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17BIT0028

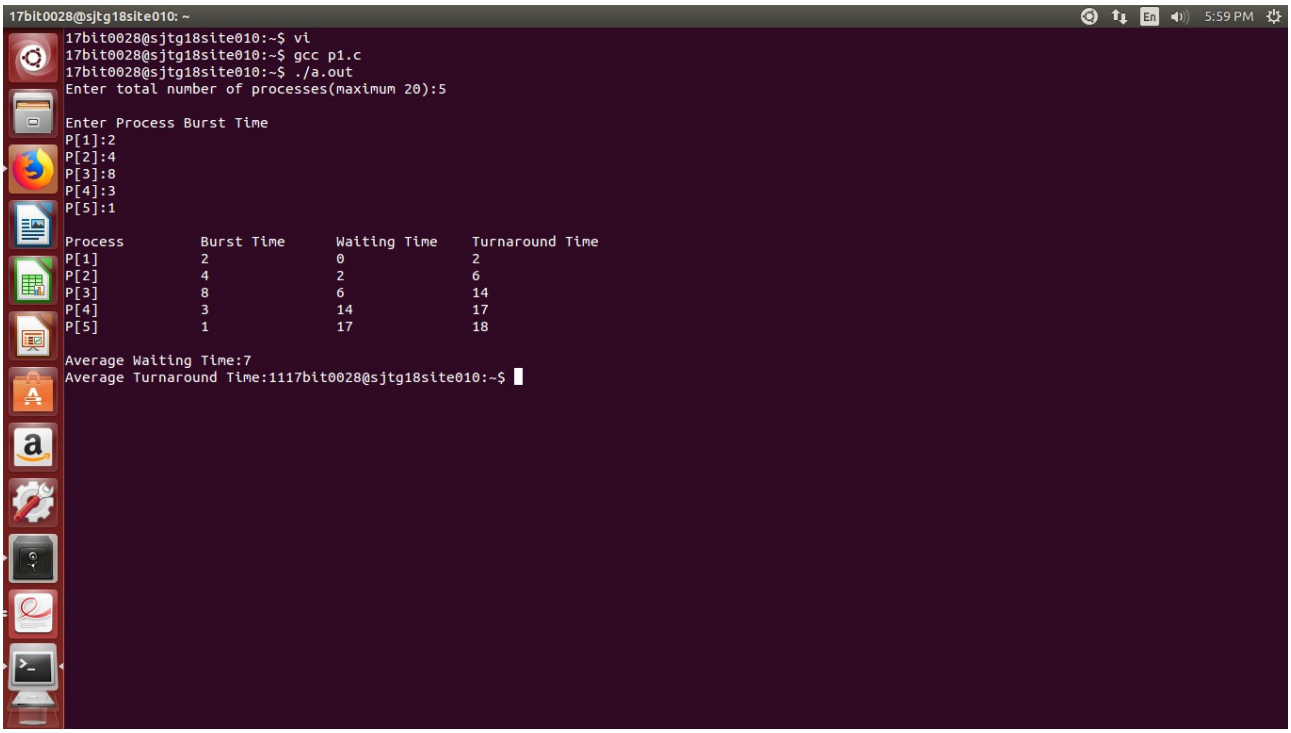
OPERATING SYSTEMS ASSESSMENT-4

NON-PREEMPTIVE

FCFS

```
#include<stdio.h>
int n,bt[20],wt[20],tat[20],avwt=0,avtat=0,i,j;
    printf("Enter total number of processes(maximum 20):");
    scanf("%d",&n);
    printf("\nEnter Process Burst Time\n");
    for(i=0;i<n;i++)
    {
        printf("P[%d]:",i+1);
        scanf("%d",&bt[i]);
    }
    wt[0]=0;    //waiting time for first process is 0
    //calculating waiting time
    for(i=1;i<n;i++)
    {
        wt[i]=0;
        for(j=0;j<i;j++)
            wt[i]+=bt[j];
    }
    printf("\nProcess\t\tBurst Time\tWaiting Time\tTurnaround Time");
    //calculating turnaround time
    for(i=0;i<n;i++)
    {
        tat[i]=bt[i]+wt[i];
        avwt+=wt[i];
        avtat+=tat[i];
        printf("\nP[%d]\t\t%d\t\t%d\t\t%d",i+1,bt[i],wt[i],tat[i]);
```

```
    }
    avwt/=i;
    avtat/=i;
    printf("\n\nAverage Waiting Time:%d",avwt);
    printf("\nAverage Turnaround Time:%d",avtat);
    return 0;
}
```

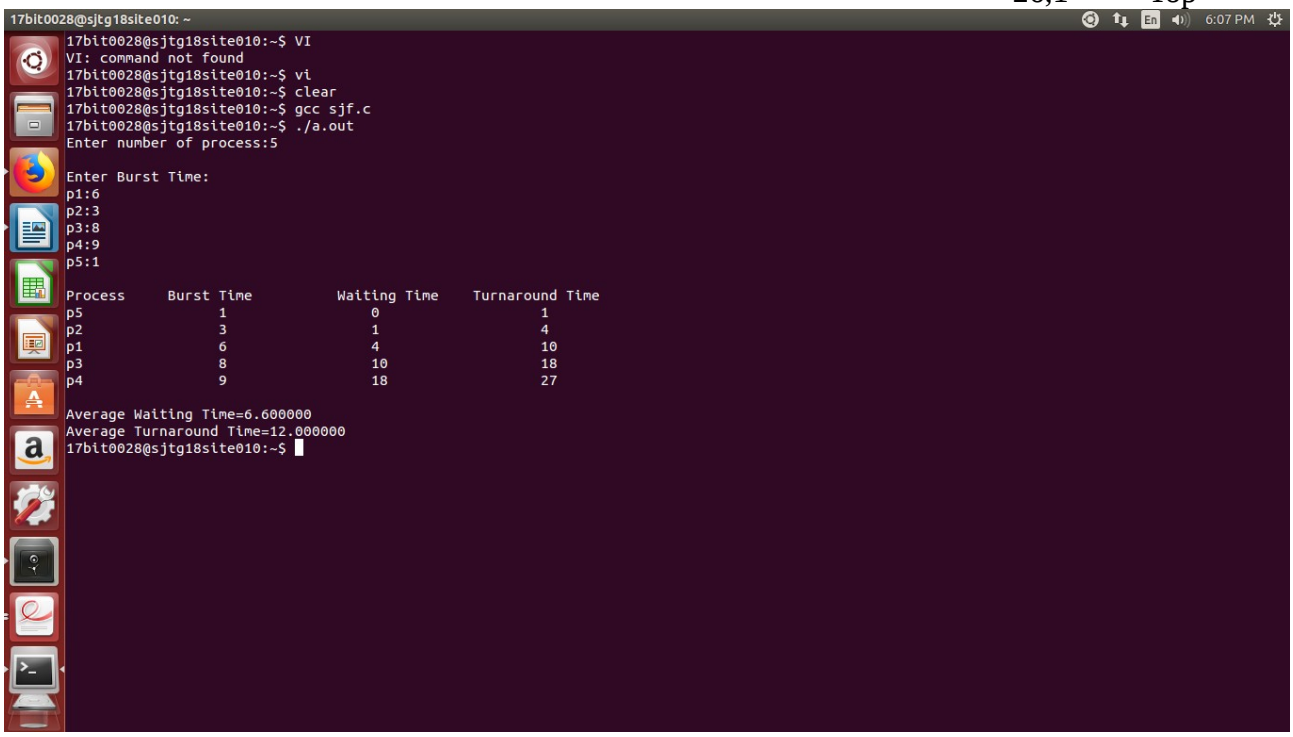


SJF

```
#include<stdio.h>

void main()
{
    int bt[20],p[20],wt[20],tat[20],i,j,n,total=0,pos,temp;
    float avg_wt,avg_tat;
    printf("Enter number of process:");
    scanf("%d",&n);

    printf("\nEnter Burst Time:\n");
    for(i=0;i<n;i++)
    {
        printf("p%d:",i+1);
        scanf("%d",&bt[i]);
        p[i]=i+1;           //contains process number
    }

    //sorting burst time in ascending order using selection sort
    for(i=0;i<n;i++)
    {
        pos=i;
        for(j=i+1;j<n;j++)
        {
            if(bt[j]<bt[pos])
                pos=j;
        }

        temp=bt[i];
        bt[i]=bt[pos];
        bt[pos]=temp;

        temp=p[i];
        p[i]=p[pos];
        p[pos]=temp;
    }

    wt[0]=0;            //waiting time for first process will be zero

     //calculate waiting time
    for(i=1;i<n;i++)
    {
        wt[i]=0;
        for(j=0;j<i;j++)
            wt[i]+=bt[j];

        total+=wt[i];
    }

    avg_wt=(float)total/n;      //average waiting time
```

```
    total=0;

    printf("\nProcess\t    Burst Time    \tWaiting Time\tTurnaround Time");
    for(i=0;i<n;i++)
    {
        tat[i]=bt[i]+wt[i];     //calculate turnaround time
        total+=tat[i];
        printf("\np%d\t\t  %d\t\t    %d\t\t\t%d",p[i],bt[i],wt[i],tat[i]);
    }

    avg_tat=(float)total/n;     //average turnaround time
    printf("\n\nAverage Waiting Time=%f",avg_wt);
    printf("\nAverage Turnaround Time=%f\n",avg_tat);
}
```

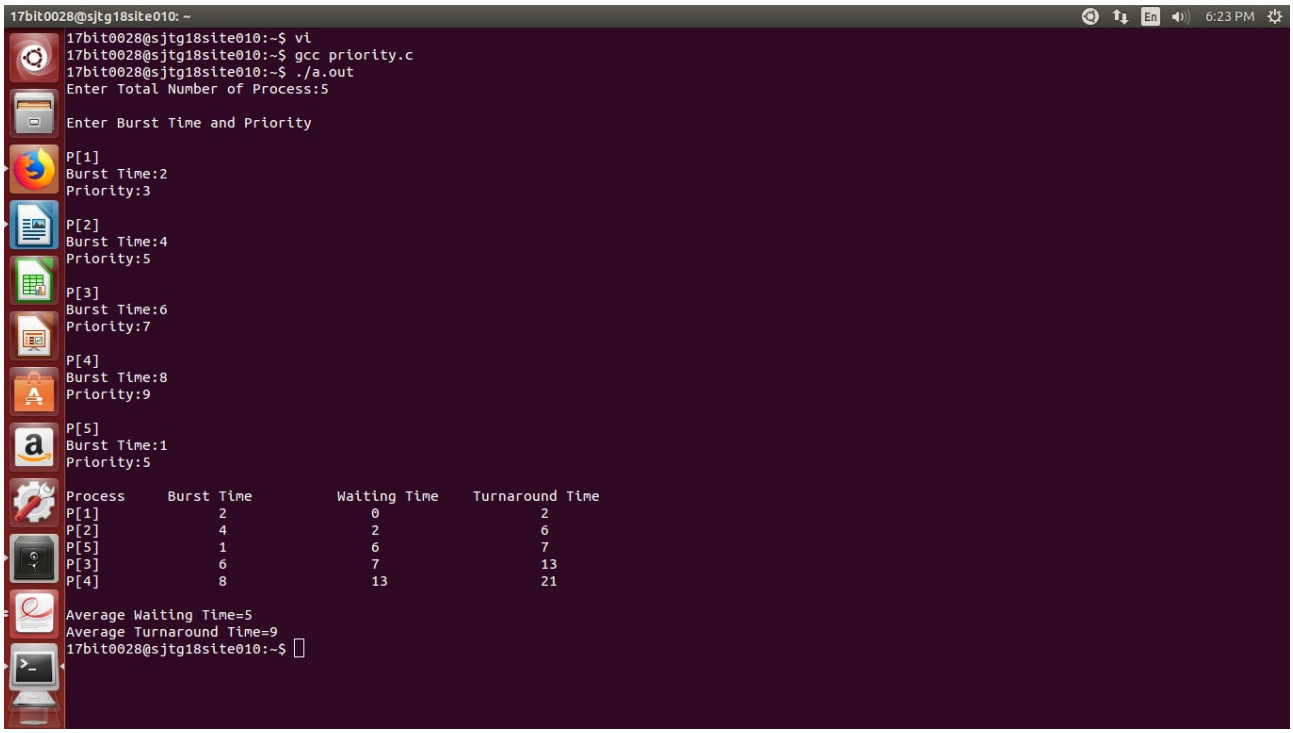
26,1 Top



PRIORITY SCHEDULING

```
#include<stdio.h>
int main()
{
   int bt[20],p[20],wt[20],tat[20],pr[20],i,j,n,total=0,pos,temp,avg_wt,avg_tat;
   printf("Enter Total Number of Process:");
   scanf("%d",&n);

   printf("\nEnter Burst Time and Priority\n");
   for(i=0;i<n;i++)
   {
      printf("\nP[%d]\n",i+1);
      printf("Burst Time:");
      scanf("%d",&bt[i]);
      printf("Priority:");
      scanf("%d",&pr[i]);
      p[i]=i+1;          //contains process number
   }

   //sorting burst time, priority and process number in ascending order using selection sort
   for(i=0;i<n;i++)
   {
      pos=i;
      for(j=i+1;j<n;j++)
      {
         if(pr[j]<pr[pos])
            pos=j;
      }

      temp=pr[i];
      pr[i]=pr[pos];
      pr[pos]=temp;

      temp=bt[i];
      bt[i]=bt[pos];
      bt[pos]=temp;

      temp=p[i];
      p[i]=p[pos];
      p[pos]=temp;
   }

 wt[0]=0;    //waiting time for first process is zero

   //calculate waiting time
   for(i=1;i<n;i++)
   {
      wt[i]=0;
      for(j=0;j<i;j++)
         wt[i]+=bt[j];
```

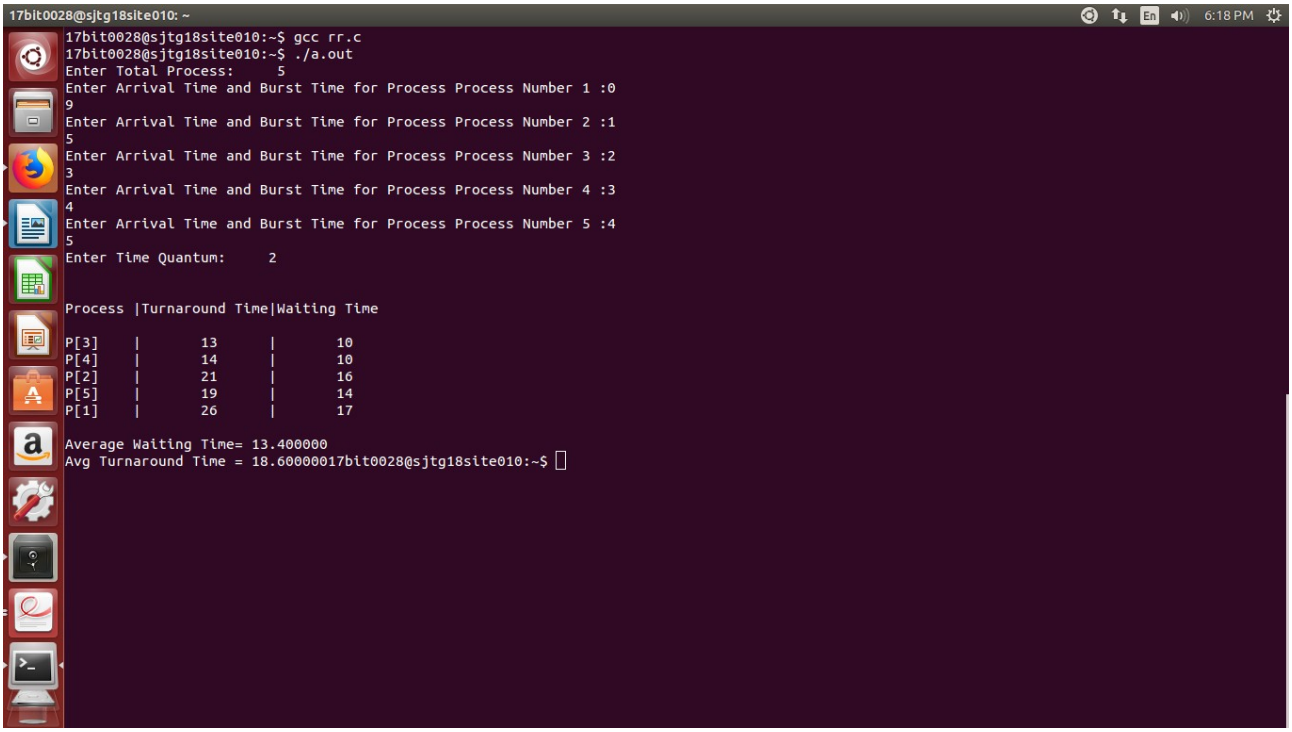
```
        total+=wt[i];
    }

    avg_wt=total/n;      //average waiting time
    total=0;

    printf("\nProcess\t    Burst Time    \tWaiting Time\tTurnaround Time");
    for(i=0;i<n;i++)
    {
        tat[i]=bt[i]+wt[i];     //calculate turnaround time
        total+=tat[i];
        printf("\nP[%d]\t\t  %d\t\t    %d\t\t\t%d",p[i],bt[i],wt[i],tat[i]);
    }

    avg_tat=total/n;     //average turnaround time
    printf("\n\nAverage Waiting Time=%d",avg_wt);
    printf("\nAverage Turnaround Time=%d\n",avg_tat);

    return 0;
}
```



PREEMPTIVE
ROUND ROBIN SCHEDULING

```
#include<stdio.h>
int main()
{

  int count,j,n,time,remain,flag=0,time_quantum;
  int wait_time=0,turnaround_time=0,at[10],bt[10],rt[10];
  printf("Enter Total Process:\t ");
  scanf("%d",&n);
  remain=n;
  for(count=0;count<n;count++)
  {
    printf("Enter Arrival Time and Burst Time for Process Process Number %d :",count+1);
    scanf("%d",&at[count]);
    scanf("%d",&bt[count]);
    rt[count]=bt[count];
  }
  printf("Enter Time Quantum:\t");
  scanf("%d",&time_quantum);
  printf("\n\nProcess\t|Turnaround Time|Waiting Time\n\n");
  for(time=0,count=0;remain!=0;)
  {
    if(rt[count]<=time_quantum && rt[count]>0)
    {
      time+=rt[count];
      rt[count]=0;
      flag=1;
    }
    else if(rt[count]>0)
    {
      rt[count]-=time_quantum;
      time+=time_quantum;
    }
    if(rt[count]==0 && flag==1)
    {
      remain--;
      printf("P[%d]\t|\t%d\t|\t%d\n",count+1,time-at[count],time-at[count]-bt[count]);
      wait_time+=time-at[count]-bt[count];
      turnaround_time+=time-at[count];
      flag=0;
    }
 if(count==n-1)
      count=0;
    else if(at[count+1]<=time)
      count++;
    else
      count=0;
  }
  printf("\nAverage Waiting Time= %f\n",wait_time*1.0/n);
```

```
  printf("Avg Turnaround Time = %f",turnaround_time*1.0/n);
  return 0;
}
```



SJF PREEMPTIVE SCHEDULING

```
#include<stdio.h>
struct process
{
    char process_name;
    int arrival_time, burst_time, ct, waiting_time, turnaround_time, priority;
    int status;
}process_queue[10];

int limit;

void Arrival_Time_Sorting()
{
    struct process temp;
    int i, j;
    for(i = 0; i < limit - 1; i++)
    {
        for(j = i + 1; j < limit; j++)
        {
            if(process_queue[i].arrival_time > process_queue[j].arrival_time)
            {
                temp = process_queue[i];
                process_queue[i] = process_queue[j];
                process_queue[j] = temp;
            }
        }
    }
}

void main()
{
    int i, time = 0, burst_time = 0, largest;
    char c;
    float wait_time = 0, turnaround_time = 0, average_waiting_time, average_turnaround_time;
    printf("\nEnter Total Number of Processes:\t");
    scanf("%d", &limit);
    for(i = 0, c = 'A'; i < limit; i++, c++)
    {
        process_queue[i].process_name = c;
        printf("\nEnter Details For Process[%C]:\n", process_queue[i].process_name);
        printf("Enter Arrival Time:\t");
         scanf("%d", &process_queue[i].arrival_time );
        printf("Enter Burst Time:\t");
        scanf("%d", &process_queue[i].burst_time);
        printf("Enter Priority:\t");
        scanf("%d", &process_queue[i].priority);
        process_queue[i].status = 0;
        burst_time = burst_time + process_queue[i].burst_time;
    }
    Arrival_Time_Sorting();
    process_queue[9].priority = -9999;
```

```
    printf("\nProcess Name\tArrival Time\tBurst Time\tPriority\tWaiting Time");
    for(time = process_queue[0].arrival_time; time < burst_time;)
    {
        largest = 9;
        for(i = 0; i < limit; i++)
        {
            if(process_queue[i].arrival_time <= time && process_queue[i].status != 1 &&
process_queue[i].priority > process_queue[largest].priority)
            {
                largest = i;
            }
        }
        time = time + process_queue[largest].burst_time;
        process_queue[largest].ct = time;
        process_queue[largest].waiting_time = process_queue[largest].ct -
process_queue[largest].arrival_time - process_queue[largest].burst_time;
        process_queue[largest].turnaround_time = process_queue[largest].ct -
process_queue[largest].arrival_time;
        process_queue[largest].status = 1;
        wait_time = wait_time + process_queue[largest].waiting_time;
        turnaround_time = turnaround_time + process_queue[largest].turnaround_time;
        printf("\n%c\t\t%d\t\t%d\t\t%d\t\t%d", process_queue[largest].process_name,
process_queue[largest].arrival_time, process_queue[largest].burst_time,
process_queue[largest].priority, process_queue[largest].waiting_time);
    }
    average_waiting_time = wait_time / limit;
    average_turnaround_time = turnaround_time / limit;
    printf("\n\nAverage waiting time:\t%f\n", average_waiting_time);
    printf("Average Turnaround Time:\t%f\n", average_turnaround_time);
}
```