CS-303 Operation System Lab

Project Report

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```
#include <iostream>
using namespace std;

class cpusch{
                                        private:
                                            int n,x,total;
                                            int processes[15];
                                            int arrival[15];
                                            int bursttime[15];
                                            int priority[15];
                                            int waiting[15];
                                            int tat[15];
                                                    int avtat;
                                                                int avwt;
                                        public:
                                            void first(){
                                                    cout<<"Enter the Number of Processes : ";
                                                    cin>>n;
                                                    //int processes[n];
                                                    for(int i=0 ; i<n ; i++){
                                                            processes[i]=i+1;
                                                    }
                                                    for(int i=0 ; i<n; i++){
                                                            cout<<"\n\nProccess Details";
                                                            cout<<"\nEnter the Arrival Time for
Proccess "<<i+1<<" : ";
                                                            cin>>arrival[i];
                                                            cout<<"\nEnter the Burst Time for
Proccess "<<i+1<<" : ";
                                                            cin>>bursttime[i];
                                                            cout<<"\nEnter the Priority for
Proccess "<<i+1<<" : ";
                                                            cin>>priority[i];
                                                    }
```

```
                                        }
                                        void display(){
                                                for(int i=0 ; i<n ; i++){
                                                        cout<<"\n\nPROCESSES "<<i+1;
                                                        cout<<"\n----------";
                                                        cout<<"\n\nArrival Time :
"<<arrival[i];
                                                        cout<<"\n\nBurst Time :
"<<bursttime[i];
                                                        cout<<"\n\nPriority Time :
"<<priority[i];
                                                }

                                        }
                                        void fcfs(){
                                                cout<<"\n\n__";
                                                cout<<"\n\nFCFS CPU Scheduling";
                                                cout<<"\n----------";
                                        waiting[0]=0;    //waiting time for first process is 0

  //calculating waiting time
  for(int i=1;i<n;i++)
  {
     waiting[i]=0;
     for(int j=0;j<i;j++)
        waiting[i]+=bursttime[j];
  }

  cout<<"\nProcess\t\tBurst Time\tWaiting Time\tTurnaround Time";

  //calculating turnaround time
  for(int i=0;i<n;i++)
  {
     tat[i]=bursttime[i]+waiting[i];
```

```
    avwt+=waiting[i];
    avtat+=tat[i];
    cout<<"\nP["<<i+1<<"]"<<"\t\t"<<bursttime[i]<<"\t\t"<<waiting[i]<<"\t\t"<<tat[i];
  }



  avwt/=n;
  avtat/=n;
  cout<<"\n\nAverage Waiting Time:"<<avwt;
  cout<<"\nAverage Turnaround Time:"<<avtat;

                                                        }

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

    temp=processes[i];
    priority[i]=priority[pos];
    priority[pos]=temp;

    temp=bursttime[i];
    bursttime[i]=bursttime[pos];
```

```
    bursttime[pos]=temp;

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

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

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

    total+=waiting[i];
}

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

cout<<"\nProcess\t    Burst Time    \tWaiting Time\tTurnaround Time";
for(int i=0;i<n;i++)
{
    tat[i]=bursttime[i]+waiting[i];     //calculate turnaround time
    total+=tat[i];
    cout<<"\nP["<<processes[i]<<"]\t\t  "<<bursttime[i]<<"\t\t    "<<waiting[i]<<"\t\t\t"<<tat[i];
}

avtat=total/n;     //average turnaround time
cout<<"\n\nAverage Waiting Time="<<avwt;
cout<<"\nAverage Turnaround Time="<<avtat;
```

```
                                                    }


void RR(void)
{
   // initialisation des variables
    int i, NOP, sum=0,count=0, y, quant, wt=0, tat=0, at[10], bt[10], temp[10];
    float avg_wt, avg_tat;
   cout<<" Entrer Number of process : ";
   cin>>NOP;
    y = NOP; // Assigner le nombre du processus a la variable y



for(i=0; i<NOP; i++)
{
cout<<" Enter Arrival time  : ";  // temps d'arrive
cin>>at[i];
cout<<" \nEnter burst time  : "; // temps d'execution
cin >>bt[i];
temp[i] = bt[i]; // enregistrer temps d'execution dans l'array
}
// Quantum
cout<<"Entrer Quantum number :";
cin>>quant;
// Affichage de :the process No, burst time, Turn Around Time and the waiting time
cout<<"\n Process  \t\t Burst Time \t\t Turnaround Time \t\t Waiting Time ";
for(sum=0, i = 0; y!=0; )
{
if(temp[i] <= quant && temp[i] > 0) // definir les conditions
{
   sum = sum + temp[i];
   temp[i] = 0;
   count=1;
   }
```

```
    else if(temp[i] > 0)
    {
        temp[i] = temp[i] - quant;
        sum = sum + quant;
    }
    if(temp[i]==0 && count==1)
    {
        y--; //decrementer le numero du processus
        cout<<"\nProcess "<<i+1<<" \t\t" << bt[i]<<"\t\t\t\t" << sum-at[i]<<"\t\t\t"<< sum-at[i]-bt[i];
        wt = wt+sum-at[i]-bt[i];
        tat = tat+sum-at[i];
        count =0;
    }
    if(i==NOP-1)
    {
        i=0;
    }
    else if(at[i+1]<=sum)
    {
        i++;
    }
    else
    {
        i=0;
    }
}
//Moyenne de Temps d'Attente et Moyenne de Temps de Rotation
avg_wt = wt * 1.0/NOP;
avg_tat = tat * 1.0/NOP;
printf("\n Average Wait time : \t%f", avg_wt);
printf("\n Average TurnAround Time : \t%f", avg_tat);

}
```

```
};

void RR(void)
{
   // initialisation des variables
   int i, NOP, sum=0,count=0, y, quant, wt=0, tat=0, at[10], bt[10], temp[10];
   float avg_wt, avg_tat;
  cout<<" Entrer Number of process : ";
  cin>>NOP;
   y = NOP; // Assigner le nombre du processus a la variable y


for(i=0; i<NOP; i++)
{
cout<<" Enter Arrival time  : ";  // temps d'arrive
cin>>at[i];
cout<<" \nEnter burst time  : "; // temps d'execution
cin >>bt[i];
temp[i] = bt[i]; // enregistrer temps d'execution dans l'array
}
// Quantum
cout<<"Entrer Quantum number :";
cin>>quant;
// Affichage de :the process No, burst time, Turn Around Time and the waiting time
cout<<"\n Process  \t\t Burst Time \t\t Turnaround Time \t\t Waiting Time ";
for(sum=0, i = 0; y!=0; )
{
if(temp[i] <= quant && temp[i] > 0) // definir les conditions
{
   sum = sum + temp[i];
   temp[i] = 0;
   count=1;
```

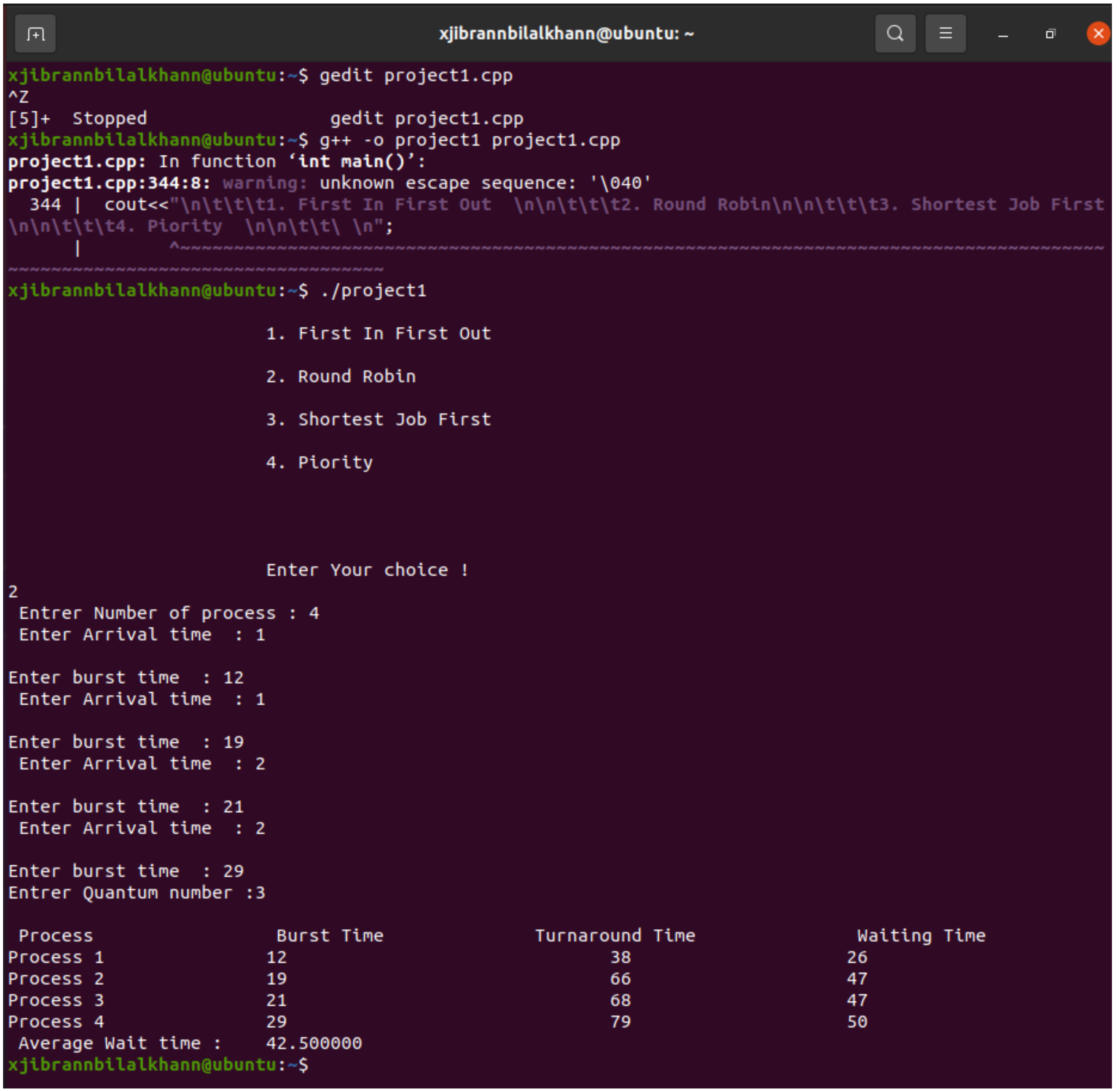
```
    }
    else if(temp[i] > 0)
    {
        temp[i] = temp[i] - quant;
        sum = sum + quant;
    }
    if(temp[i]==0 && count==1)
    {
        y--; //decrementer le numero du processus
        cout<<"\nProcess "<<i+1<<" \t\t" << bt[i]<<"\t\t\t\t" << sum-at[i]<<"\t\t\t"<< sum-at[i]-bt[i];
        wt = wt+sum-at[i]-bt[i];
        tat = tat+sum-at[i];
        count =0;
    }
    if(i==NOP-1)
    {
        i=0;
    }
    else if(at[i+1]<=sum)
    {
        i++;
    }
    else
    {
        i=0;
    }
}
//Moyenne de Temps d'Attente et Moyenne de Temps de Rotation
avg_wt = wt * 1.0/NOP;
avg_tat = tat * 1.0/NOP;
printf("\n Average Wait time : \t%f", avg_wt);
printf("\n Average TurnAround Time : \t%f", avg_tat);
```

```
}
void sjf(){
                                                    {
    int n,temp,tt=0,min,d,i,j;
    float atat=0,awt=0,stat=0,swt=0;

    cout<<"enter no of process"<<endl;
    cin>>n;
    int a[n],b[n],e[n],tat[n],wt[n];

    for(i=0;i<n;i++)
    {
        cout<<"enter arival time ";      //input
        cin>>a[i];
    }
    for(i=0;i<n;i++)
    {
        cout<<"enter brust time ";     //input
        cin>>b[i];
    }
    for(i=0;i<n;i++)
    {
      for(j=i+1;j<n;j++)
       {
           if(b[i]>b[j])
           {
               temp=a[i];
               a[i]=a[j];
               a[j]=temp;

               temp=b[i];
               b[i]=b[j];
               b[j]=temp;
```

```
        }
    }
}
min=a[0];
for(i=0;i<n;i++)
{
    if(min>a[i])
    {
        min=a[i];
        d=i;
    }
}
tt=min;
e[d]=tt+b[d];
tt=e[d];

for(i=0;i<n;i++)
{
    if(a[i]!=min)
    {
        e[i]=b[i]+tt;
        tt=e[i];
    }
}
for(i=0;i<n;i++)
{

    tat[i]=e[i]-a[i];
    stat=stat+tat[i];
    wt[i]=tat[i]-b[i];
    swt=swt+wt[i];
}
atat=stat/n;
```

```
    awt=swt/n;
    cout<<"Process  Arrival-time(s)  Burst-time(s)  Waiting-time(s)  Turnaround-time(s)\n";


   for(i=0;i<n;i++)
   {
   cout<<"P"<<i+1<<"          "<<a[i]<<"          "<<b[i]<<"          "<<wt[i]<<"
"<<tat[i]<<endl;
   }


   cout<<"awt="<<awt<<" atat="<<atat;  //average waiting time and turn around time
}
                                                    }









int main(){
                                                    cpusch a;
                                                    cout<<"\n\t\t\t1. First In First Out  \n\n\t\t\t2. Round
Robin\n\n\t\t\t3. Shortest Job First\n\n\t\t\t4. Piority  \n\n\t\t\ \n";
                                                    cout<<"\n\n\t\t\tEnter Your choice !\n";
                                                    int u;
                                                    cin>>u;


                                                    switch(u) {
 case 1:
                                                    a.first();
  a.fcfs();
   break;
 case 2:
  RR();
   break;
```

```
  case 3:
   sjf();
    break;
  case 4:
                                                    a.first();
   a.prioritysch();
                                                     break;
  default:
    cout<<"Invalid Entry ";
}
}
```



```
xjibrannbilalkhann@ubuntu: ~
xjibrannbilalkhann@ubuntu:~$ gedit project1.cpp
^Z
[5]+  Stopped                 gedit project1.cpp
xjibrannbilalkhann@ubuntu:~$ g++ -o project1 project1.cpp
project1.cpp: In function ‘int main()’:
project1.cpp:344:8: warning: unknown escape sequence: '\040'
  344 |  cout<<"\n\t\t\t1. First In First Out  \n\n\t\t\t2. Round Robin\n\n\t\t\t3. Shortest Job First
\n\n\t\t\t4. Piority  \n\n\t\t\ \n";
      |        ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
xjibrannbilalkhann@ubuntu:~$ ./project1

                        1. First In First Out

                        2. Round Robin

                        3. Shortest Job First

                        4. Piority



                        Enter Your choice !
2
 Entrer Number of process : 4
 Enter Arrival time  : 1

Enter burst time  : 12
 Enter Arrival time  : 1

Enter burst time  : 19
 Enter Arrival time  : 2

Enter burst time  : 21
 Enter Arrival time  : 2

Enter burst time  : 29
Entrer Quantum number :3

 Process                 Burst Time                 Turnaround Time              Waiting Time
Process 1                12                             38                       26
Process 2                19                             66                       47
Process 3                21                             68                       47
Process 4                29                             79                       50
 Average Wait time :     42.500000
xjibrannbilalkhann@ubuntu:~$
```

Question 2:

```
#include <stdio.h>

#include <string.h>

#include <fcntl.h>

#include <unistd.h>
```

```
#define MAX 256
 int main()  {
      FILE *fptr1, *fptr2;
      int lno, linectr = 0;
      char str[MAX],fname[MAX];
      char newln[MAX], temp[] = "temp.txt";
     static char savefile[MAX];


                                                printf("\n\n REPLACE A WRONGLY WRITTEN
INFORMATION IN TEXT FILE WITH A NEW TEXT:\n");
                                                printf("-----------------------------------------------------
------\n");
                                                printf(" INPUT THE FILE NAME YOU WANT TO
BE OPENED : ");
      fgets(fname, MAX, stdin);
      fname[strlen(fname) - 1] = '\0';
      fptr1 = fopen(fname, "r");
      int fd = open(fname, O_RDONLY);
      if (!fptr1) {
            printf("ERROR !!!!!!------UNABLE TO OPEN THE INPUT FILE!!\n");
            return 0;
      }
      if(fd != -1) {


                                               printf("-----------------------------EXIXTING DATA
FROM FILE WITH WRONG INFORMATION :-------------------------------\n");
                                               printf("\n");
                                               read(fd, savefile, 256);


                                               printf("%s", savefile);
                                                }
      fptr2 = fopen(temp, "w");
```

```
if (!fptr2) {
        printf("ERROR!!!!!-------UNABLE TO OPEN A TEMPORARY FILE TO WRITE !!\n");
        fclose(fptr1);
        return 0;
}
/* get the new line from the user */
printf(" INPUT THE CORRECT THE CORRECT INFORMATION IN NEW LINE : ");
fgets(newln, MAX, stdin);
/* get the line number to delete the specific line */
printf(" INPUT THE LINE NO. YOU WANT OT REPLACE :");
scanf("%d", &lno);
lno++;
 // copy all contents to the temporary file other except specific line
while (!feof(fptr1))   {
   strcpy(str, "\0");
   fgets(str, MAX, fptr1);
   if (!feof(fptr1))
   {
      linectr++;
      if (linectr != lno) {
            fprintf(fptr2, "%s", str);
         }
         else {
            fprintf(fptr2, "%s", newln);
         }
      }
}
fclose(fptr1);
fclose(fptr2);
remove(fname);
rename(temp, fname);
```

```
    printf("---------DATA REPLACE SUCCESSFULLY---------- \n");
    return 0;
}
```

Output

```
moon@ubuntu:~$ touch file
moon@ubuntu:~$ cat > file
my name is jibu
i am from gilgit
i am 20 year old
moon@ubuntu:~$ cat file
my name is jibu
i am from gilgit
i am 20 year old
moon@ubuntu:~$ gedit pro.c
moon@ubuntu:~$ gcc -o pro pro.c
moon@ubuntu:~$ ./pro


 REPLACE A WRONGLY WRITTEN INFORMATION IN TEXT FILE WITH A NEW TEXT:
---------------------------------------------------------------
 INPUT THE FILE NAME YOU WANT TO BE OPENED : file
------------------------------EXIXTING DATA FROM FILE WITH WRONG INFORMATION :--
------------------------------

my name is jibu
i am from gilgit
i am 20 year old
 INPUT THE CORRECT THE CORRECT INFORMATION IN NEW LINE : My name is Jibran Bila
l khan
 INPUT THE LINE NO. YOU WANT OT REPLACE :0
---------DATA REPLACE SUCCESSFULLY----------
moon@ubuntu:~$ cat file
My name is Jibran Bilal khan
```

```
moon@ubuntu:~$ cat file
My name is Jibran Bilal khan
i am from gilgit
i am 20 year old
moon@ubuntu:~$
```