Problem statement: Phase 1 Project Code

NAME: Adnan Sadar ROLL NO: 02

CLASS: SY BRANCH: IT BATCH: B1

**Q. Design and implementation of a Multiprogramming Operating System: Stage I i.CPU/ Machine Simulation ii.Supervisor Call through interrupt**

**Program:**

#include<stdio.h>

#include<string.h>

int IC,C;

char IR[4],R[4]; //stores instructions to be excecuted(GD,PD,H,LR,SR,CR,BT)

int SI; // stores read,write and excecute cases

char M[100][4]; //stores the data to be printed as output

char buffer[41];//for temporary storage of data

int i=0,loc;

int t=0,a=0;

int j;

FILE \*fp,\*fp1; //for read and write files

void EXECUTEUSERPROGRAM();

void LOAD();

void MOS();

void START();

void READ();

void WRITE();

void TERMINATE();

void init();

void EXECUTEUSERPROGRAM() //Performs GD,PD,LR,SR,BT,CR

{

for(i=0;i<4;i++)

{

IR[i]=M[IC][i];

}

loc = ((int)IR[2] -48)\*10 + ((int)IR[3] -48);

IC++;

printf("\n\n%d\n\n",loc);

if(IR[0] == 'G' && IR[1] =='D')

{

SI = 1;

printf("\nIN GD\n");

MOS();

}

else if(IR[0] == 'P' && IR[1] =='D')

{

SI = 2;

printf("\nIN PD\n");

for(int i=loc;i<loc+10;i++)

{

printf("M[%d] : ",i);

for(j=0;j<4;j++)

{

printf("%c",M[i][j]);

}

printf("\n");

}

MOS();

}

else if(IR[0] == 'H')

{

SI = 3;

printf("Program Terminated");

MOS();

}

else if(IR[0]=='L' && IR[1]=='R')

{

printf("\nIn LR\n");

for(i=0;i<4;i++)

{

R[i]=M[loc][i];

printf("%c",R[i]);

}

EXECUTEUSERPROGRAM();

}

else if(IR[0]=='S' && IR[1]=='R')

{

printf("\nIN SR\n" );

printf("\nmemory stored with data-->>");

for(i=0;i<4;i++)

{

M[loc][i]=R[i];

printf("%c",M[loc][i]);

}

EXECUTEUSERPROGRAM();

}

else if(IR[0]=='C' && IR[1]=='R')

{

for(i=0;i<4;i++)

{

if(R[i]==M[loc][i])

{

printf("\nStrings Match!\n");

C=1;

}

else

{

C=0;

printf("\nStrings Don't Match!\n");

break;

}

}

EXECUTEUSERPROGRAM();

}

else if(IR[0]=='B' && IR[1]=='T')

{

if(C==1)

{

IC=loc;

printf("\nValue of IC ->>%d", IC); //prints pointer location between 0-99

}

EXECUTEUSERPROGRAM();

}

}

void init() //initializing the array M[][] with $

{

int i, j;

for(i=0;i<100;i++)

{

for(j=0;j<4;j++)

{

M[i][j]='$';

}

}

for(i=0;i<4;i++)

{

IR[i]=R[i]='$';

}

for(i=0;i<4;i++)

{

IR[i]=R[i]='$';

}

}

void READ()

{

int i, j, k;

if(fgets(buffer,41,fp)!=NULL)

{

k=0;

for(i=loc;i<loc+10;i++)//current string exists for 10 positions even if not occupied.

{

printf("M[%d] : ",i);

for(j=0;j<4 && buffer[k]!='\0';j++)

{

M[i][j]=buffer[k];

k++;

printf("%c",M[i][j]); //printing the characters in input file 4 at a time

}

printf("\n");

}

}

EXECUTEUSERPROGRAM();

}

deletebuffer()

{

for(int asd=0;asd<41;asd++)

{

buffer[asd]=NULL;

}

}

void WRITE()

{

int i, j, k;

IR[3] = '0';

k=0;

printf("\n");

deletebuffer();

for(i=loc; i<loc+10; i++)

{

for(j=0; j<4 && M[i][j]!='$'; j++)

{

if(M[i][j]=='\n')

{

buffer[k]=' ';

}

else

buffer[k] = M[i][j];

printf("%c",buffer[k]);

k++;

}

}

buffer[k]='\n';

printf("\nLets see the whole string\n");

for(int as=0;as<41;as++)

{

printf("%c",buffer[as]);

}

fputs(buffer,fp1);

EXECUTEUSERPROGRAM();

}

void TERMINATE()

{

memset(buffer,0,41);

buffer[0]='\n';

buffer[1]='\n';

fputs(buffer,fp1);

}

void MOS()

{

switch(SI)

{

case 1:

READ();

break;

case 2:

WRITE();

break;

case 3:

TERMINATE();

break;

default:

SI = 0;

}

}

void START()

{

IC = 0; //Instruction Counter

EXECUTEUSERPROGRAM();

}

void LOAD()

{

int t=0;

int i,j,k;

while(getc(fp)!=EOF)//get all the characters in the input file

{

fseek(fp,-1,SEEK\_CUR);

memset(buffer,0,42);

fgets(buffer,42,fp);//42 characters at max will be copied from the filepointer into the buffer

printf("\nBuffer contents:\n");

for(i=0;i<41;i++)

{

printf("%c",buffer[i]);//printing buffer contents

}

printf("\n");

if(buffer[0] == '$' && buffer[1] == 'A' && buffer[2] =='M' && buffer[3] == 'J')

{

printf("\nProcess started.........\n");

t=0;

init();

}

else if(buffer[0] == '$' && buffer[1] == 'D' && buffer[2] =='T' && buffer[3] == 'A')

{

START();

}

else if(buffer[0] == '$' && buffer[1] == 'E' && buffer[2] =='N' && buffer[3] == 'D')

continue;

else

{

for(int k=t;k<t+10;k++)

{

printf("M[%d]:",k);

for(int i=0;i<4;i++)

{

M[k][i]=buffer[a];

a++;

printf("%c",M[k][i]);

}

printf("\n");

}

t=t+10;

a=0;

}

}

fclose(fp);

fclose(fp1);

}

int main()

{

//Open read and write files

fp = fopen("inputfile.txt","r");

fp1 = fopen("outputfile.txt","w");

LOAD();

return 0;

}

**Input File:**

$AMJ010200210001

GD30LR36SR40LR35SR41LR34SR42LR33SR43LR32

SR44LR31SR45LR30SR46LR39SR47SR38SR49PD40

H

$DTA

AMA PANANAL A CPLANN A A MA

$END0102

$AMJ020100120003

GD20LR20GD30CR33BT07GD40PD40PD20PD30GD40

PD40H

$DTA

HOPE FOR IT

THERE IS NO HOPE

BUT STILL HOPE

$END0201

$AMJ000300170007

GD20PD20GD30PD30GD40LR40SR20PD20PD30GD40

LR40SR20PD20PD30GD50PD50H

$DTA

3 LITTLE PIGS WENT TO OS CLASS.

THE WOLF ATE ONE!

2 LI

1 LI

CLASS DISMISSED!

$END0003

$AMJ020200160005

GD20PD20LR20SR30SR31PD30SR40SR41SR42PD40

SR50SR51PD50SR60PD60H

$DTA

\*

$END0202

$AMJ000700200002

GD50LR50SR67LR51SR66LR52SR65LR53SR64LR54

SR63LR55SR62LR56SR61LR57SR60PD50PD60H

$DTA

N U T R A F I N

$END0007

$AMJ030100100003

GD20PD20GD30PD30LR20CR30BT10GD40PD40H

$DTA

VIT IS GOOD

VIIT IS GOOD

BOTH ARE SISTER INSTITUTES

$END0301

$AMJ030200080003

GD20PD20GD30PD30LR30SR20PD20H

$DTA

CAT CAN EAT RAT

RAT CAN NOT EAT CAT

$END0302

$AMJ010100040001

GD20LR22SR25PD20H

$DTA

I LIKE THIS PEN OF

$END0101

$AMJ040100120004

GD20PD20GD30PD30GD40GD50LR20CR30BT10PD40

PD50H

$DTA

ABCD

ABCD

DO NOT

MATCH

$END0401

$AMJ040200130004

GD20PD20GD30LR30SR20PD20GD40PD40GD50LR50

SR20PD20H

$DTA

RAT

S

ON

M

$END0402

$AMJ010200070002

GD20LR26CR20BT06GD30PD30PD20H

$DTA

RAM IS OLDER THAN SHRIRAM

NOT IN EXISTANCE

$END0102

**Output File:**

HOPE FOR IT

THERE IS NO HOPE

3 LITTLE PIGS WENT TO OS CLASS.

THE WOLF ATE ONE!

2 LITTLE PIGS WENT TO OS CLASS.

THE WOLF ATE ONE!

\*

0SR51PD50SR60PD60H

\*

0\*

0

\*

0\*

0\*

0

VIT IS GOOD

VIIT IS GOOD

BOTH ARE SISTER INSTITUTES

CAT CAN EAT RAT

RAT CAN NOT EAT CAT

RAT CAN EAT RAT

I LIKE THIS PEN OF HIS

ABCD

ABCD

RAT

H

SAT

H

ON

RAM IS OLDER THAN SHRIRAM