# CPU scheduling algorithms

1. **FCFS**

#include<stdio.h> int main()

{

int bt[20], wt[20], tat[20], i, n; float wtavg, tatavg;

printf("\nEnter the number of processes -- "); scanf("%d", &n);

for(i=0;i<n;i++)

{

printf("\nEnter Burst Time for Process %d -- ", i); scanf("%d", &bt[i]);

}

wt[0] = wtavg = 0; tat[0] = tatavg = bt[0]; for(i=1;i<n;i++)

{

wt[i] = wt[i-1] +bt[i-1];

tat[i] = tat[i-1] +bt[i]; wtavg = wtavg + wt[i]; tatavg = tatavg + tat[i];

}

printf("\t PROCESS \tBURST TIME \t WAITING TIME\t TURNAROUND TIME\n");

for(i=0;i<n;i++)

printf("\n\t P%d \t\t %d \t\t %d \t\t %d", i, bt[i], wt[i], tat[i]); printf("\nAverage Waiting Time -- %f", wtavg/n); printf("\nAverage Turnaround Time -- %f", tatavg/n); return 0;

}

1. **SJF (Non-Pre-emptive)**

#include<stdio.h> int main()

{

int p[20], bt[20], wt[20], tat[20], i, k, n, temp; float wtavg, tatavg;

printf("\nEnter the number of processes -- "); scanf("%d", &n);

for(i=0;i<n;i++)

{

p[i]=i;

printf("Enter Burst Time for Process %d -- ", i); scanf("%d", &bt[i]);

}

for(i=0;i<n;i++) for(k=i+1;k<n;k++) if(bt[i]>bt[k])

{

temp=bt[i]; bt[i]=bt[k]; bt[k]=temp;

temp=p[i]; p[i]=p[k]; p[k]=temp;

}

wt[0] = wtavg = 0;

tat[0] = tatavg = bt[0]; for(i=1;i<n;i++)

{

wt[i] = wt[i-1] +bt[i-1];

tat[i] = tat[i-1] +bt[i]; wtavg = wtavg + wt[i]; tatavg = tatavg + tat[i];

}

printf("\n\t PROCESS \tBURST TIME \t WAITING TIME\t TURNAROUND TIME\n");

for(i=0;i<n;i++)

printf("\n\t P%d \t\t %d \t\t %d \t\t %d", p[i], bt[i], wt[i], tat[i]); printf("\nAverage Waiting Time -- %f", wtavg/n); printf("\nAverage Turnaround Time -- %f", tatavg/n);

return 0;

}

## When Arrival Time is User should provide in SJF:

#include<stdio.h>

int main(){

int p[20], bt[20],at[20],wt[20],tat[20],i,n,k,temp; float wtavg,tatavg;

printf("Enter the no of process --"); scanf("%d",&n);

for(i=0;i<n;i++)

{

p[i]=i;

printf("Enter the Arrival time for process %d --",i);

scanf("%d",&at[i]);

}

for(i=0;i<n;i++)

{

p[i]=i;

printf("Enter the Burst time for process %d --",i); scanf("%d",&bt[i]);

}

for(i=0;i<n;i++) for(k=i+1;k<n;k++) if(bt[i]>bt[k])

{

temp=bt[i]; bt[i]=bt[k]; bt[k]=temp;

temp=p[i]; p[i]=p[k]; p[k]=temp;

}

wt[0]=wtavg=0; tat[0]=tatavg=bt[0]; for(i=1;i<n;i++){

wt[i]=wt[i-1]+bt[i-1];

tat[i]=wt[i]+bt[i]; wtavg=wtavg+wt[i]; tatavg=tatavg+tat[i];

}

printf("\t PROCESS\tARRIVAL TIME\tBURST TIME\t WAITING TIME\t TURN AROUNT TIME\n");

for(i=0;i<n;i++) printf("\n\tP%d\t\t%d\t\t%d\t\t%d\t\t%d",i,at[i],bt[i],wt[i],tat[i]);

printf("\n Average waiting time -- %f",wtavg/n); printf("\n Average Turn Around Time -- %f",tatavg/n);

return 0;

}

**SRTF:**

#include<stdio.h>

int main(){

int p[20], bt[20],at[20],wt[20],tat[20],i,n,k,temp;

float wtavg,tatavg;

printf("Enter the no of process --");

scanf("%d",&n);

for(i=0;i<n;i++)

{

p[i]=i;

printf("Enter the Arrival time for process %d --",i);

scanf("%d",&at[i]);

}

for(i=0;i<n;i++)

{

p[i]=i;

printf("Enter the Burst time for process %d --",i);

scanf("%d",&bt[i]);

}

// Sort processes based on arrival time

for(i=0;i<n;i++)

for(k=i+1;k<n;k++)

if(at[i]>at[k])

{

temp=at[i]; at[i]=at[k]; at[k]=temp;

temp=bt[i]; bt[i]=bt[k]; bt[k]=temp;

temp=p[i]; p[i]=p[k]; p[k]=temp;

}

int time = 0;

int completed = 0;

while(completed < n) {

int min\_bt = 1000;

int min\_index = -1;

for(i=0;i<n;i++) {

if(at[i] <= time && bt[i] < min\_bt && bt[i] > 0) {

min\_bt = bt[i];

min\_index = i;

}

}

if(min\_index != -1) {

bt[min\_index]--;

time++;

if(bt[min\_index] == 0) {

completed++;

wt[min\_index] = time - at[min\_index] - min\_bt;

tat[min\_index] = time - at[min\_index];

}

} else {

time++;

}

}

wtavg = 0;

tatavg = 0;

for(i=0;i<n;i++) {

wtavg += wt[i];

tatavg += tat[i];

}

printf("\t PROCESS\tARRIVAL TIME\tBURST TIME\t WAITING TIME\t TURN AROUNT TIME\n");

for(i=0;i<n;i++)

printf("\n\tP%d\t\t%d\t\t%d\t\t%d\t\t%d",p[i],at[i],bt[i],wt[i],tat[i]);

printf("\n Average waiting time -- %f",wtavg/n);

printf("\n Average Turn Around Time -- %f",tatavg/n);

return 0;

}

# Round Robin:

#include<stdio.h>

int main(){

int p[20], bt[20], at[20], wt[20], tat[20], rt[20], i, n, k, temp, t, q; float wtavg, tatavg;

printf("Enter the no of process --"); scanf("%d",&n);

for(i=0;i<n;i++)

{

p[i]=i;

printf("Enter the Arrival time for process %d --",i); scanf("%d",&at[i]);

}

for(i=0;i<n;i++)

{

p[i]=i;

printf("Enter the Burst time for process %d --",i); scanf("%d",&bt[i]);

rt[i] = bt[i]; // initialize remaining time

}

printf("Enter the time quantum --"); scanf("%d",&q);

t = 0;

while(1) {

int flag = 0; for(i=0;i<n;i++) {

if(at[i] <= t && rt[i] > 0) {

if(rt[i] > q) {

rt[i] -= q; t += q;

else {

}

t += rt[i];

rt[i] = 0;

flag = 1;

}

}

}

if(flag == 0) t++;

int all\_done = 1; for(i=0;i<n;i++) {

if(rt[i] > 0) { all\_done = 0; break;

}

}

if(all\_done) break;

}

wtavg = tatavg = 0; for(i=0;i<n;i++) {

tat[i] = t - at[i];

wt[i] = tat[i] - bt[i]; wtavg += wt[i]; tatavg += tat[i];

}

printf("\t PROCESS\tARRIVAL TIME\tBURST TIME\t WAITING TIME\t TURN AROUNT TIME\n");

for(i=0;i<n;i++) printf("\n\tP%d\t\t%d\t\t%d\t\t%d\t\t%d",i,at[i],bt[i],wt[i],tat[i]);

printf("\n Average waiting time -- %f",wtavg/n); printf("\n Average Turn Around Time -- %f",tatavg/n);

return 0;

}

## Priority:

#include<stdio.h>

int main(){

int p[20], bt[20], at[20], pr[20], wt[20], tat[20], i, n, k, temp, t; float wtavg, tatavg;

printf("Enter the no of process --"); scanf("%d",&n);

for(i=0;i<n;i++)

{

p[i]=i;

printf("Enter the Arrival time for process %d --",i); scanf("%d",&at[i]);

}

for(i=0;i<n;i++)

{

p[i]=i;

printf("Enter the Burst time for process %d --",i); scanf("%d",&bt[i]);

}

for(i=0;i<n;i++)

{

p[i]=i;

printf("Enter the Priority for process %d --",i); scanf("%d",&pr[i]);

}

// Sorting based on priority in descending order (higher priority first) for(i=0;i<n;i++)

{

for(k=i+1;k<n;k++)

{

if(pr[i] < pr[k])

{

temp = p[i]; p[i] = p[k]; p[k] = temp;

temp = at[i]; at[i] = at[k]; at[k] = temp;

temp = bt[i]; bt[i] = bt[k]; bt[k] = temp;

temp = pr[i]; pr[i] = pr[k]; pr[k] = temp;

}

}

}

t = 0;

wtavg = tatavg = 0; for(i=0;i<n;i++)

{

t += bt[i]; tat[i] = t - at[i];

wt[i] = tat[i] - bt[i]; wtavg += wt[i]; tatavg += tat[i];

}

printf("\t PROCESS\tARRIVAL TIME\tBURST TIME\tPRIORITY\t WAITING TIME\t TURN AROUNT TIME\n");

for(i=0;i<n;i++) printf("\n\tP%d\t\t%d\t\t%d\t\t%d\t\t%d\t\t%d",p[i],at[i],bt[i],pr[i],wt[i],tat[i]);

printf("\n Average waiting time -- %f",wtavg/n); printf("\n Average Turn Around Time -- %f",tatavg/n);

return 0;

}