Institute of Computer Technology
B. Tech Computer Science and Engineering
Subject: ESFP-II (2CSE203)

PRACTICAL-5

AIM: - To learn about arrays & strings in C++.

1. Follow the given details for inquiries about student data.
The program will display a menu that enables the users to choose whether they want to view all students 'records or view only the records of a specific student by the student's id. See sample below.

MENU
1. View all students' records 2. View a student's records by ID 3. Show the highest and the lowest final scores Please enter your choice: 1
|StudentID | Quiz1 | Quiz2 | Mid-Term | Final |
==========
|1232 | 10 | 23 | 45 | 56 |
|2343 | 45 | 43 | 24 | 78 |
|2343 | 34 | 45 | 45 | 45 |
|3423 | 67 | 06 | 65 | 56 |

Note: These records will be stored in a two-dimensional array

CODE:

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

void ShowHeading();
int HighMarks(int stu[4][5]);
int LowMarks(int stu[4][5]);

void displaymenu(){
   cout<<"\n";
   cout<<"======================================================"<<"\n";
   cout<<"                  MENU                          "<<"\n";
   cout<<"======================================================"<<"\n";
   cout<<"    1.View all student records"<<"\n";
   cout<<"    2.View a student records by ID"<<"\n";
   cout<<"    3.Show the highest and the lowest scores"<<"\n"<<endl;
}

void ShowAll(int stu[4][5]){
 int i,j;

ShowHeading();
 for(i=0;i<4;i++){
  for(j=0;j<5;j++) {
      cout<<stu[i][j]<<"\t\t";
      }
```

```
      cout<<"\n";
    }
}

void SearchByID(int stu[4][5]){
    int id,i,j;
    cout<<"Please enter a student's ID:";
    cin>>id;

    for(i=0;i<4;i++){
     if(stu[i][0]==id){
       ShowHeading();
       for(j=0;j<5;j++){
          cout<<stu[i][j]<<"\t\t";
       }
       cout<<"\n";
     }
    }
}
void HighLow(int stu[4][5]){
   cout<<"The higest final score is:"<<HighMarks(stu);
   cout<<"\n";
   cout<<"The lowest final score is:"<<LowMarks(stu);
   cout<<"\n";
}
void ShowHeading(){
cout<<"=========================================================================\n";
cout<<"StudentID     Quiz1        Quiz2        Mid-term       Final\n";
cout<<"=========================================================================\n";
}

int HighMarks(int stu[4][5]){
   int *max,i;
   max=&stu[0][4];

   for(i=0;i<4;i++)
   {
     if(*max<stu[i][4]){
        *max=stu[i][4];
      }
   }
   return(*max);
}

int LowMarks(int stu[4][5]){
   int *min,i;
   min=&stu[0][4];
   for(i=0;i<4;i++)
   {
     if(*min>stu[i][4])
       {
```

```
            *min=stu[i][4];
          }
      }
      return(*min);
}

int main(int argc, char *argv[]) {

int stu[4][5]={{1232,32,34,43,43},{2345,34,34,54,35},{3432,45,54,56,34},{3456,56,34,34,56}};

displaymenu();

int yourchoice;
char confirm;
do
{
cout<<"Enter your choice(1-3):";
cin>>yourchoice;
switch(yourchoice){
 case 1:
    ShowAll(stu);
    break;
 case 2:
    SearchByID(stu);
    break;
 case 3:
    HighLow(stu);
    break;

 default:
    cout<<"invalid";
}
cout<<"Press y or Y to continue:";
    cin>>confirm;
} while(confirm=='y'||confirm=='Y');

  return 0;
}
```

OUTPUT:

```
=============================================================
                        MENU
=============================================================
     1.View all student records
     2.View a student records by ID
     3.Show the highest and the lowest scores

Enter your choice(1-3):1
=====================================================================
StudentID      Quiz1          Quiz2          Mid-term         Final
=====================================================================
1232           32             34             43               43
2345           34             34             54               35
3432           45             54             56               34
3456           56             34             34               56
Press y or Y to continue:y
Enter your choice(1-3):2
Please enter a student's ID:1232
=====================================================================
StudentID      Quiz1          Quiz2          Mid-term         Final
=====================================================================
1232           32             34             43               43
Press y or Y to continue:y
Enter your choice(1-3):3
The higest final score is:56
The lowest final score is:34
Press y or Y to continue:n
PS C:\Users\admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-5>
```

2. In this C++ exercise, your are about to display a matrix as shown below. The diagonal of the matrix fills with 0. The lower side fills will -1s and the upper side fills with 1s.

0 1 1 1 1
-1 0 1 1 1
-1 -1 0 1 1
-1 -1 -1 0 1
-1 -1 -1 -1 0

CODE:

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

int main() {
   int mat[5][5];
   int i,j;

   for (i = 0; i < 5; i++)
   {
      for (j = 0; j < 5; j++)
      {
         if(i>j) {
            mat[i][j]=-1;
         }
```

```
        else if (i<j)
        {
           mat[i][j]=1;
        }
        else {
           mat[i][j]=0;
        }

     }

  }

  for (i = 0; i < 5; i++)
  {
     for (j = 0; j < 5; j++)
     {
        cout<<mat[i][j]<<"\t";
     }
     cout<<endl;
  }
  return 0;
}
```

OUTPUT:

```
0       1       1       1       1
-1      0       1       1       1
-1      -1      0       1       1
-1      -1      -1      0       1
-1      -1      -1      -1      0
PS C:\Users\admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-5>
```

3. Me trying to write a program that change every letter in a given string with the letter following it in the alphabet (ie. a becomes b, p becomes q, z becomes a).

Example:

Sample Input: w3resource

Sample Output: x3sftpvsdf

CODE:

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

int main()
{
  char a[30];
  int code,i,l;
  cout<<"\nEnter String: ";
  gets(a);
cout<<"\n\nInput: "<<a;
  l=sizeof(a);
       for (i = 0; i < l; i++)
```

```
        {
                code = int(a[i]);

                if (code == 122)
                {
                        a[i] = char(97);
                }
                else if (code == 90)
                {
                        a[i] = char(65);
                }
                else if (code >= 65 && code <= 90 || code >= 97 && code <= 122)
                {
                        a[i] = char(code + 1);
                }
        }
   cout<<"\nOutput: "<<a;
        return 0;
}
```

OUTPUT:

```
Input: Yash Prajapati


Input: Yash Prajapati
Output: Zbti Qsbkbqbuj
PS C:\Users\admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-5>
```

Post Practical Work:

1. Find how many times and in which year an entered birth Day has same day within a span of 100 years?
Example:
Input
Enter Your Birthday: 23- 7 -1998
Output
Your Birthday was on Friday and will be repeated 7 times
2007, 2022, 2036, 2059, 2071,2083, 2091.

CODE:

```
#include <iostream>
using namespace std;
class date
{
   public:
   int d,m,y,sd,sm,sy,sday,gd;
   int wd[7]={0,1,2,3,4,5,6};
   char wkd[7]={'S','M','T','W','t','F','s'};
   int month[12]={1,2,3,4,5,6,7,8,9,10,11,12};
   int day[12]={31,28,31,30,31,30,31,31,30,31,30,31};
```

```
void accept() {
   cout<<"Enter the Date (dd):- ";
   cin>>d;
   cout<<"Enter the Month (mm):- ";
   cin>>m;
   cout<<"Enter the Year (yyyy):- ";
   cin>>y;
   }

void getTime() {
   time_t now = time(0);
   tm *ltm = localtime(&now);
   sy=1900 + ltm->tm_year;
   sm=1 + ltm->tm_mon;
   sd=ltm->tm_mday;
   sday= ltm->tm_wday;

   cout<<sy<<endl;
   cout<<sm<<endl;
   cout<<sd<<endl;
   cout<<sday<<endl;
}

void calculate() {
   int i,ctrl=0,ty,tm,td,total;
   int c;
   for(i=y+1;i<sy;i++){
      if((i%4==0&&i%100!=0)||i%400==0){
         ctrl++;
      }
   ty=sy-y+1-ctrl;
   }
   for(i=m+1;i<=12;i++) {
      tm+=day[i];
      while(i==2) {
         if((y%4==0&&y%100!=0)||y%400==0) {
            tm+=1;
         }
      break;
      }
   }
   for(i=1;i<sm;i++) {
      tm+=day[i];
      while(i==2) {
         if((sy%4==0&&sy%100!=0)||sy%400==0){
            tm+=1;
         }
         break;
      }
   }
```

```
        td=sd+day[m]-d+1;
        total=ty*365+ctrl*366+tm+td;
        gd=total%7;

        if(gd<sday) {
            gd=sday-gd;
            cout<<wkd[gd]<<endl;
        }
        else {
            gd=sday+7-gd;
            cout<<wkd[gd];
        }
    }

    void getYears() {
        int i,td=gd;
        cout<<"Repeating Years with the same Weekday are: "<<endl;
        for(i=y+1;i<=y+100;i++) {
            if((i%4==0&&i%100!=0)||i%400==0) {
                td+=2;
            }
            else {
                td+=1;
                td=td%7;
            }
            if(td==gd) {
                cout<<i<<endl;
            }
        }
    }
};

int main() {
    fflush(stdin);
    date ob;
    ob.accept();
    ob.getTime();
    ob.calculate();
    ob.getYears();
}
```

OUTPUT:

```
Enter the Date (dd):- 10
Enter the Month (mm):- 10
Enter the Year (yyyy):- 2002
2021
4
16
5
W
Repeating Years with the same Weekday are:
2013
2019
2024
2030
2041
2047
2052
2058
2069
2075
2080
2086
2097
PS C:\Users\admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-5>
```

2. Write the output of the following program. Assume that all necessary header files are included.

```
void Encrypt(char T[])
{
for (int i = 0; T[i] != '\0'; i += 2)
if (T[i] == 'A' || T[i] == 'E')
T[i] = '#';
else if (islower(T[i]))
T[i] = toupper(T[i]);
else
T[i] = '@';
}
int main()
{
char text[]="SaVE EArtH";
Encrypt(text);
cout << text << endl;
return 0;
}
```

OUTPUT:

```
@a@E@E#rTH
PS C:\Users\admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-5>
```

3. include<iostream>
using namespace std;
void main()
{
int num[]={1,2,3,4,5,6};
num[1]==[1]num ? cout<<"Success" : cout<<"Error";
}

OUTPUT: **No Output, there is syntax error. It should be num[1], not [1]num.**

OUTPUT (after correction):

```
Success
PS C:\Users\admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-5>
```

4. Implement a program to insert a dash character (-) between two odd numbers in a given string of numbers.

Example:

Sample Input: 1345789

Sample Output: Result-> 1-345-789

CODE:

```
#include <iostream>
#include <string>
using namespace std;
string Insert_dash(string num_str) {
   string result_str = num_str;
   for (int x = 0; x < num_str.length() - 1; x++) {
      if ((num_str[x] == '1' || num_str[x] == '3' || num_str[x] == '5' || num_str[x] == '7' || num_str[x] == '9') && (num_str[x + 1] == '1' || num_str[x + 1] == '3' || num_str[x + 1] == '5' || num_str[x + 1] == '7' || num_str[x + 1] == '9'))
      {
         result_str.insert(x+1,"-"); num_str = result_str;
      }
   }
   return result_str;
   }

int main() {
   cout << "\nOriginal number-1345789 : Result-> "<< Insert_dash("1345789") << endl;
   return 0;
}
```

OUTPUT:

```
Original number-1345789 : Result-> 1-345-789
PS C:\Users\admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-5>
```

5. Find errors, if any, in the following function definition for displaying a matrix:

void display(int A[][], int m, int n)

{

```
for(i=0; i<m; i++)
for(j=0; j<n; j++)
cout<<" "<<A[i][j];
cout<<"\n";
}
```

CORRECTED CODE:

```
#include <iostream>
using namespace std;
int main()
{
   int A[10][10];
   int m;
   int n;
   for(int i=0; i<m; i++)
      {
      for(int j=0; j<n; j++)
      {
         cout<<" "<<A[i][j];
         cout<<"\n";
      }
      }
      return 0;
}
```

OUTPUT:

Non-Terminating Loop

```
7569
0
7581
7584
7588
7623
7655
35817
9649
9667
8653
-35057664
-34996759
9765364
369491977
7743
113424
3648
113429
113429
53720
113439
53732
53737
53741
53746
113453
8731
113461
53732
3648
113525
113577
113697
113741
0
0
9495
0
65537
1
2752554

PS C:\Users\admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-5>
```