#include<stdio.h>

#include<string.h>

#include<stdlib.h>

typedef struct

{

char ppid[10];

int at;

int bt;

int wt,tat,rt;

}proces;

typedef struct

{

char ppid[100];

int start,end;

}gantt;

void input(proces \*p,int n);

void schedule\_fcfs(proces \*p,int n);

void schedule\_sjf\_np(proces \*p,int n);

void schedule\_sjf\_p(proces \*p,int n);

void display(proces \*p,int n);

int smallest\_process(proces \*p,int n);

void main()

{

proces \*p;

int n;

int ch=0;

char cho;

while(ch!=3)

{

printf(" 1.FCFS \n 2.SJF\n 3.EXIT\n\n Choice : ");

scanf("%d",&ch);

if(ch==1)

{

printf("Enter the no. of proceses : ");

scanf("%d",&n);

p=(proces\*)malloc(sizeof(proces)\*n);

input(p,n);

schedule\_fcfs(p,n);

display(p,n);

free(p);

}

else if(ch==2)

{

printf("\ta.Non-preemtive \n\tb.Preemtive\n\tChoice : ");

scanf(" %c",&cho);

if(cho=='a')

{

printf("Enter the no. of proceses : ");

scanf("%d",&n);

p=(proces\*)malloc(sizeof(proces)\*n);

input(p,n);

schedule\_sjf\_np(p,n);

display(p,n);

free(p);

}

else if(cho=='b')

{

printf("Enter the no. of proceses : ");

scanf("%d",&n);

p=(proces\*)malloc(sizeof(proces)\*n);

input(p,n);

schedule\_sjf\_p(p,n);

display(p,n);

free(p);

}

}

}

}

void input(proces \*p,int n)

{

int i;

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

{

printf("\n\nEnter proces %d\n",i+1);

printf("Enter proces id : ");

scanf("%s",p[i].ppid);

printf("Enter arrival time : ");

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

printf("Enter burst time : ");

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

}

}

void schedule\_fcfs(proces \*t,int n)

{

proces p[n];

int i,j,a=-1;

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

{

if(t[i].at>a)

a=t[i].at;

}

int k=0;

proces \*temp;

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

{

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

{

if(t[j].at==i)

{

p[k]=t[j];

k++;

if(k>=n)

break;

}

}

}

int gun[20];

k=0;

gun[k]=p[0].at;

k++;

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

{

if(gun[k-1]>=p[i].at)

{

gun[k]=p[i].bt+gun[k-1];

k++;

}

else

{

gun[k]=p[i].at;

k++;

gun[k]=p[i].bt+gun[k-1];

k++;

}

p[i].wt=gun[k-2]-p[i].at;

if(p[i].wt<0)

p[i].wt=0;

p[i].tat=gun[k-1]-p[i].at;

p[i].rt=p[i].wt;

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

{

if(!strcmp(p[i].ppid,t[j].ppid))

{

t[j]=p[i];

}

}

}

printf("\n\n \t GANTT CHART\n\n\t : ");

k=0;

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

{

if(gun[k]>=p[i].at)

{

printf("%d %s %d : ",gun[k],p[i].ppid,gun[k+1]);

k++;

}

else

{

printf("%d idle %d : ",gun[k],gun[k+1]);

k++;

i-=1;

}

}

printf("\n\n");

}

void schedule\_sjf\_np(proces \*t,int n)

{

proces p[n],\*temp;

int i,j,k=0,m=0,flag[n];

int a=0,b=0;

char f[10];

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

{

flag[i]=0;

if(t[i].bt>b)

b=t[i].bt;

}

while(k<n)

{

printf("a: %d\n",a);

temp=(proces\*)malloc(sizeof(proces)\*n);

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

{

if(t[i].at<=a && flag[i]==0)

{

temp[m]=t[i];

m++;

}

}

if(m==0)

a++;

for(j=0;j<=b;j++)

{

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

{

if(temp[i].bt==j)

{

p[k]=temp[i];

k++;

strcpy(f,temp[i].ppid);

a+=temp[i].bt;

goto loop;

}

}

}

loop:

m=0;

free(temp);

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

{

if(!strcmp(f,t[i].ppid))

{

flag[i]=1;

}

}

}

int gun[20];

k=0;

gun[k]=p[0].at;

k++;

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

{

if(gun[k-1]>=p[i].at)

{

gun[k]=p[i].bt+gun[k-1];

k++;

}

else

{

gun[k]=p[i].at;

k++;

gun[k]=p[i].bt+gun[k-1];

k++;

}

p[i].wt=gun[k-2]-p[i].at;

if(p[i].wt<0)

p[i].wt=0;

p[i].tat=gun[k-1]-p[i].at;

p[i].rt=p[i].wt;

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

{

if(!strcmp(p[i].ppid,t[j].ppid))

{

t[j]=p[i];

}

}

}

printf("\n\n \t GANTT CHART\n\n\t : ");

k=0;

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

{

if(gun[k]>=p[i].at)

{

printf("%d %s %d : ",gun[k],p[i].ppid,gun[k+1]);

k++;

}

else

{

printf("%d idle %d : ",gun[k],gun[k+1]);

k++;

i-=1;

}

}

printf("\n\n");

}

void schedule\_sjf\_p(proces \*t,int n)

{

proces p[n];

int i,j,a=-1,b=0;

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

{

if(t[i].at>a)

a=t[i].at;

t[i].wt=0;

t[i].rt=-1;

t[i].tat=0;

}

int k=0;

proces temp[n];

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

{

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

{

if(t[j].at==i)

{

temp[k]=t[j];

k++;

if(k>=n)

break;

}

}

}

k=0;

int max=temp[0].at;

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

{

if(t[i].at>max)

max=t[i].at;

max+=t[i].bt;

}

int gun[100],count=0,stop=0,index;

a=0;

proces temporary[n],small,previous;

j=0;

proces idle;

strcpy(idle.ppid,"idle");

idle.at=-1;

idle.bt=-1;

int f=0;

gantt g[100];

printf("\t\t GANTT CHART\n\t");

while(a<max)

{

j=0;

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

{

if(temp[i].at<=a && temp[i].bt>0)

{

temporary[j]=temp[i];

j++;

}

}

if(j==0)

{

small=idle;

}

else

{

index=smallest\_process(temporary,j);

small=temporary[index];

}

gun[count]=a;

count++;

if(strcmp(previous.ppid,small.ppid))

{

printf(" : %d %s ",gun[count-1],small.ppid);

strcpy(g[f].ppid,small.ppid);

g[f].start=gun[count-1];

}

a++;

previous=small;

if(j!=0)

{

temporary[index].bt--;

for(k=0;k<j;k++)

{

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

{

if(!strcmp(temporary[k].ppid,temp[i].ppid))

{

temp[i]=temporary[k];

}

}

}

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

{

if(strcmp(temp[i].ppid,small.ppid))

temp[i].wt++;

else if(temporary[index].bt==0)

{

temp[i].tat=a-temp[i].at;

}

}

}

j=0;

b=temp[0].bt;

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

{

if(temp[i].at<=a && temp[i].bt>0)

{

temporary[j]=temp[i];

j++;

}

}

if(j==0)

{

small=idle;

}

else

{

index=smallest\_process(temporary,j);

small=temporary[index];

}

gun[count]=a;

count++;

if(strcmp(previous.ppid,small.ppid))

{

printf("%d :",gun[count-1]);

g[f].end=gun[count-1];

f++;

}

}

printf("\n");

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

{

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

{

if(!strcmp(temp[j].ppid,g[i].ppid))

{

if(temp[j].rt==-1)

{

temp[j].rt=g[i].start-temp[j].at;

}

}

}

}

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

{

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

{

if(!strcmp(temp[k].ppid,t[i].ppid))

{

t[i].rt=temp[k].rt;

t[i].tat=temp[k].tat;

}

}

}

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

{

t[i].wt=t[i].tat-t[i].bt;

}

}

int smallest\_process(proces \*p,int n)

{

int b=p[0].bt;

int index=0;

int i;

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

{

if(p[i].bt<b)

{

b=p[i].bt;

index=i;

}

}

return index;

}

void display(proces \*p,int n)

{

int i;

float avg\_wt=0,avg\_rt=0;

printf("---------------------------------------------------------------------------------------------\n");

printf("proces ID Arrival Time Burst Time TurnaroundTime Waiting Time Response Time\n");

printf("---------------------------------------------------------------------------------------------\n");

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

{

printf("%s %d %d %d %d %d \n",p[i].ppid,p[i].at,p[i].bt,p[i].tat,p[i].wt,p[i].rt);

avg\_wt+=p[i].wt;

avg\_rt+=p[i].rt;

}

avg\_wt/=n;

avg\_rt/=n;

printf("---------------------------------------------------------------------------------------------\n");

printf(" Average %f %f\n",avg\_wt,avg\_rt);

}

/\*

PS F:\SEM4\OS\Assignment3> gcc -o a myprocess.c

PS F:\SEM4\OS\Assignment3> ./a

1.FCFS

2.SJF

3.EXIT

Choice : 2

a.Non-preemtive

b.Preemtive

Choice : b

Enter the no. of proceses : 5

Enter proces 1

Enter proces id : p1

Enter arrival time : 0

Enter burst time : 8

Enter proces 2

Enter proces id : p2

Enter arrival time : 1

Enter burst time : 6

Enter proces 3

Enter proces id : p3

Enter arrival time : 2

Enter burst time : 1

Enter proces 4

Enter proces id : p4

Enter arrival time : 3

Enter burst time : 9

Enter proces 5

Enter proces id : p5

Enter arrival time : 4

Enter burst time : 3

GANTT CHART

: 0 p1 1 : : 1 p2 2 : : 2 p3 3 : : 3 p2 4 : : 4 p5 7 : : 7 p2 11 : : 11 p1 18 : : 18 p4 27 :

---------------------------------------------------------------------------------------------

proces ID Arrival Time Burst Time TurnaroundTime Waiting Time Response Time

---------------------------------------------------------------------------------------------

p1 0 8 18 10 0

p2 1 6 10 4 0

p3 2 1 1 0 0

p4 3 9 24 15 15

p5 4 3 3 0 0

---------------------------------------------------------------------------------------------

Average 5.800000 3.000000

1.FCFS

2.SJF

3.EXIT

Choice : 3

PS F:\SEM4\OS\Assignment3> ./a

1.FCFS

2.SJF

3.EXIT

Choice : 2

a.Non-preemtive

b.Preemtive

Choice : b

Enter the no. of proceses : 7

Enter proces 1

Enter proces id : p1

Enter arrival time : 2

Enter burst time : 3

Enter proces 2

Enter proces id : p2

Enter arrival time : 4

Enter burst time : 2

Enter proces 3

Enter proces id : p3

Enter arrival time : 5

Enter burst time : 1

Enter proces 4

Enter proces id : p4

Enter arrival time : 7

Enter burst time : 4

Enter proces 5

Enter proces id : p5

Enter arrival time : 9

Enter burst time : 2

Enter proces 6

Enter proces id : p6

Enter arrival time : 15

Enter burst time : 6

Enter proces 7

Enter proces id : p7

Enter arrival time : 16

Enter burst time : 8

GANTT CHART

: 0 idle 2 : : 2 p1 5 : : 5 p3 6 : : 6 p2 8 : : 8 p4 9 : : 9 p5 11 : : 11 p4 14 : : 14 idle 15 : : 15 p6 21 : : 21 p7 29 :

---------------------------------------------------------------------------------------------

proces ID Arrival Time Burst Time TurnaroundTime Waiting Time Response Time

---------------------------------------------------------------------------------------------

p1 2 3 3 0 0

p2 4 2 4 2 2

p3 5 1 1 0 0

p4 7 4 7 3 1

p5 9 2 2 0 0

p6 15 6 6 0 0

p7 16 8 13 5 5

---------------------------------------------------------------------------------------------

Average 1.428571 1.142857

1.FCFS

2.SJF

3.EXIT

Choice : 2

a.Non-preemtive

b.Preemtive

Choice : a

Enter the no. of proceses : 7

Enter proces 1

Enter proces id : p1

Enter arrival time : 2

Enter burst time : 3

Enter proces 2

Enter proces id : p2

Enter arrival time : 4

Enter burst time : 2

Enter proces 3

Enter proces id : p3

Enter arrival time : 5

Enter burst time : 1

Enter proces 4

Enter proces id : p4

Enter arrival time : 7

Enter burst time : 4

Enter proces 5

Enter proces id : p5

Enter arrival time : 9

Enter burst time : 2

Enter proces 6

Enter proces id : p6

Enter arrival time : 15

Enter burst time : 6

Enter proces 7

Enter proces id : p7

Enter arrival time : 16

Enter burst time : 8

a: 0

a: 1

a: 2

a: 5

a: 6

a: 8

a: 12

a: 14

a: 15

a: 21

GANTT CHART

: 2 p1 5 : 5 p3 6 : 6 p2 8 : 8 p4 12 : 12 p5 14 : 14 idle 15 : 15 p6 21 : 21 p7 29 :

---------------------------------------------------------------------------------------------

proces ID Arrival Time Burst Time TurnaroundTime Waiting Time Response Time

---------------------------------------------------------------------------------------------

p1 2 3 3 0 0

p2 4 2 4 2 2

p3 5 1 1 0 0

p4 7 4 5 1 1

p5 9 2 5 3 3

p6 15 6 6 0 0

p7 16 8 13 5 5

---------------------------------------------------------------------------------------------

Average 1.571429 1.571429

1.FCFS

2.SJF

3.EXIT

Choice : 1

Enter the no. of proceses : 7

Enter proces 1

Enter proces id : p1

Enter arrival time : 2

Enter burst time : 3

Enter proces 2

Enter proces id : p2

Enter arrival time : 4

Enter burst time : 2

Enter proces 3

Enter proces id : p3

Enter arrival time : 5

Enter burst time : 1

Enter proces 4

Enter proces id : p4

Enter arrival time : 7

Enter burst time : 4

Enter proces 5

Enter proces id : p5

Enter arrival time : 9

Enter burst time : 2

Enter proces 6

Enter proces id : p6

Enter arrival time : 15

Enter burst time : 6

Enter proces 7

Enter proces id : p7

Enter arrival time : 16

Enter burst time : 8

GANTT CHART

: 2 p1 5 : 5 p2 7 : 7 p3 8 : 8 p4 12 : 12 p5 14 : 14 idle 15 : 15 p6 21 : 21 p7 29 :

---------------------------------------------------------------------------------------------

proces ID Arrival Time Burst Time TurnaroundTime Waiting Time Response Time

---------------------------------------------------------------------------------------------

p1 2 3 3 0 0

p2 4 2 3 1 1

p3 5 1 3 2 2

p4 7 4 5 1 1

p5 9 2 5 3 3

p6 15 6 6 0 0

p7 16 8 13 5 5

---------------------------------------------------------------------------------------------

Average 1.714286 1.714286

1.FCFS

2.SJF

3.EXIT

Choice : 3

PS F:\SEM4\OS\Assignment3>

\*/