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**CSE 321 Lab 4:**

**Task 1:**

print("Enter no of process:")

n=int(input())

arrival\_time=[]

burst\_time=[]

complete\_time=[0]\*n

turnaround\_time=[0]\*n

waiting\_time=[0]\*n

burst\_remaining=[]

f=[0]\*n

st=0

tot=0

for i in range(n):

print("Enter Arrival Time of Process",i+1)

arrival\_time.append(int(input()))

print("Enter Burst Time of Process",i+1)

burst\_time.append(int(input()))

burst\_remaining=burst\_time.copy()

while(True):

c=n

minm=999

if tot==n:

break

for i in range(n):

if(arrival\_time[i]<=st and f[i]==0):

if burst\_remaining[i]<minm:

minm=burst\_remaining[i]

c=i

if burst\_remaining[i]==minm:

if(arrival\_time[i]<arrival\_time[c]):

minm=burst\_remaining[i]

c=i

if c==n:

st+=1

else:

burst\_remaining[c]=burst\_remaining[c]-1

st+=1

if(burst\_remaining[c]==0):

complete\_time[c]=st

turnaround\_time[c]=complete\_time[c]-arrival\_time[c]

waiting\_time[c]=turnaround\_time[c]-burst\_time[c]

f[c]=1

tot+=1

for i in range(1,n+1):

if i==1:

print("Completion Time of Process",i,":",complete\_time[i-1],end=", ")

elif i==n:

print("Process",i,":",complete\_time[i-1])

else:

print("Process",i,":",complete\_time[i-1],end=", ")

for i in range(1,n+1):

if i==1:

print("Turnaround Time of Process",i,":",turnaround\_time[i-1],end=", ")

elif i==n:

print("Process",i,":",turnaround\_time[i-1])

else:

print("Process",i,":",turnaround\_time[i-1],end=", ")

for i in range(1,n+1):

if i==1:

print("Waiting Time of Process",i,":",waiting\_time[i-1],end=", ")

elif i==n:

print("Process",i,":",waiting\_time[i-1])

else:

print("Process",i,":",waiting\_time[i-1],end=", ")

print("Average Turnaround Time:",sum(turnaround\_time)/n)

print("Average Waiting Time:",sum(waiting\_time)/n)

**Task 2:**

print("Enter no of process:")

n=int(input())

arrival\_time=[]

burst\_time=[]

complete\_time=[0]\*n

turnaround\_time=[0]\*n

waiting\_time=[0]\*n

burst\_remaining=[]

priority=[]

f=[0]\*n

st=0

tot=0

for i in range(n):

print("Enter Arrival Time of Process",i+1)

arrival\_time.append(int(input()))

print("Enter Burst Time of Process",i+1)

burst\_time.append(int(input()))

print("Enter Priority of Process",i+1)

priority.append(int(input()))

burst\_remaining=burst\_time.copy()

while(True):

c=n

minm=999

if tot==n:

break

for i in range(n):

if(arrival\_time[i]<=st and f[i]==0):

if priority[i]<minm:

minm=priority[i]

c=i

if priority[i]==minm:

if(priority[i]<arrival\_time[c]):

minm=priority[i]

c=i

if c==n:

st+=1

else:

burst\_remaining[c]=burst\_remaining[c]-1

st+=1

if(burst\_remaining[c]==0):

complete\_time[c]=st

turnaround\_time[c]=complete\_time[c]-arrival\_time[c]

waiting\_time[c]=turnaround\_time[c]-burst\_time[c]

f[c]=1

tot+=1

for i in range(1,n+1):

if i==1:

print("Completion Time of Process",i,":",complete\_time[i-1],end=", ")

elif i==n:

print("Process",i,":",complete\_time[i-1])

else:

print("Process",i,":",complete\_time[i-1],end=", ")

for i in range(1,n+1):

if i==1:

print("Turnaround Time of Process",i,":",turnaround\_time[i-1],end=", ")

elif i==n:

print("Process",i,":",turnaround\_time[i-1])

else:

print("Process",i,":",turnaround\_time[i-1],end=", ")

for i in range(1,n+1):

if i==1:

print("Waiting Time of Process",i,":",waiting\_time[i-1],end=", ")

elif i==n:

print("Process",i,":",waiting\_time[i-1])

else:

print("Process",i,":",waiting\_time[i-1],end=", ")

print("Average Turnaround Time:",sum(turnaround\_time)/n)

print("Average Waiting Time:",sum(waiting\_time)/n)

**Task 3:**

print("Enter no of process:")

n=int(input())

print("Enter time quantum:")

tq=int(input())

arrival\_time=[]

burst\_time=[]

complete\_time=[0]\*n

turnaround\_time=[0]\*n

waiting\_time=[0]\*n

burst\_remaining=[]

f=[0]\*n

st=0

tot=0

q=[]

q.append(0)

f[0]=1

for i in range(n):

print("Enter Arrival Time of Process",i+1)

arrival\_time.append(int(input()))

print("Enter Burst Time of Process",i+1)

burst\_time.append(int(input()))

burst\_remaining=burst\_time.copy()

while(True):

if tot==n:

break

c=q[0]

q.pop(0)

if burst\_remaining[c]-tq>0:

burst\_remaining[c]=burst\_remaining[c]-tq

st+=tq

complete\_time[i]

else:

st+=burst\_remaining[c]

burst\_remaining[c]=0

tot+=1

complete\_time[c]=st

turnaround\_time[c]=complete\_time[c]-arrival\_time[c]

waiting\_time[c]=turnaround\_time[c]-burst\_time[c]

for i in range(n):

if burst\_remaining[i]>0 and arrival\_time[i]<=st and f[i]==0:

q.append(i)

f[i]=1

if burst\_remaining[c]>0:

q.append(c)

if len(q)==0:

for i in range(n):

if burst\_remaining[i]>0:

q.append(i)

f[i]=1

break

for i in range(1,n+1):

if i==1:

print("Completion Time of Process",i,":",complete\_time[i-1],end=", ")

elif i==n:

print("Process",i,":",complete\_time[i-1])

else:

print("Process",i,":",complete\_time[i-1],end=", ")

for i in range(1,n+1):

if i==1:

print("Turnaround Time of Process",i,":",turnaround\_time[i-1],end=", ")

elif i==n:

print("Process",i,":",turnaround\_time[i-1])

else:

print("Process",i,":",turnaround\_time[i-1],end=", ")

for i in range(1,n+1):

if i==1:

print("Waiting Time of Process",i,":",waiting\_time[i-1],end=", ")

elif i==n:

print("Process",i,":",waiting\_time[i-1])

else:

print("Process",i,":",waiting\_time[i-1],end=", ")

print("Average Turnaround Time:",sum(turnaround\_time)/n)

print("Average Waiting Time:",sum(waiting\_time)/n)