))
      do
         wt[i]="$((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]}"
```

```
   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: Input valid number of processes or Input cannot be blank"
echo "Please try again."
echo "Enter the number of processes -- "
read -r number
done

declare -a Btime
declare -a  p
declare -a  rem_bt

#Accepts user input for Burst Time and Input Validation
for (( i=1; i<=number; i++ ))
do

echo "Enter Burst Time for Process -- $i"
read -r "Btime[i]"

while [[ "${Btime[i]}" -lt 1 ]] || [[ -z "${Btime[i]}" ]]
do
echo "Error: Input valid burst time for the process or Inputs cannot be blank"
echo "Please try again."
echo "Enter Burst Time for Process -- $i"
read -r "Btime[i]"
done
p[i]=$i  #contains process number
rem_bt[i]=${Btime[i]} #remaining process
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 Shortest Job first for processes entered are as follows: "
shortestjobfirst
```

Output:

```
reeha@Reeha:/mnt/e/sem 6/Operating Systems$ ./sjf.sh
Enter the number of processes --
3
Enter Burst Time for Process -- 1
34
Enter Burst Time for Process -- 2
45
Enter Burst Time for Process -- 3
5
CPU burst Time for processes in nano second -- 34 45 5
Process Number for CPU burst time           -- 1 2 3

Calculation for Shortest Job first for processes entered are as follows:
Process     Burst Time          Waiting Time    Turnaround Time
3                5                  0                  5
1                34                 5                  39
2                45                 39                 84


Total waiting time = 44
Average waiting time = 14.66
Total Turnaround Time = 128
Average Turnaround Time = 42.66
```

```
reeha@Reeha:/mnt/e/sem 6/Operating Systems$ ./sjf.sh
Enter the number of processes --
5
Enter Burst Time for Process -- 1
23
Enter Burst Time for Process -- 2
54
Enter Burst Time for Process -- 3
3
Enter Burst Time for Process -- 4
34
Enter Burst Time for Process -- 5
9
CPU burst Time for processes in nano second -- 23 54 3 34 9
Process Number for CPU burst time           -- 1 2 3 4 5

Calculation for Shortest Job first for processes entered are as follows:
Process     Burst Time          Waiting Time    Turnaround Time
3                3                  0                  3
5                9                  3                  12
1                23                 12                 35
4                34                 35                 69
2                54                 69                 123


Total waiting time = 119
Average waiting time = 23.80
Total Turnaround Time = 242
Average Turnaround Time = 48.40
```