PSP [20ES104] COURSE PROJECT REPORT

On

"Title of the Project"

Developed By:

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CERTIFICATE

This is to certify that the PSP course project report entitled **" Title of the project"** is a record of bonafide work carried out by the student(s) Student Name1, Student Name2 & Student Name3 bearing roll number(s) HTNo1, HTNo2 & HTNo3 of Computer Science and Artificial Intelligence department during the academic year 2022-23.

Supervisor

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PROBLEM STATEMENT:

Develop a menu driven program with the following applications:

1) Develop a C Application to estimate the marks which a student has to get in mid-2 to achieve his target for the total internal marks in a sem based on his/her mid-1 marks.

2) Develop a C Application to estimate the number of following periods, a student must attend to maintain his/her attendance above 75 percent in a respective subject.

3) Develop a C Application to create a game like Tic Tac Toe.

MODULES:

In this application, almost all variables are declared globally so that these variables can be accessed throughout the program at any function call. We can choose any function by using function call. The application displays four options and asks the person who runs the program to select one of the four applications. Based on selection he/she will be directed to the respective application.

In this program fourteen modules are used.

1. Main Menu

In this module, the program displays four options and directs the user to the respective application based on his/her selection. The menu will be like this, press :1 to estimate the internal marks, 2 to know how to maintain attendance, 3 to play a game and 4 to exit.

Let's discuss other modules with respective application wise.

Estimating internal marks:

1. Reading the data:

In this module the application takes the input from a

student like target for the total internal marks in a sem and mid-1 marks for each subject.

2. Estimating the required marks for mid-2:

In this module all the data which has taken from a user will be stored in the form of arrays and required mid-2 marks are calculated using some mathematical formula.

3. Estimating the marks when the target is not reachable

This module is called when the entered target for the total internal marks in a sem is not obtained even if the student gets 40 marks in mid-2. In this particular case, the module calculates the resultant marks for the respective subject if the user gets 40 marks in mid-2.

4. Printing the Required marks:

In this module the whole data consisting of the target , entered mid-1 marks for every subject and required marks in mid-2 for every subject are printed on the console in a tabular format. Also after printing the whole data, the application displays three options press: 1 to calculate again, 2 to return to main menu, 0 to exit and performs the action based on the user's choice.

Estimating the number of periods required to maintain the attendance above 75 percent:

1. Taking the current date as an input:

In this module the application takes inputs from the user like the current day and month number and passes the data as arguments to another subprogram.

2. Calculating the periods held:

In this module, the number of periods held for each subjects are held are calculated based on the current date which is given as input from the user.

3. Calculating the periods required:

This module takes the attendance percentage of each subject and performs mathematical calculations to estimate the required periods to maintain attendance above 75 percent.

4. Printing the number of periods required:

This module prints the whole data consisting of attandance, no of periods held and no of periods required to maintain attendance above 75 percent for every subject in a tabular form and also displays three options as press :1
to calculate again, 2 to return to main menu and 0 to exit.

Game (Tic Tac Toe) :

1. Home page:

In this module player's name is taken as input. This module serves as a home page for the total game.

2. selection of numbers:

In this module 9 numbers from 1 to 9 are displayed in a tabular form user has to select 1 number and the selected number will be replaced with the player's symbol ie.,(O). This module also passes data to other submodules like checking the winner and declares the winner based on return value.

3. Logical thinking of a program:

In this module all logical calculations are written and program itself acts as an opponent to the player and makes its moves to defeat the player

4. checking the winner:

After every move, this module is called. This module checks the conditions written in this subprogram and decides the winner.

5. Printing the game data on the console:

In this module, the data of the game is printed on the console in a preformatted structure and refreshes after every move of the player and computer.

KNOWLEDGE REQUIRED TO DEVELOP THIS APPLICATION

- Control Statements (if, if-else, switch)
- Loop Statements (while/do while, for)
- Arrays (1D/2D-arrays)
- Strings (Strings and Table of strings) and its functions (strcpy, strcmp)
- Functions (Any type of user defined functions)

SOURCE CODE [.C FILE]:

```
#include<stdio.h>
#include<conio.h>
#include<stdlib.h>
#include<string.h>
#include<math.h>
void mainprogram(),printing(),mainp(),print(),incre(int,int),sub(int,int);
void coreprogram(),tictactoe(),board();
int checkwin(),esti(int),nr(int),computer();
int day,month,ss[8],att[8],num,i,target = 0,et[7],su[7];
float r[7],p[8]; char
s[10]={'1','2','3','4','5','6','7','8','9','\0'},name[30];
int main()
{   int opinion;
    system("cls");
    printf("\t\t\t\t\t\tA STUDENT THING\n");
    printf("\t\t\t\t\t\t\t-An innovation from Rishik [redacted]\n\n\n\n\n\n");
    printf("\n\n\n\t\t\t\t\t  Press:\n");
    printf("\t\t\t\t\t    1  to estimate internal marks\n");
    printf("\t\t\t\t\t    2  to know how to maintain attendence\n");
    printf("\t\t\t\t\t    3  to play a game\n");
    printf("\t\t\t\t\t    4  to exit\n\n\n");
    printf("\t\t\t\t\t    Your choice:");
    scanf("%d",&opinion);
    if(opinion==3)          tictactoe();
    else if(opinion==2)     coreprogram();
    else if(opinion==1)     mainp();
    else if(opinion==4)     {exit(0);getch();}
    else    {printf("\n\n\n\n\t\t\t\t\t\t    invalid input"); getch(); main();}
    return 0;}
void tictactoe()
{   system("cls");
    printf("\n\t\tWelcome to Tic Tac Toe\n\n\n");
    printf("  Enter player name:");scanf("%s",name); system("cls");
    mainprogram();}
void mainprogram()
{   int player=1,choice,choi;
    char mark,str[10];strcpy(str,s);
```

```
do
  {board();
   player=(player % 2)?1:2;
   mark=(player==1)? 'X' : 'O' ;
   if(player==1)
   {printf("\n\n  %s,",name);
   printf(" enter a number:"); scanf("%d",&choice);}
   else choice=computer();num=choice;
   if ((s[0]=='1')&&(choice== 1))          s[0]=mark;
   else if ((s[1]=='2')&&(choice== 2))     s[1]=mark;
   else if ((s[2]=='3')&&(choice== 3))     s[2]=mark;
   else if ((s[3]=='4')&&(choice== 4))     s[3]=mark;
   else if ((s[4]=='5')&&(choice== 5))     s[4]=mark;
   else if ((s[5]=='6')&&(choice== 6))     s[5]=mark;
   else if ((s[6]=='7')&&(choice== 7))     s[6]=mark;
   else if ((s[7]=='8')&&(choice== 8))     s[7]=mark;
   else if ((s[8]=='9')&&(choice== 9))     s[8]=mark;
   else
   {   printf("  invalid input,retry again");
       player--;getch();}
   i=checkwin(); player++;
   }while(i== -1);
   if(i==1)
   {board(); --player;
   if(player==1)
   {printf("\n\n  %s won the match\n\n\n",name); strcpy(s,str);
   printf("  press:\n");
   printf("  1 to play again\n  2 to return to main menu\n  0 to exit\n\n
   your choice:");
   scanf("%d",&choi);
   if(choi==1)    mainprogram();
   else if(choi==0)    exit(0);
   else if(choi==2)    main();
   else              {printf("\n\n  You did not shared your opinion
   properly");getch();}}
   else
   {printf("\n\n  Computer won the match\n\n\n"); strcpy(s,str);
    printf("  press:\n");
```

```
     printf("  1 to play again\n  2 to return to main menu\n  0 to exit\n\n
     your choice:");
     scanf("%d",&choi);
    if(choi==1)    mainprogram();
    else if(choi==0)    exit(0);
    else if(choi==2)    main();
    else
    {printf("\n\n  You did not shared your opinion properly");
    getch();}}}
    else
    {board();
    printf("\n\n  Game is draw\n\n\n");
    strcpy(s,str);
    printf("  press:\n");
    printf("  1 to play again\n  2 to return to main menu\n  0 to exit\n\n
    your choice:");
    scanf("%d",&choi);
    if(choi==1)    mainprogram();
    else if(choi==0)    exit(0);
    else if(choi==2)   main();
    else
    {printf("\n\n  You did not shared your opinion properly");getch();}}}
int checkwin()
{
if(((s[0]==s[1])&&(s[0]==s[2]))||((s[3]==s[4])&&(s[3]==s[5]))||((s[6]==s[8])
                                                        &&(s[6]==s[7])))
    return 1;
else if(((s[0]==s[3])&&(s[0]==s[6]))||((s[1]==s[4])&&(s[1]==s[7]))||
                                              ((s[2]==s[5])&&(s[2]==s[8])))
    return 1;
else if(((s[0]==s[4])&&(s[0]==s[8]))||((s[2]==s[4])&&(s[2]==s[6])))
    return 1;
else if (s[0] == '1' || s[1] == '2' || s[2] == '3' || s[3] == '4' ||s[4] == '5'
                  ||s[5]  == '6' || s[6] == '7' || s[7] == '8' || s[8] == '9')
    return -1;
else
    return 0;}
void board()
{   system("cls");
```

```
    printf("\t\tTic Tac Toe\n\n");
    printf("  %s - (X)\tComputer - (O)\n\n\n",name);
    printf("\t          |   |    \n");
    printf("\t       %c | %c | %c \n",s[0],s[1],s[2]);
    printf("\t     ____|___|____\n");
    printf("\t          |   |    \n");
    printf("\t       %c | %c | %c \n",s[3],s[4],s[5]);
    printf("\t     ____|___|____\n");
    printf("\t          |   |    \n");
    printf("\t       %c | %c | %c \n",s[6],s[7],s[8]);
    printf("\t          |   |    \n");
    printf("\n\n");
    if(num!=0 && i!=1)    printf("  Computer choice:%d",num);}
int computer()
{  if((s[1]==s[2]||s[4]==s[8]||s[3]==s[6])&&(s[0]=='1'))          return 1;
   else if((s[4]==s[7]||s[0]==s[2])&&(s[1]=='2'))                return 2;
   else if((s[0]==s[1]||s[6]==s[4]||s[5]==s[8])&&(s[2]=='3'))    return 3;
   else if((s[0]==s[6]||s[4]==s[5])&&(s[3]=='4'))                return 4;
   else if((s[0]==s[8])&&(s[4]=='5'))                            return 5;
   else if((s[1]==s[7])&&(s[4]=='5'))                            return 5;
   else if((s[2]==s[6])&&(s[4]=='5'))                            return 5;
   else if((s[3]==s[5])&&(s[4]=='5'))                            return 5;
   else if((s[3]==s[4]||s[2]==s[8])&&(s[5]=='6'))                return 6;
   else if((s[0]==s[3]||s[7]==s[8]||s[4]==s[2])&&(s[6]=='7'))    return 7;
   else if((s[1]==s[4]||s[6]==s[8])&&(s[7]=='8'))                return 8;
   else if((s[6]==s[7]||s[0]==s[4]||s[2]==s[5])&&(s[8]=='9'))    return 9;
   else if(s[0]=='1')                                            return 1;
   else if(s[4]=='5')                                            return 5;
   else if(s[2]=='3')                                            return 3;
   else if(s[6]=='7')                                            return 7;
   else if (s[8]=='9')                                           return 9;
   else if(s[7]=='8')                                            return 8;
   else if(s[1]=='2')                                            return 2;
   else if(s[5]=='6')                                            return 6;
   else if(s[3]=='4')                                            return 4;
   return 0;}
void coreprogram()
{   system("cls");
```

```
     ss[0]=29,ss[1]=29,ss[2]=8,ss[3]=20,ss[4]=24,ss[5]=23,ss[6]=16,ss[7]=3;
     printf("  Enter day number:");       scanf("%d",&day);
     printf("  Enter month number:");     scanf("%d",&month);
     sub(day,month);}
void sub(int day,int month)
{    if(month==4)
     incre(day,4);
    else if(month==5)
    {incre(31,4);
     incre(day,5);}
    else if(month==6)
    {ss[0]=54,ss[1]=55,ss[2]=18,ss[3]=30,ss[4]=42,ss[5]=45,ss[6]=28,ss[7]=14;
     incre(32,5);
     incre(day,6);}
     printf("  Enter the attandence percentage of all subjects:\n");
     printf("  1.APTT:");                                scanf("%f",&p[4]);
     printf("  2.AP:");                                  scanf("%f",&p[1]);
     printf("  3.EM:");                                  scanf("%f",&p[0]);
     printf("  4.EP LAB:");                              scanf("%f",&p[2]);
     printf("  5.ELE:");                                 scanf("%f",&p[6]);
     printf("  6.PSP:");                                 scanf("%f",&p[3]);
     printf("  7.PSP LAB:");                             scanf("%f",&p[5]);
     printf("  8.PPC:");                                 scanf("%f",&p[7]);
    r[0]=round((p[0]*ss[0])/100);                       att[0]=(int)r[0];
    r[1]=round((p[1]*ss[1])/100);                       att[1]=(int)r[1];
    r[2]=round((p[2]*ss[2])/100);                       att[2]=(int)r[2];
    r[3]=round((p[3]*ss[3])/100);                       att[3]=(int)r[3];
    r[4]=round((p[4]*ss[4])/100);                       att[4]=(int)r[4];
    r[5]=round((p[5]*ss[5])/100);                       att[5]=(int)r[5];
    r[6]=round((p[6]*ss[6])/100);                       att[6]=(int)r[6];
    r[7]=round((p[7]*ss[7])/100);                       att[7]=(int)r[7];
    r[0]=((75*ss[0])-(100*r[0]))/25;
    r[1]=((75*ss[1])-(100*r[1]))/25;
    r[2]=((75*ss[2])-(100*r[2]))/25;
    r[3]=((75*ss[3])-(100*r[3]))/25;
    r[4]=((75*ss[4])-(100*r[4]))/25;
    r[5]=((75*ss[5])-(100*r[5]))/25;
    r[6]=((75*ss[6])-(100*r[6]))/25;
    r[7]=((75*ss[7])-(100*r[7]))/25;
```

```
print();}
void incre(int day,int m)
{   int d;

    if(m==4)                        d=16;
    else if((m==5)&&(month==6))     d=29;
    else                            d=1;
    for(;d<day;d++)
    {
if((((d==17)||(d==24))&&(m==4))||((d==1)||(d==8)||(d==29))&&(m==5))||((d==5)
                                          ||(d==12)||(d==19)||(d==26))&&(m==6)))
    {ss[1]++;ss[0]+=2;ss[3]++;ss[6]++,ss[5]=ss[5]+3;}
else
if((((d==18)||(d==25))&&(m==4))||((d==2)||(d==9)||(d==30))&&(m==5))||((d==6)
                                          ||(d==13)||(d==20)||(d==27))&&(m==6)))
     {ss[0]++;ss[1]+=2;ss[6]++;}
else
if((((d==19)||(d==26))&&(m==4))||((d==3)||(d==10)||(d==31))&&(m==5))||((d==7)
                                           ||(d==14)||(d==21)||(d==28))&&(m==6)))
     {ss[0]++;ss[3]++;ss[2]=ss[2]+2;ss[7]=ss[7]+3;}
else
if((((d==20)||(d==27))&&(m==4))||((d==4)||(d==11))&&(m==5))||((d==1)||(d==8)
                                                ||(d==15)||(d==22))&&(m==6)))
     {ss[6]++;ss[0]++;ss[1]++;ss[4]=ss[4]+3;}
else
if((((d==21)||(d==28))&&(m==4))||((d==5)||(d==12))&&(m==5))||((d==2)||(d==9)
                                          ||(d==16)||(d==23)||(d==30))&&(m==6)))
     {ss[3]=ss[3]+3;ss[0]++;ss[1]++;}
else if(((d==29)&&(m==4))||((d==6)&&(m==5))||((d==3)||(d==10)||(d==17)||
                                                      (d==24))&&(m==6)))
     {ss[1]++;ss[4]=ss[4]+3;ss[0]++;}}}
void print()
{   int choice;
    system("cls");
printf(" No of periods should be attended in each subject to get 75%% of
attendance:\n\n\n");
printf("Subjects\tAttandance percentage|Periods held|Periods attended|No of
peroids required\n\n");
printf("  1.APTT     : \t\t%.2f   \t\t%d\t\t%d\t\t",p[4],ss[4],att[4]);
   if(p[4]<75.00)  printf("%d\n",(int)r[4]);
```

```
   else            printf("Attendance in this subject is greater than 75%%\n");
printf("  2.AP      : \t\t%.2f  \t\t%d\t\t%d\t\t",p[1],ss[1],att[1]);
   if(p[1]<75.00)  printf("%d\n",(int)r[1]);
   else            printf("Attendance in this subject is greater than 75%%\n");
printf("  3.EM      : \t\t%.2f  \t\t%d\t\t%d\t\t",p[0],ss[0],att[0]);
   if(p[0]<75.00)  printf("%d\n",(int)r[0]);
   else            printf("Attendance in this subject is greater than 75%%\n");
printf("  4.EP LAB  : \t\t%.2f  \t\t%d\t\t%d\t\t",p[2],ss[2],att[2]);
   if(p[2]<75.00)  printf("%d\n",(int)r[2]);
   else            printf("Attendance in this subject is greater than 75%%\n");
printf("  5.ELE     : \t\t%.2f  \t\t%d\t\t%d\t\t",p[6],ss[6],att[6]);
    if(p[6]<75.00) printf("%d\n",(int)r[6]);
    else           printf("Attendance in this subject is greater than 75%%\n");
printf("  6.PSP     : \t\t%.2f  \t\t%d\t\t%d\t\t",p[3],ss[3],att[3]);
    if(p[3]<75.00) printf("%d\n",(int)r[3]);
    else           printf("Attendance in this subject is greater than 75%%\n");
printf("  7.PSP LAB : \t\t%.2f  \t\t%d\t\t%d\t\t",p[5],ss[5],att[5]);
    if(p[5]<75)    printf("%d\n",(int)r[5]);
    else           printf("Attendance in this subject is greater than 75%%\n");
printf("  8.PPC     : \t\t%.2f  \t\t%d\t\t%d\t\t",p[7],ss[7],att[7]);
    if(p[7]<75.00) printf("%d\n",(int)r[7]);
    else           printf("Attendance in this subject is greater than 75%%\n");
    printf("\n\n\n  press:\n");
printf("  1 to caluclate again\n  2 to return to main menu\n  0 to exit\n\n
your choice:");
    scanf("%d",&choice);
    if(choice==1)          coreprogram();
    else if(choice==0)     exit(0);
    else if(choice==2)     main();
    else {printf("\n\n  You did not shared your opinion properly");getch();}}
void mainp()
{   system("cls");
    printf("  Enter your target for total internal marks in this sem :");
    scanf("%d",&target);
    system("cls");
    printf("  Target:%d\n\n",target);
    printf("  Enter the marks of mid 1 for all the subjects:\n\n");
    printf("  1.PSP:");        scanf("%d",&su[0]);    et[0]=esti(su[0]);
    printf("  2.AP/EMMS:");    scanf("%d",&su[1]);    et[1]=esti(su[1]);
```

```
    printf("  3.EM:");          scanf("%d",&su[2]);    et[2]=esti(su[2]);
    printf("  4.EP LAB:");      scanf("%d",&su[3]);    et[3]=esti(su[3]);
    printf("  5.ELE:");         scanf("%d",&su[4]);    et[4]=esti(su[4]);
    printf("  6.APTT/ES:");     scanf("%d",&su[5]);    et[5]=esti(su[5]);
    printf("  7.PSP LAB:");     scanf("%d",&su[6]);    et[6]=esti(su[6]);
    printing();}
int esti(int m)
{   int c1,c2,result;
    float x,y,z,a,b,c;
    x = m*0.75;    y = target-x;    z = y/0.25;
    c1 = round(z);
    a = m*0.25;    b = target-a;    c = b/0.75;
    c2= round(c);
    if((c1<=40)||(c2<=40))    {   result=(c1<c2)?c1:c2; return result;}
    else return 0;}
void printing()
{   int choice;
    system("cls");
    printf("\n  Target:%d",target);
    printf("\n\n  Subjects\tFirst Mid marks | Estimated marks\n\n");
    printf("  1.PSP     :\t\t%d",su[0]);
    if(et[0]!=0)  printf("\t\t%d\n",et[0]);
    else  printf("\tTarget not reachable-Max(%d) if mid-2 is 40 \n",nr(su[0]));
    printf("  2.AP/EMMS : \t\t%d",su[1]);
    if(et[1]!=0) printf("\t\t%d\n",et[1]);
    else  printf("\tTarget not reachable-Max(%d) if mid-2 is 40 \n",nr(su[1]));
    printf("  3.EM      :\t\t%d",su[2]);
    if(et[2]!=0  printf("\t\t%d\n",et[2]);
    else printf("\tTarget not reachable-Max(%d) if mid-2 is 40 \n",nr(su[2]));
    printf("  4.EP LAB  :\t\t%d",su[3]);
     if(et[3]!=0) printf("\t\t%d\n",et[3]);
     else  printf("\tTarget not reachable-Max(%d) if mid-2 is 40
\n",nr(su[3]));
    printf("  5.ELE     :\t\t%d",su[4]);
     if(et[4]!=0) printf("\t\t%d\n",et[4]);
     else printf("\tTarget not reachable-Max(%d) if mid-2 is 40 \n",nr(su[4]));
    printf("  6.APTT/ES : \t\t%d",su[5]);
     if(et[5]!=0)  printf("\t\t%d\n",et[5]);
     else printf("\tTarget not reachable-Max(%d) if mid-2 is 40 \n",nr(su[5]));
```

```
    printf("  7.PSP LAB :\t\t%d",su[6]);
     if(et[6]!=0)  printf("\t\t%d\n",et[6]);
     else printf("\tTarget not reachable-Max(%d) if mid-2 is 40 \n",nr(su[6]));
    printf("\n\n\n  press:\n");
    printf("  1 to caluclate again\n  2 to return to main menu\n  0 to exit\n\n
    your choice:");
    scanf("%d",&choice);
    if(choice==1)       mainp();
    else if(choice==0)  exit(0);
    else if(choice==2)  main();
    else                {printf("\n\n  You did not shared your opinion
    properly");getch();}}
int nr(int m)
{   int y; float x;
    x=(m*0.25)+30; y=round(x);
    return y;}
```

SOURCE CODE [HEADER FILE]:

1.stdio.h :

The stdio.h header file includes C standard library functions to perform input and output operation. It contains functions performing input and output operations on stdin, stdout and stderr as well as on file. It contains functions defined specifically for a particular data type like getchar and generic functions like printf and scanf.

2.string.h

string.h is the header in the C standard library for the C programming language which contains macro definitions, constants and declarations of functions and types used not only for string handling but also various memory handling functions; the name is thus something of a misnomer.

3.math.h

math.h is a header file in the standard library of the C programming language designed for basic mathematical operations.The C <math.h> header file declares a set of functions to perform mathematical operations such as: sqrt() to calculate the square root, log() to find natural logarithm of a number etc.

4.stdlib.h

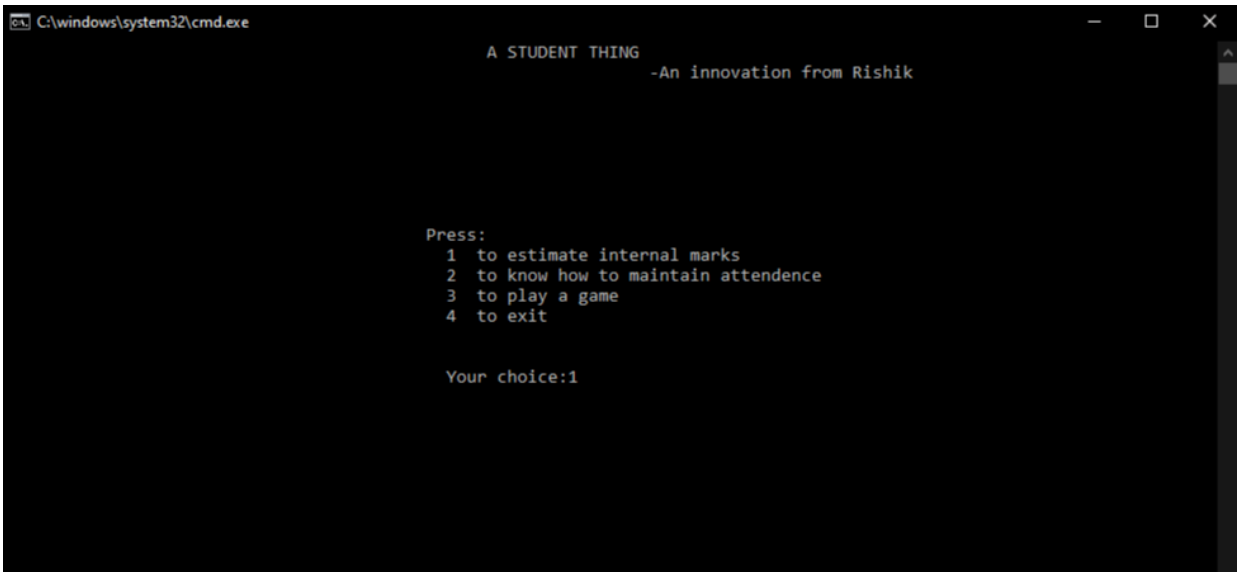
stdlib.h is a header file and also the Standard Library of C programming language that declares various utility functions for type conversions, memory allocation, algorithms, and other similar use cases. It also has multiple data types and macros defined in the header.

5.conio.h

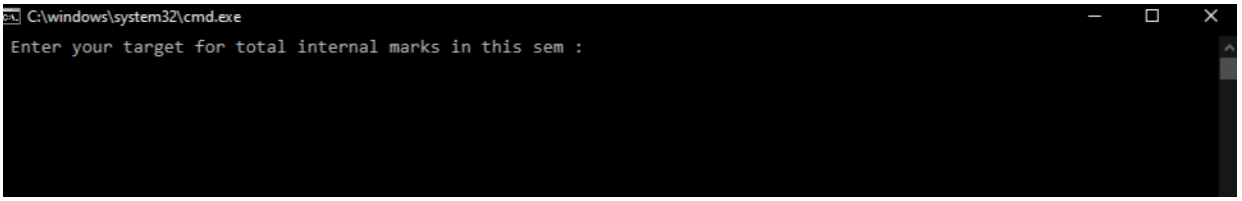
It is a header file in C which is most widely used in the C programming language. It stands for console input-output. Many built-in library functions in conio.h are utilised by c programmes for input and output. The functions which are declared inside the conio.h varies from compiler to compiler.

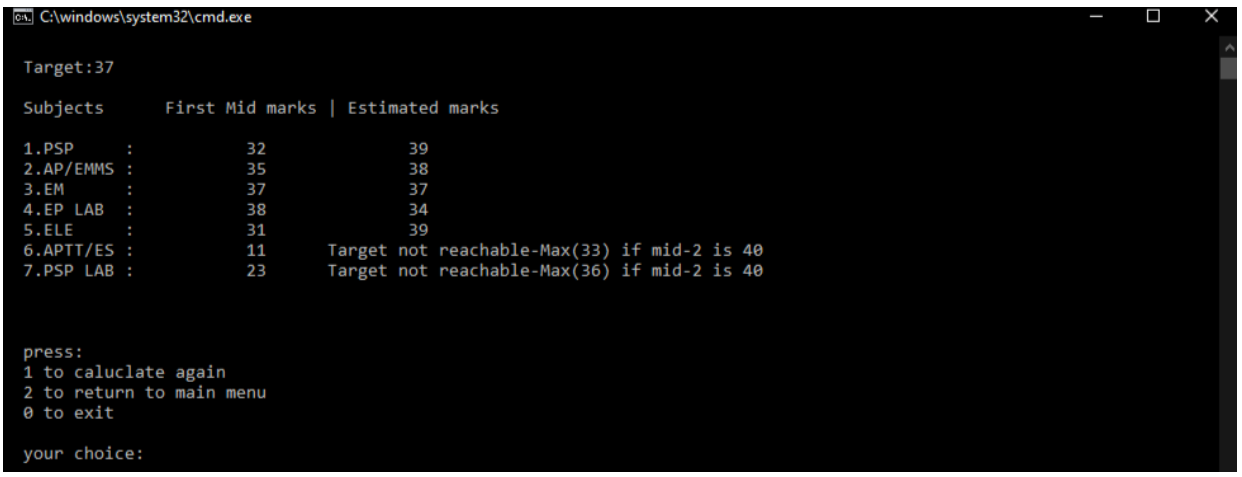
RESULTS:

Main menu

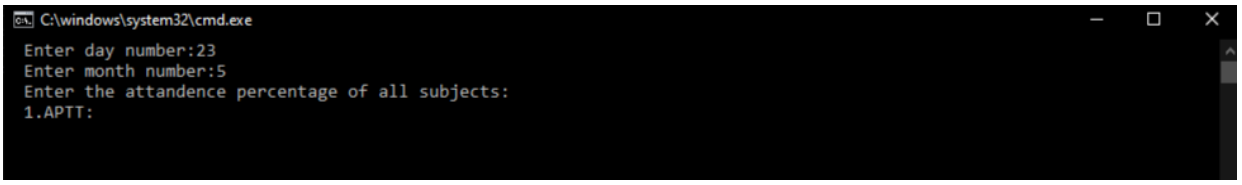


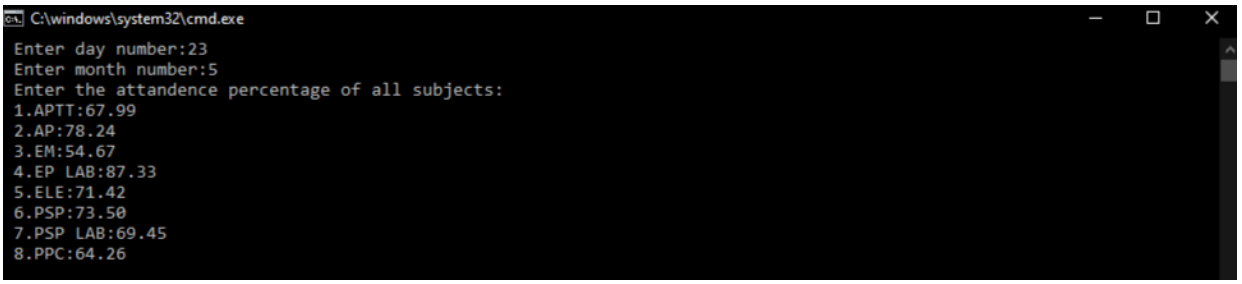
Estimation of required marks for mid-2

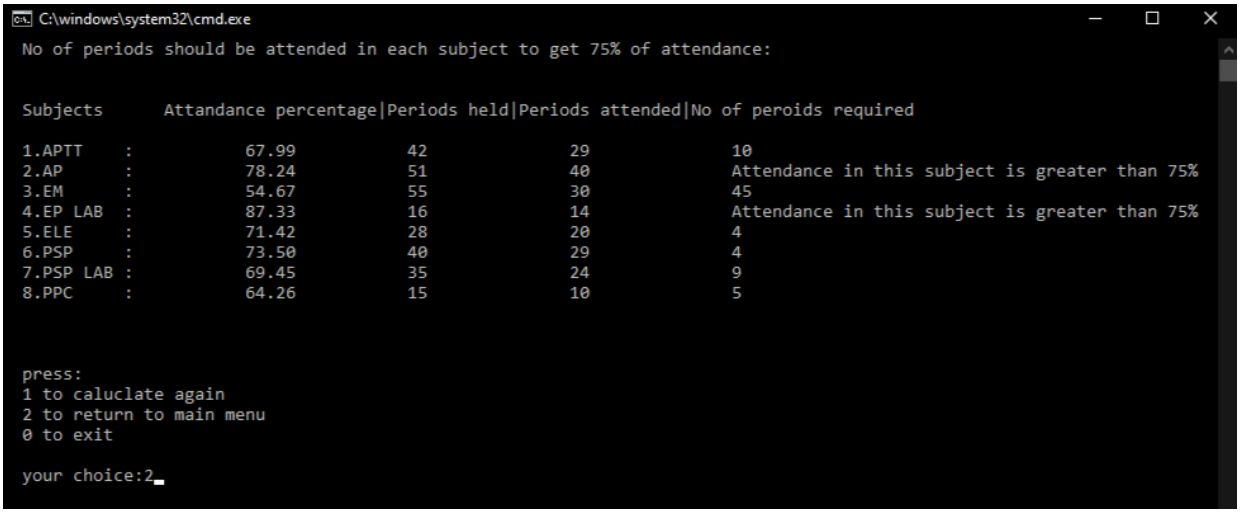




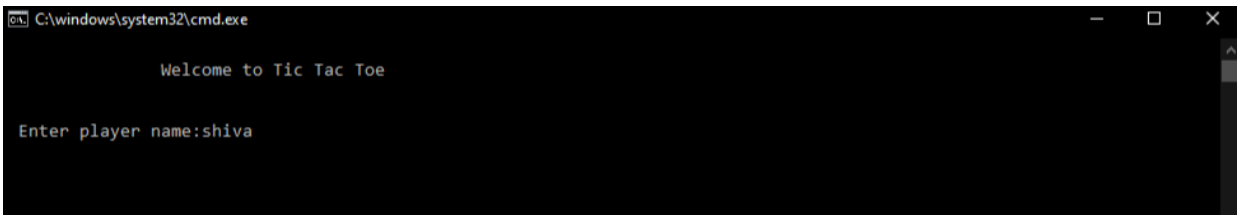
Calculations of number of periods required to maintain attendance above 75 percent







Tic-Tac-Toe game




C:\windows\system32\cmd.exe
Tic Tac Toe
shiva - (X) Computer - (O)
1 | 2 | 3
4 | 5 | 6
7 | 8 | 9
shiva, enter a number:1


C:\windows\system32\cmd.exe
Tic Tac Toe
shiva - (X) Computer - (O)
X | O | X
4 | O | 6
7 | 8 | 9
Computer choice:2
shiva, enter a number:8


C:\windows\system32\cmd.exe
Tic Tac Toe
shiva - (X) Computer - (O)
X | O | X
X | O | X
O | X | O
Computer choice:4
Game is draw
press:
1 to play again
2 to return to main menu
0 to exit
your choice:0
Press any key to continue . . .