Ex. No.: 7 a
Date: 02.04.2024

FIRST COME FIRST SERVE

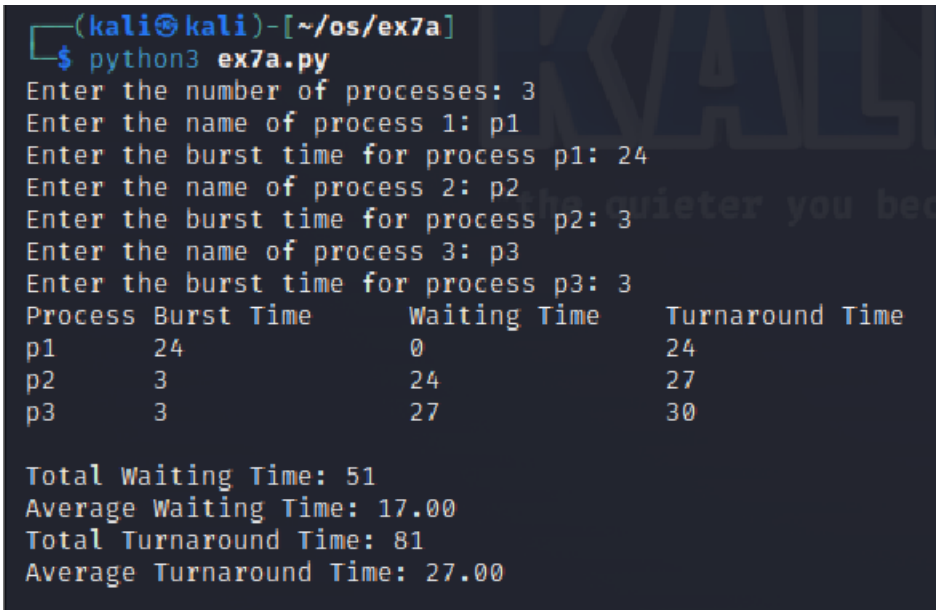
Aim:

To implement First-come First- serve(FCFS) scheduling technique

Program Code:

```
def fcfs_scheduling(processes):
    n = len(processes)
    wait_time = [0] * n
    turnaround_time = [0] * n

    for i in range(1, n):
        wait_time[i] = processes[i-1][1] + wait_time[i-1]

    for i in range(n):
        turnaround_time[i] = processes[i][1] + wait_time[i]

    total_waiting_time = sum(wait_time)
    total_turnaround_time = sum(turnaround_time)

    average_waiting_time = total_waiting_time / n
    average_turnaround_time = total_turnaround_time / n

    print("Process\tBurst Time\tWaiting Time\tTurnaround Time")
    for i in range(n):
        print(f"{processes[i][0]}\t{processes[i][1]}\t\t{wait_time[i]}\t\t{turnaround_time[i]}")

    print(f"\nTotal Waiting Time: {total_waiting_time}")
    print(f"Average Waiting Time: {average_waiting_time:.2f}")
    print(f"Total Turnaround Time: {total_turnaround_time}")
    print(f"Average Turnaround Time: {average_turnaround_time:.2f}")

num_processes = int(input("Enter the number of processes: "))

processes = []
for i in range(num_processes):
    process_name = input(f"Enter the name of process {i+1}: ")
    burst_time = int(input(f"Enter the burst time for process {process_name}: "))
    processes.append((process_name, burst_time))

fcfs_scheduling(processes)
```

Output:



Result:

The above program executed successfully and output got verified.

Ex. No.: 7b
Date: 06.04.2024

SHORTEST JOB FIRST

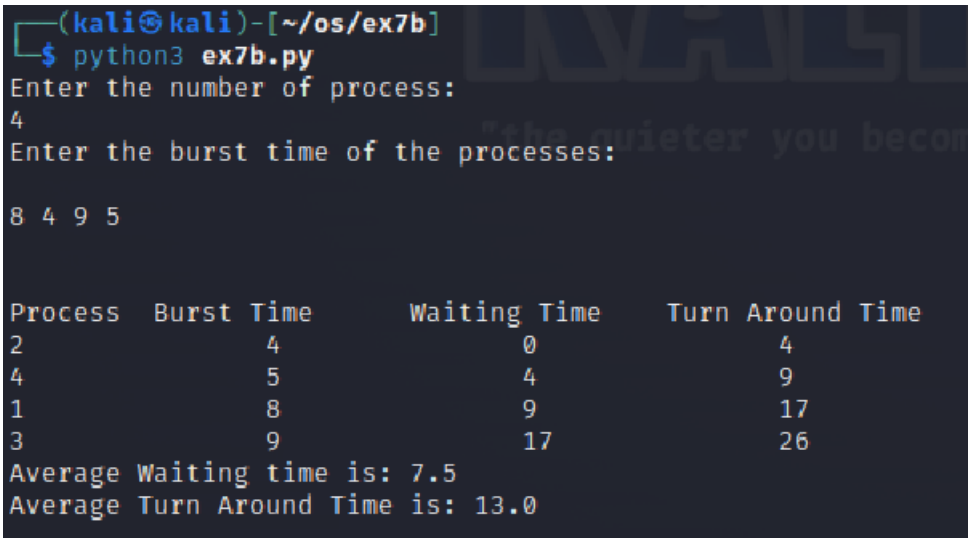
Aim:

To implement the Shortest Job First(SJF) scheduling technique

Program Code:

```
bt=[]
print("Enter the number of process: ")
n=int(input())
processes=[]
for i in range(0,n):
    processes.insert(i,i+1)
print("Enter the burst time of the processes: \n")
bt=list(map(int, input().split()))
for i in range(0,len(bt)-1):
    for j in range(0,len(bt)-i-1):
        if(bt[j]>bt[j+1]):
            temp=bt[j]
            bt[j]=bt[j+1]
            bt[j+1]=temp
            temp=processes[j]
            processes[j]=processes[j+1]
            processes[j+1]=temp
wt = []
avgwt = 0
tat = []
avgtat = 0
wt.insert(0,0)
tat.insert(0,bt[0])
for i in range(1,len(bt)):
    wt.insert(i,wt[i-1]+bt[i-1])
    tat.insert(i,wt[i]+bt[i])
    avgwt+=wt[i]
    avgtat+=tat[i]
avgwt=float(avgwt)/n
avgtat=float(avgtat)/n
print("\n")
print("Process\t Burst Time\t Waiting Time\t Turn Around Time")
for i in range(0,n):
    print(str(processes[i])+"\t\t"+str(bt[i])+"\t\t"+str(wt[i])+"\t\t"+str(tat[i]))
print("Average Waiting time is: "+str(avgwt))
print("Average Turn Around Time is: "+str(avgtat))
```

Output:



Result:

The above program executed successfully and output got verified.

Ex. No.: 7 c
Date: 06.04.2024

PRIORITY SCHEDULING

Aim:

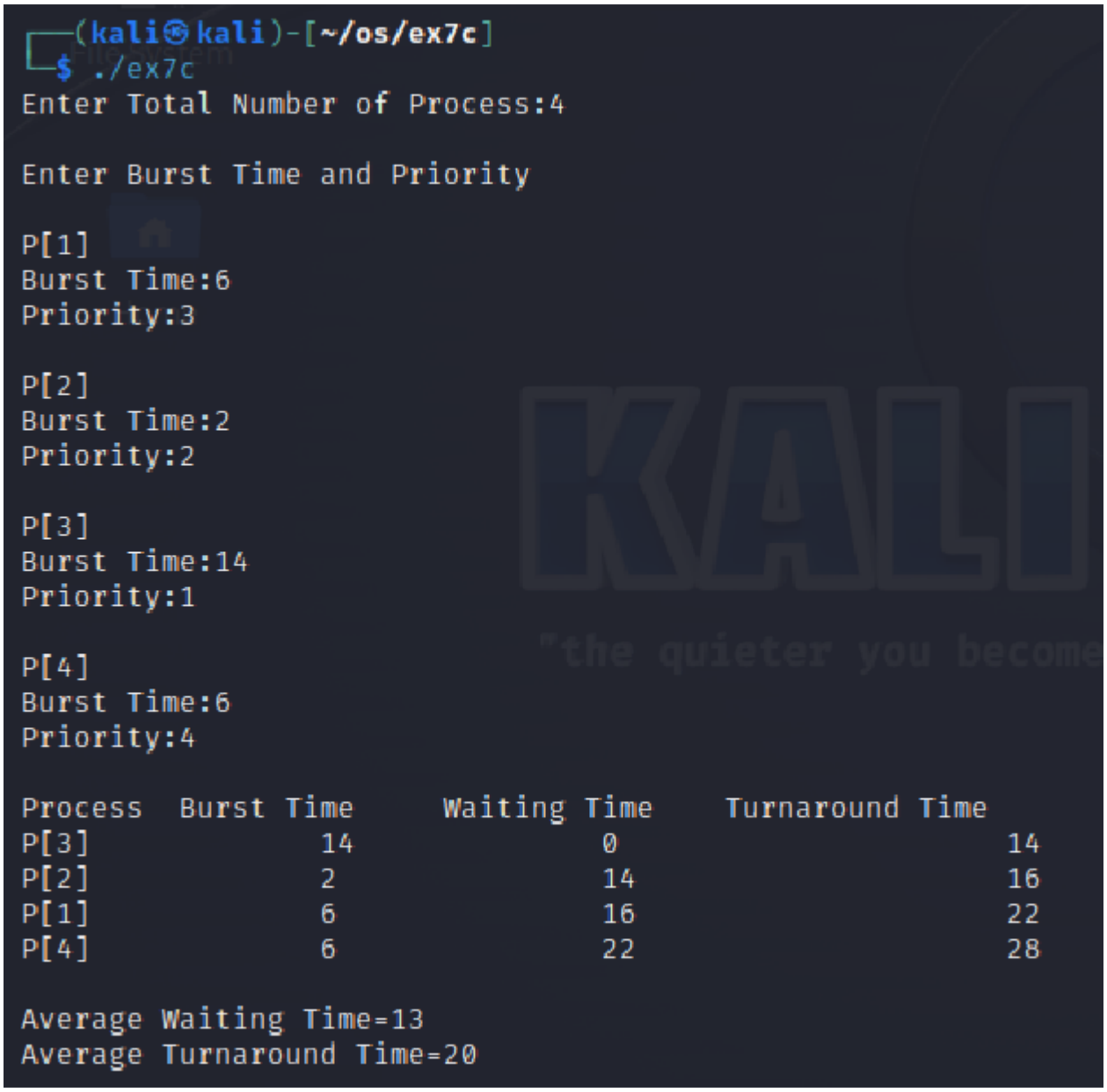
To implement priority scheduling technique

Program Code:

```
#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\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;
}
```

Output:



Result:

The above program executed successfully and output got verified.

Ex. No.: 7d
Date 08.04.2024

ROUND ROBIN SCHEDULING

Aim:

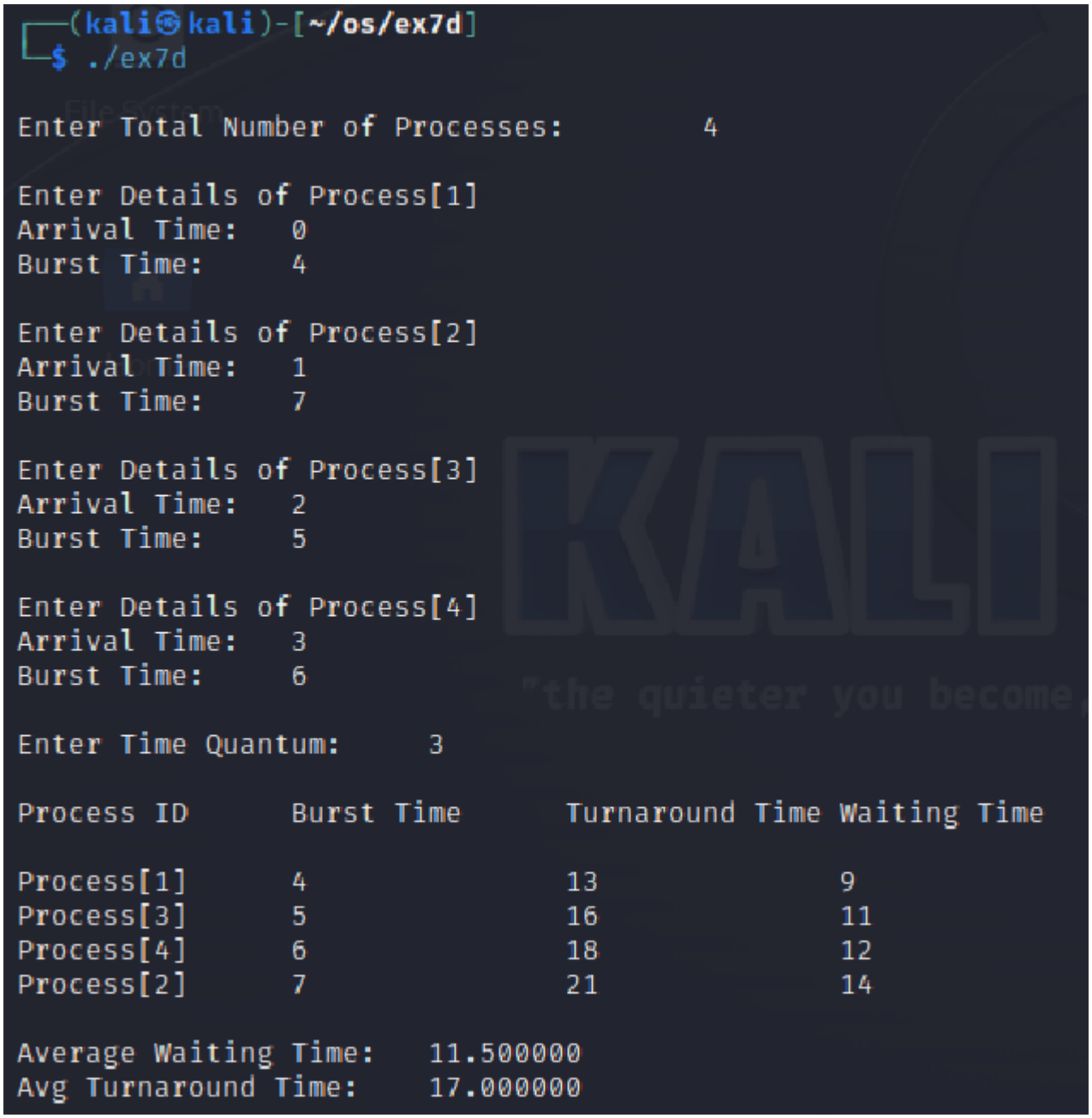
To implement the Round Robin (RR) scheduling technique

Program Code:

```
#include <stdio.h>

int main() {
   int i, limit, total = 0, x, counter = 0, time_quantum;
   int wait_time = 0, turnaround_time = 0, arrival_time[10], burst_time[10], temp[10];
   float average_wait_time, average_turnaround_time;

   printf("\nEnter Total Number of Processes:\t");
   scanf("%d", &limit);
   x = limit;

   for (i = 0; i < limit; i++) {
      printf("\nEnter Details of Process[%d]\n", i + 1);
      printf("Arrival Time:\t");
      scanf("%d", &arrival_time[i]);
      printf("Burst Time:\t");
      scanf("%d", &burst_time[i]);
      temp[i] = burst_time[i];
   }

   printf("\nEnter Time Quantum:\t");
   scanf("%d", &time_quantum);

   printf("\nProcess ID\tBurst Time\tTurnaround Time\tWaiting Time\n");

   for (total = 0, i = 0; x != 0;) {
      if (temp[i] <= time_quantum && temp[i] > 0) {
         total = total + temp[i];
         temp[i] = 0;
         counter = 1;
      } else if (temp[i] > 0) {
         temp[i] = temp[i] - time_quantum;
         total = total + time_quantum;
      }

      if (temp[i] == 0 && counter == 1) {
         x--;
         printf("\nProcess[%d]\t%d\t\t%d\t\t%d", i + 1, burst_time[i], total - arrival_time[i], total -
```

```
arrival_time[i] - burst_time[i]);
            wait_time = wait_time + total - arrival_time[i] - burst_time[i];
            turnaround_time = turnaround_time + total - arrival_time[i];
            counter = 0;
        }

        if (i == limit - 1) {
            i = 0;
        } else if (arrival_time[i + 1] <= total) {
            i++;
        } else {
            i = 0;
        }
    }

    average_wait_time = wait_time * 1.0 / limit;
    average_turnaround_time = turnaround_time * 1.0 / limit;

    printf("\n\nAverage Waiting Time:\t%f", average_wait_time);
    printf("\nAvg Turnaround Time:\t%f\n", average_turnaround_time);

    return 0;
}
```

Output:



Result:

The above program executed successfully and output got verified.