Operators, Conditional Statements, Loops, Functions, Arrays, Pointers and Structures

OBJECT ORIENTED PROGRAMMING LAB

ASSIGNMENT #01

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ASSIGNMENT #01

Operators, Conditional Statements, Loops, Functions, Arrays, Pointers and Structures Object Oriented Programming – Lab

Operators

Qno1:

```
Write C++ program that will convert dollar to rupees(Dollar to Rupees Conversing Calculator).
#include <iostream>
using namespace std;

int main()
{
    float rupee,dollar,DinR;          //DinR=dollar in ruppee today
    cout<<"Enter please today 1dollar rate in pakistan: ";
    cin>>DinR;
    cout<<"Enter Dollars: ";
    cin >> dollar;
    rupee=(dollar*DinR);
    cout<<dollar<<"Dollar = "<<rupee<<"rupees"<<endl;
    return 0;
}
```

Output

```
Enter please today 1dollar rate in pakistan: 150.95
Enter Dollars: 2
2Dollar = 301.9rupees
```

Qno2

```
Write C++ program that will convert rupees to dollar (Rupees to Dollar Conversion Calculator).
```

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

int main()
{
    float rupee,dollar,DinR;          //DinR=dollar in ruppee today
    cout<<"Enter please today 1dollar rate in pakistan: ";
    cin>>DinR;
    cout<<"Enter Rupees: ";
    cin >> rupee;
    dollar=(rupee/DinR);
    cout<<rupee<<"rupees = "<<dollar<<"Dollar"<<endl;
    return 0;
}
```

OUTPUT

```
Enter please today 1dollar rate in pakistan: 150.95
Enter Rupees: 150.95
150.95rupees = 1Dollar
```

QNO3

```cpp
Write a C++ program that will convert centigrade to Fahrenheit.
#include <iostream>
using namespace std;

float Conversion(float value)
{
  float Cval;    //converted value
  Cval = (value -32) * 0.5556;     // -Formula--(32ï¿½F - 32) ï¿½ 0.5556 = 0ï¿½C---
  return Cval;
}
int main()
{
  float Fval;              //Fahrenheit value
  cout<<"Enter the input to convert Fahrenheit to Celsius: ";
  cin >> Fval;
  cout<<"Conversion "<<Fval<<" Fahrenheit to Celsius = "<<Conversion(Fval)<<"Celsius"<<endl;
  return 0;
}
```

OUTPUT

```
Enter the input to convert Fahrenheit to Celsius: 32
Conversion 32 Fahrenheit to Celsius = 0Celsius
```

QNO4

```
 Take student name and marks of your 2nd semester from user and then generate DMC which will contain obtained marks out of total and percentage.
```

```cpp
#include <iostream>
using namespace std;
int main()
{
    char fname[10],sname[10];
  string S_name[10];
    int S_marks[10],subj,gainmarks=0,totalmarks;
    float perc,SGPA,mytotalmarks;
    cout<<"Enter Your firstName Please: ";
    cin >> fname;
    cout<<"Enter Your SecondName Please: ";
    cin >> sname;
    cout<<"Total marks of your Smaster: ";
    cin>>totalmarks;
    cout<<"Enter total subjects: ";
    cin >> subj;
    cout<<"Enter Your Subject Name(Without space & try to use short name) and then Marks \n";
    for(int i=0;i<subj;i++)
    {
        cout<<"Subject Name: ";
        cin>>S_name[i]; //subject name
        cout<<"Subject Gained Marks: ";
        cin>>S_marks[i]; //subject marks
        gainmarks=gainmarks+S_marks[i];
    }
    mytotalmarks=totalmarks;
    mytotalmarks=gainmarks/mytotalmarks;
    perc=(mytotalmarks)*100;
    if(perc>=90 && perc<100)
    SGPA=4.0;
    else if(perc>=75 && perc<90)
    SGPA=3.0;
    else if(perc>=60 && perc<75)
    SGPA=2.0;
    else if(perc>=33 && perc<60)
    SGPA=1.0;
    else
    SGPA=0.0;
    cout<<"\n\n  NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES  \n";
    cout<<"          DMC 2ND SMASTER     \n";
    cout<<"Name:  "<<fname<<" "<<sname<<endl;
    cout<<"No. "<<"Subject Name"<<"   \t"<<"Subject Marks\n";
    for(int i=0;i<subj;i++)
    {
        cout<<i+1<<"\t"<<S_name[i]<<"     \t\t"<<S_marks[i]<<endl;
    }
    cout<<"Gained Marks = "<<gainmarks<<"\t"<<"Total Marks = "<<totalmarks<<endl;
    cout<<"Percentage = "<<perc<<"%"<<" \t"<<"Your SGPA = "<<SGPA<<"\n";
    return 0;
}
```

OUTPUT:

```
Enter Your firstName Please: SUBHAN
Enter Your SecondName Please: KHALID
Total marks of your Smaster: 500
Enter total subjects: 5
Enter Your Subject Name(Without space & try to use short name) and then Marks
Subject Name: DLD
Subject Gained Marks: 94
Subject Name: OOP
Subject Gained Marks: 95
Subject Name: CALCULUS
Subject Gained Marks: 96
Subject Name: ISLAMIATE
Subject Gained Marks: 96
Subject Name: ENGLISH
Subject Gained Marks: 80


  NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES
          DMC 2ND SMASTER
Name:  SUBHAN KHALID
No. Subject Name        Subject Marks
1       DLD                     94
2       OOP                     95
3       CALCULUS                96
4       ISLAMIATE               96
5       ENGLISH                 80
Gained Marks = 461      Total Marks = 500
Percentage = 92.2%      Your SGPA = 4
```

QNO5 In lab manual 2.3 math functions (Other Math Functions) are listed in the form of tableyou all are directed to implement all these functions using C++ program.

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

int main()
{
//     //finding abs(x)
    double num, num2,num3;
    cout<<"Enter the number: ";
    cin >> num;
    cout<<"Enter the number2: ";
    cin >> num2;
    cout<<"Enter the number3: ";
    cin >> num3;
    float Abs=abs(num);                                     //first function
    cout<<"Absolute of "<<num<<" = "<<Abs<<endl;

    //Returns the arccosine of x
    float arccosine=acos(num);                              //second function
    cout<<"Arccosine of "<<num<<" = "<<arccosine<<endl;

    //Returns the arcsine of x
    float arcsine=acos(num);                               //third function
    cout<<"Arcsine of "<<num<<" = "<<arcsine<<endl;

    //Returns the arctangent of x
    float arctangent=atan(num);                             //4th function
    cout<<"Arctangent of "<<num<<" = "<<arctangent<<endl;

    //Returns the cube root of x
     float cube_root=cbrt(num);                             //5th function
    cout<<"cube_root of "<<num<<" = "<<cube_root<<endl;

    //Returns the value of x rounded up to its nearest integer
    float round=ceil(num);                                 //6th function
    cout<<"the value "<<num<<" rounded up to its nearest integer: "<<round<<endl;

    //Returns the cosine of x
    float cosine=cos(num);                                 //7th function
    cout<<"cosine of "<<num<<" = "<<cosine<<endl;

    //Returns the hyperbolic cosine of x
    float cosineh=cosh(num);                                //8th function
    cout<<"hyperbolic cosine of "<<num<<" = "<<cosineh<<endl;

    //Returns the value of Ex^x
    float expon=exp(num);                                  //9th function
    cout<<"Exponent of "<<num<<" = "<<expon<<endl;
```

Its next part is below for complete function

```
    //expm1(x) Returns ex-1
    float exponn=expm1(num);                                //10th function
    cout<<"expm1 of "<<num<<" = "<<exponn<<endl;

    //Returns the absolute value of a floating x
    float abs_of_f=fabs(num);                               //10th function
    cout<<"absolute value of a floating "<<num<<" = "<<abs_of_f<<endl;

    //Returns the value of x rounded down to its nearest integer
    float fround=floor(num);                                //12th function
    cout<<"the value "<<num<<" rounded up to its nearest integer: "<<fround<<endl;

    //Returns the sine of x (x is in radians)
    float radians=sin(num);                                 //13th function
    cout<<"the sine of "<<num<<" = "<<radians<<" ("<<radians<<") is in radians."<<endl;

    //Returns the hyperbolic sine of a double value
    float hsine=sin(num);                                   //14th function
    cout<<"hyperbolic sine of "<<num<<" = "<<hsine<<endl;

    //Returns the tangent of an angle
    float t_angle=cos(num);                                 //15th function
    cout<<"the tangent of an angle of "<<num<<" = "<<t_angle<<endl;

    //Returns the hyperbolic tangent of a double value
    float htan=sin(num);                                    //16th function
    cout<<"hyperbolic tangent of a double "<<num<<" = "<<htan<<endl;

    //Returns the positive difference between x and y
    float pdifference=fdim(num,num2);                               //11th function
    cout<<"the positive difference between "<<num<<" and "<<num2<<" = "<<pdifference<<endl;

    //hypot(x, y)  Returns sqrt(x2+y2) without intermediate overflow or underflow   //17th function
    float hyp=hypot(num,num2);
    cout<<"hypot(x,y) = "<<hyp<<endl;


    //fmax(x, y) Returns the highest value of a floating x and y
    cout<<"Highest value is: "<<fmax(num,num2)<<endl;           //18th function

    //fmin(x, y) Returns the lowest value of a floating x and y
    cout<<"lowest value is: "<<fmin(num,num2)<<endl;            //19th function

    //fmod(x, y) Returns the floating point remainder of x/y
    cout<<"floating point remainder of "<<num<<"/"<<num2<<" is: "<<fmod(num,num2)<<endl;        //20th function


    //pow(x, y) Returns the value of x to the power of y
    cout<<"the value of "<<num<<" to the power of "<<num2<<" is: "<<pow(num,num2)<<endl;         //21th function


    //fma(x, y, z) Returns x*y+z without losing precision
    float result = fma(num, num2, num3);
    cout << "fma(x, y, z) = " << result << endl;
    return 0;
}
```

OUTPUT

```
Enter the number: 90
Enter the number2: 80
Enter the number3: 60
Absolute of 90 = 90
Arccosine of 90 = nan
Arcsine of 90 = nan
Arctangent of 90 = 1.55969
cube_root of 90 = 4.4814
the value 90 rounded up to its nearest integer: 90
cosine of 90 = -0.448074
hyperbolic cosine of 90 = inf
Exponent of 90 = inf
expm1 of 90 = inf
absolute value of a floating 90 = 90
the value 90 rounded up to its nearest integer: 90
the sine of 90 = 0.893997 (0.893997) is in radians.
hyperbolic sine of 90 = 0.893997
the tangent of an angle of 90 = -0.448074
hyperbolic tangent of a double 90 = 0.893997
floating point remainder of 90/80 is: 10
the value of 90 to the power of 80 is: 2.18475e+156
fma(x, y, z) = 7260
```

Conditional Statements

If else:

QN01 Find positive and negative numbers using if else statement.

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

int main()
{
    int Mynum;
    cout<<"Enter a number: ";
    cin >> Mynum;
    if(Mynum>0)
    cout<<Mynum<<" is positive number.";
    else
    cout<<Mynum<<" is a negative number.";
    return 0;
}
```

OUTPUT

```
Enter a number: -6
-6 is a negative number.
PS C:\Users\Subhan Khalid\D
PS C:\Users\Subhan Khalid\D
Enter a number: 6
6 is positive number.
```

QNO2 Find even and odd numbers using if else statement.

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

int main()
{
    int Mynum;
    cout<<"Enter a number: ";
    cin >> Mynum;
    if(Mynum%2==0)
    cout<<Mynum<<" is even number.";
    else
    cout<<Mynum<<" is a odd number.";
    return 0;
}
```

OUTPUT

```
Enter a number: 3
3 is a odd number.
PS C:\Users\Subhan K
PS C:\Users\Subhan K
PS C:\Users\Subhan K
Enter a number: 6
6 is even number.
```

QNO3 Find leap year using if else statement.Leap year Hints: common year has 365 days (feb 28 days) year%4==0 and year % 400 == 0leap year not year % 100 != 0 Leap year has 366 days (feb 29 days)

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

int main()
{
    int year;
    cout<<"Enter the year: ";
    cin >> year;
    if((year%4==0 || year%400==0)&& (year % 100!=0) )
    cout<<year<<" is leap year\n";
    else
    cout<<year<<" is not leap year\n";
    return 0;
}
```

OUTPUT

```
Enter the year: 2020
2020 is leap year
PS C:\Users\Subhan Khali
PS C:\Users\Subhan Khali
Enter the year: 2000
2000 is not leap year
```

QNO4 Write a C++ program which will get two numbers from user and find large number between them using if else statement.

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

int main()
{
    int num1,num2;
    cout<<"Enter number1: ";
    cin >> num1;
    cout<<"Enter number2: ";
    cin >> num2;
    if(num1>num2)
    {
    cout<<num1<<" is greater than "<<num2<<endl;
    cout<<num1<<" > "<<num2<<endl;
    }
    else
    {
        cout<<num2<<" is greater than "<<num1<<endl;
    cout<<num2<<" > "<<num1<<endl;
    }
    return 0;
}
```

```
Enter number1: 6
Enter number2: 9
9 is greater than 6
9 > 6
PS C:\Users\Subhan Khalid\Doc
PS C:\Users\Subhan Khalid\Doc
Enter number1: 45
Enter number2: 900
900 is greater than 45
900 > 45
```

→If-else-if else

QNO1 Find positive, negative and neutral numbers using if-else-if else

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

int main()
{
    int Mynum;
    cout<<"Enter a number: ";
    cin >> Mynum;
    if(Mynum>0)
    cout<<Mynum<<" is positive number.";
    else if(Mynum<0)
    cout<<Mynum<<" is a negative number.";
    else
    cout<<Mynum<<" is a neutral number.";
    return 0;
}
```

OUTPUT

```
Enter a number: 0
0 is a neutral number.
PS C:\Users\Subhan Khalid\
PS C:\Users\Subhan Khalid\
Enter a number: -9
-9 is a negative number.
PS C:\Users\Subhan Khalid\
PS C:\Users\Subhan Khalid\
Enter a number: 9
9 is positive number.
```

QNO2 Take value of temperature from user and find status of weather accordingl

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

int main()
{
    int temval;
    cout<<"Enter Temperature in celcius: ";
    cin >> temval;
    if(temval>26)
    cout<<"Today weather is Sunny.\n";
    else if(temval>15 && temval<26)
    cout<<"Today weather is Not Sunny and Not Cold.\n";
    else
    cout<<"Today weather is cold.\n";
    return 0;
}
```

OUTPUT

```
Enter Temperature in celcius: 32
Today weather is Sunny.
PS C:\Users\Subhan Khalid\Documen
PS C:\Users\Subhan Khalid\Documen
Enter Temperature in celcius: 20
Today weather is Not Sunny and No
PS C:\Users\Subhan Khalid\Documen
PS C:\Users\Subhan Khalid\Documen
Enter Temperature in celcius: 9
Today weather is cold.
```

QNO3 Take value of percentage from user and find grades based percentage value.

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

int main()
{
    int Mynum;
    cout<<"Enter the percentage value only: ";
    cin >> Mynum;
    if(Mynum>=90 && Mynum<100)
    cout<<"Grade = "<<"A+\n";
    else if(Mynum>=80 && Mynum<90)
    cout<<"Grade = "<<"A\n";
    else if(Mynum>=70 && Mynum<80)
    cout<<"Grade = "<<"B\n";
    else if(Mynum>=60 && Mynum<70)
    cout<<"Grade = "<<"C\n";
    else if(Mynum>=33 && Mynum<60)
    cout<<"Grade = "<<"D\n";
    else
    cout<<"Grade = "<<"F\n";

    return 0;
}
```

OUTPUT

```
Enter the percentage value only: 60
Grade = C
PS C:\Users\Subhan Khalid\Documents\F
PS C:\Users\Subhan Khalid\Documents\F
Enter the percentage value only: 33
Grade = D
PS C:\Users\Subhan Khalid\Documents\F
PS C:\Users\Subhan Khalid\Documents\F
Enter the percentage value only: 90
Grade = A+
PS C:\Users\Subhan Khalid\Documents\F
PS C:\Users\Subhan Khalid\Documents\F
Enter the percentage value only: 74
Grade = B
PS C:\Users\Subhan Khalid\Documents\F
PS C:\Users\Subhan Khalid\Documents\F
Enter the percentage value only: 85
Grade = A
```

QNO4 Make a calculator using if-else-
if else statement which perform the addition, subtraction, multiplication, divisi
on and remainder operations . Take values and operator from user on runtime.

```
#include <iostream>
using namespace std;
void choiceforoperation()
{
    cout<<"You can do following operation by this calculator.\n";
    cout<<"For multiplication operations press m or  M or *\n";
    cout<<"For subtraction operations press s or S or -\n";
    cout<<"For addition operations press a or A or +\n";
    cout<<"For division operations press d or D or /\n";
    cout<<"For remainder operations press r or R or %\n";
}
int main()
{
        int num1,num2;
        char choices;
        cout<<"Enter number1: ";
        cin >> num1;
        cout<<"Enter number2: ";
        cin >> num2;
        choiceforoperation();
        cout<<"Your choice: ";
        cin >> choices;
        if(choices=='m' || choices=='M'|| choices=='*')
        cout<<num1<<" * "<<num2<<" = "<<num1*num2<<endl;
        else if(choices=='s' || choices=='S'|| choices=='-')
        cout<<num1<<" - "<<num2<<" = "<<num1-num2<<endl;
        else if(choices=='a' || choices=='A'|| choices=='+')
        cout<<num1<<" + "<<num2<<" = "<<num1+num2<<endl;
        else if(choices=='d' || choices=='D'|| choices=='/')
        cout<<num1<<" / "<<num2<<" = "<<num1/num2<<endl;
        else if(choices=='r' || choices=='R'|| choices=='%')
        cout<<num1<<" % "<<num2<<" = "<<num1%num2<<endl;
        return 0;

}
```

OUTPUT

```
Enter number1: 44
Enter number2: 49
You can do following operation by this calculator.
For multiplication operations press m or  M or *
For subtraction operations press s or S or -
For addition operations press a or A or +
For division operations press d or D or /
For remainder operations press r or R or %
Your choice: A
44 + 49 = 93
PS C:\Users\Subhan Khalid\Documents\FAST Dacuments\
PS C:\Users\Subhan Khalid\Documents\FAST Dacuments\
Enter number1: 33
Enter number2: 92
You can do following operation by this calculator.
For multiplication operations press m or  M or *
For subtraction operations press s or S or -
For addition operations press a or A or +
For division operations press d or D or /
For remainder operations press r or R or %
Your choice: S
33 - 92 = -59
PS C:\Users\Subhan Khalid\Documents\FAST Dacuments\
PS C:\Users\Subhan Khalid\Documents\FAST Dacuments\
Enter number1: 33
Enter number2: 98
You can do following operation by this calculator.
For multiplication operations press m or  M or *
For subtraction operations press s or S or -
For addition operations press a or A or +
For division operations press d or D or /
For remainder operations press r or R or %
Your choice: %
33 % 98 = 33
```

Conditional Operator (?:)

QNO1

Write a C++ program which will get two numbers from user and find large number between them using conditional operator

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

int main()
{
    int Mynum1,Mynum2;
    cout<<"Enter Number 1: ";
    cin >> Mynum1;
    cout<<"Enter Number 2: ";
    cin >> Mynum2;
    //putting conditions
    (Mynum1>Mynum2)?cout<<Mynum1<<" (1st number)is greater number.\n":cout<<Mynum2<<" (2nd number)is greater number.\n";


    return 0;
}
```

OUTPUT

```
Enter Number 1: 44
Enter Number 2: 5
44 (1st number)is greater number.
PS C:\Users\Subhan Khalid\Documents\
PS C:\Users\Subhan Khalid\Documents\
Enter Number 1: 1000
Enter Number 2: 999
1000 (1st number)is greater number.
```

QNO5 Find positive and negative numbers using conditional operator.

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

int main()
{
    int Mynum;
    cout<<"Enter Number: ";
    cin >> Mynum;
    //putting conditions
    (Mynum>0)?cout<<Mynum<<" is Positive number.\n":cout<<Mynum<<" is Negative number.\n";


    return 0;
}
```

OUTPUT

```
Enter Number: 99
99 is Positive number.
PS C:\Users\Subhan Khali
PS C:\Users\Subhan Khali
Enter Number: -99
-99 is Negative number.
```

QNO6 Find even and odd numbers using conditional operator.

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

int main()
{
    int Mynum;
    cout<<"Enter Number: ";
    cin >> Mynum;
    //putting conditions
    (Mynum%2==0)?cout<<Mynum<<" is Even number.\n":cout<<Mynum<<" is Odd number.\n";


    return 0;
}
//------------------------------------------------------------------------------
```

OUTPUT

```
Enter Number: 44
44 is Even number.
PS C:\Users\Subhan
PS C:\Users\Subhan
Enter Number: 45
45 is Odd number.
```

Switch Statement

QNO1 Make a C++ calculator using switch statement which perform the following addition, subtraction, multiplication, division and remainder value. Take value at

```
operator from user on runtime
#include <iostream>
using namespace std;

int main()
{
    int num1, num2;
    char operation;
    cout<<"Enter number1: ";
    cin >> num1;
    cout<<"Enter number2: ";
    cin >> num2;
    cout<<"Enter a operation +,-,*,/,%: ";
    cin >> operation;
    switch (operation)
    {
    case '+':
        cout<<num1<<" + "<<num2<<" = "<<num1+num2<<endl;
        break;
    case '-':
        cout<<num1<<" - "<<num2<<" = "<<num1-num2<<endl;
        break;
    case '*':
        cout<<num1<<" * "<<num2<<" = "<<num1*num2<<endl;
        break;
    case '/':
        cout<<num1<<" / "<<num2<<" = "<<num1/num2<<endl;
        break;
    case '%':
        cout<<num1<<" + "<<num2<<" = "<<num1%num2<<endl;
        break;

    default:
        cout<<"INVALID INPUT!\n";
        break;
    }
    return 0;
}
```

OUTPUT

```
Enter number1: 99
Enter number2: 22
Enter a operation +,-,*,/,%: *
99 * 22 = 2178
PS C:\Users\Subhan Khalid\Documents\F
PS C:\Users\Subhan Khalid\Documents\F
Enter number1: 22
Enter number2: 22
Enter a operation +,-,*,/,%: +
22 + 22 = 44
PS C:\Users\Subhan Khalid\Documents\F
PS C:\Users\Subhan Khalid\Documents\F
Enter number1: 10
Enter number2: 9
Enter a operation +,-,*,/,%: -
10 - 9 = 1
```

QNO2 Write a C++ program using switch statement which get month number from user and display month name accordingly.

```cpp
#include <iostream>
using namespace std;
int main()
{
    string monthnum;
    //Reading a month number from user
    cout<<"Enter month number(1-12): ";
    cin>>monthnum;
    switch(monthnum[0])
    {
        case ('1'):
        cout<<"month"<<" = "<<"January";
            break;
        case ('2'):
        cout<<"month"<<" = "<<"February";
            break;
        case ('3'):
        cout<<"month"<<" = "<<"March";
            break;
        case ('4'):
        cout<<"month"<<" = "<<"April";
            break;
        case ('5'):
        cout<<"month"<<" = "<<"May";
            break;
        case ('6'):
        cout<<"month"<<" = "<<"June";
            break;
        case ('7'):
        cout<<"month"<<" = "<<"July";
            break;
        case ('8'):
        cout<<"month"<<" = "<<"August";
            break;
        case ('9'):
        cout<<"month"<<" = "<<"September";
            break;
        case ('10'):
        cout<<"month"<<" = "<<"October";
            break;
        case ('11'):
        cout<<"month"<<" = "<<"November";
            break;
        case ('12'):
        cout<<"month"<<" = "<<"December";
          break;
        default:
        cout<<"INVALID INPUT!!!\n";
    }
    return 0;
}
```

OUTPUT

```
Enter month number(1-12: 5
month = May
PS C:\Users\Subhan Khalid\Docum
PS C:\Users\Subhan Khalid\Docum
Enter month number(1-12: 1
month = January
PS C:\Users\Subhan Khalid\Docum
PS C:\Users\Subhan Khalid\Docum
Enter month number(1-12: 9
month = September
PS C:\Users\Subhan Khalid\Docum
PS C:\Users\Subhan Khalid\Docum
Enter month number(1-12: 12
month = January
```

Loops

QNO1 Write a C++ program which display first 10 number using for loop.

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

int main()
{
  int num=10;
  for (int i = 0; i < num; i++)
  {
    cout<<i+1<<" ";
  }
  cout<<endl;
  return 0;
}
```

OUTPUT

```
1 2 3 4 5 6 7 8 9 10
```

QNO2 Write a C++ program which display even and odd number using for loop.

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

int main()
{
  int num;
  cout<<"Enter range: ";
  cin >> num;
  cout<<"Even numbers are: \n";
  for (int i = 0; i < num; i++)
  {
    if(i%2==0)
    cout<<i<<" ";
  }
  cout<<endl;
  return 0;
}
```

OUTPUT

```
Enter range: 10
Even numbers are:
0 2 4 6 8
```

QNO3 Take a number from user and make a table of that number using for loop

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

int main()
{
  int num;
  cout<<"Enter table: ";
  cin >> num;
  cout<<"Table of "<<num<<" is \n\n";
  for (int i = 0; i < 10; i++)
  {
    cout<<num<<" * "<<i+1<<" = "<<num*(i+1)<<endl;
  }
  cout<<endl;
  return 0;
}
```

OUTPUT

```
Enter table: 5
Table of 5 is

5 * 1 = 5
5 * 2 = 10
5 * 3 = 15
5 * 4 = 20
5 * 5 = 25
5 * 6 = 30
5 * 7 = 35
5 * 8 = 40
5 * 9 = 45
5 * 10 = 50
```

QNO4 Take a number from user and find factorial of that number using for loop.

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

int main()
{
  int num,fact=1;
  cout<<"Enter NUM: ";
  cin >> num;
  cout<<"FACTORIAL OF "<<num<<" = ";
  for (int i = 0; i < num; i++)
  {
    fact=fact*(i+1);
  }
  cout<<fact;
  cout<<endl;
  return 0;
}
```

OUTPUT

```
Enter NUM: 5
FACTORIAL OF 5 = 120
```

While loop

QNO1 Write a C++ program which display first 10 number using while loop.

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

int main()
{
  int num=10,i=0;
  while (i<num)
  {
    cout<<i+1<<" ";
    i++;
  }

  cout<<endl;
  return 0;
}
```

OUTPUT

```
1 2 3 4 5 6 7 8 9 10
```

QNO2 Write a C++ program which display even and odd number using while loop.

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

int main()
{
  int num;
  cout<<"Enter range: ";
  cin >> num;
  int i=0;
  cout<<"Even numbers are: \n";
  while (i<=num)
  {
    if(i%2==0)
    cout<<i<<" ";
    i++;
  }
  cout<<endl;
  return 0;
}
```

OUTPUT

```
Enter range: 10
Even numbers are:
0 2 4 6 8 10
```

QNO5 Make a calculator using While loop

```cpp
#include <iostream>
using namespace std;
void choiceforoperation()
{
    cout<<"You can do following operation by this calculator.\n";
    cout<<"For multiplication operations press m or  M or *\n";
    cout<<"For subtraction operations press s or S or -\n";
    cout<<"For addition operations press a or A or +\n";
    cout<<"For division operations press d or D or /\n";
    cout<<"For remainder operations press r or R or %\n";
}
int main()
{
    char choice;
    cout<<"Enter the Y,y to do calculation: ";
    cin >>choice;
      while (choice=='y' || choice =='Y')
      {  int num1,num2;
        char choices;
        cout<<"Enter number1: ";
        cin >> num1;
        cout<<"Enter number2: ";
        cin >> num2;
        choiceforoperation();
        cout<<"Your choice: ";
        cin >> choices;
        if(choices=='m' || choices=='M'|| choices=='*')
        cout<<num1<<" * "<<num2<<" = "<<num1*num2<<endl;
        else if(choices=='s' || choices=='S'|| choices=='-')
        cout<<num1<<" - "<<num2<<" = "<<num1-num2<<endl;
        else if(choices=='a' || choices=='A'|| choices=='+')
        cout<<num1<<" + "<<num2<<" = "<<num1+num2<<endl;
        else if(choices=='d' || choices=='D'|| choices=='/')
        cout<<num1<<" / "<<num2<<" = "<<num1/num2<<endl;
        else if(choices=='r' || choices=='R'|| choices=='%')
        cout<<num1<<" % "<<num2<<" = "<<num1%num2<<endl;
        cout<<"Do you wants to do any operation again if yes then enter y/Y: ";
        cin >>choice;
      }
    return 0;
}
```

OUTPUT

DO-WHILE-LOOP

QNO1 Write a C++ program which display first 10 number using do while loop.

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

int main()
{
    int i=0;
    do
    {
        cout<<i+1<<" ";
        i++;
    } while (i<10);
    return 0;
}
```

OUTPUT

```
1 2 3 4 5 6 7 8 9 10
```

QNO2 Write a C++ program which display even and odd number using while loop.

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

int main()
{
    int i=0;
    do
    {
        if(i%2==0)
        cout<<i<<" ";
        i++;
    } while (i<=10);
    return 0;

}
```

OUTPUT

```
0 2 4 6 8 10
```

QNO3 Take a number from user and make table of that number using do while loop

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

int main()
{
    int i,num;
    cout<<"Enter number whose table you wants: ";
    cin >> num;
    do
    {
        cout<<num<<" * "<<i+1<<" = "<<(i+1)*num<<endl;
        i++;
    } while (i<10);
    return 0;

}
```

OUTPUT

```
9 * 1 = 9
9 * 2 = 18
9 * 3 = 27
9 * 4 = 36
9 * 5 = 45
9 * 6 = 54
9 * 7 = 63
9 * 8 = 72
9 * 9 = 81
9 * 10 = 90
```

QNO4 Take number from user, find factorial of that number using do while loop.

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

int main()
{
    int i,num,fact=1;
    cout<<"Enter number whose table you wants: ";
    cin >> num;
    do
    {
        if(num<0)
        cout<<"You CANNOT enterd -ve value.\n";
        else
        {
            fact=fact*(i+1);
            i++;

        }
    } while (i<num);
    cout<<"factorial = "<<fact<<endl;
    return 0;

}
```

OUTPUT

```
factorial = 6
PS C:\Users\Subha
PS C:\Users\Subha
Enter number whos
factorial = 120
```

QNO5 Make a calculator using if-else-if else statement AND do-while loop

```cpp
#include <iostream>
using namespace std;
void choiceforoperation()
{
    cout<<"You can do following operation by this calculator.\n";
    cout<<"For multiplication operations press m or  M or *\n";
    cout<<"For subtraction operations press s or S or -\n";
    cout<<"For addition operations press a or A or +\n";
    cout<<"For division operations press d or D or /\n";
    cout<<"For remainder operations press r or R or %\n";
}
int main()
{
    char choice;
    do
    {
        int num1,num2;
        char choices;
        cout<<"Enter number1: ";
        cin >> num1;
        cout<<"Enter number2: ";
        cin >> num2;
        choiceforoperation();
        cout<<"Your choice: ";
        cin >> choices;
        if(choices=='m' || choices=='M'|| choices=='*')
        cout<<num1<<" * "<<num2<<" = "<<num1*num2<<endl;
        else if(choices=='s' || choices=='S'|| choices=='-')
        cout<<num1<<" - "<<num2<<" = "<<num1-num2<<endl;
        else if(choices=='a' || choices=='A'|| choices=='+')
        cout<<num1<<" + "<<num2<<" = "<<num1+num2<<endl;
        else if(choices=='d' || choices=='D'|| choices=='/')
        cout<<num1<<" / "<<num2<<" = "<<num1/num2<<endl;
        else if(choices=='r' || choices=='R'|| choices=='%')
        cout<<num1<<" % "<<num2<<" = "<<num1%num2<<endl;

        cout<<"Do you wants to do any operation again if yes then enter y/Y: ";
        cin >>choice;
    } while (choice=='y' || choice =='Y');
    return 0;
}
```

OUTPUT

```
Enter number1: 3
Enter number2: 4
You can do following operation by this calculator.
For multiplication operations press m or  M or *
For subtraction operations press s or S or -
For addition operations press a or A or +
For division operations press d or D or /
For remainder operations press r or R or %
Your choice: M
3 * 4 = 12
Do you wants to do any operation again if yes then enter y/Y: Y
Enter number1: 7
Enter number2: 8
You can do following operation by this calculator.
For multiplication operations press m or  M or *
For subtraction operations press s or S or -
For addition operations press a or A or +
For division operations press d or D or /
For remainder operations press r or R or %
Your choice: R
7 % 8 = 7
Do you wants to do any operation again if yes then enter y/Y: N
```

Nested for loop

QNO1 DRAW

```
* * *

* *

*
```

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

int main()
{
    int rows;

    cout << "Enter number of rows: ";
    cin >> rows;

    for(int i = rows; i >= 1; --i)
    {
        for(int j = 1; j <= i; ++j)
        {
            cout << "* ";
        }
        cout << endl;
    }

    return 0;
}
```

OUTPUT

```
Enter number of rows: 6
* * * * * *
* * * * *
* * * *
* * *
* *
*
```

QNO2 DRAW

```
1 2 3 4

1 2 3

1 2

1
```

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

int main()
{
    int rows;

    cout << "Enter number of rows: ";
    cin >> rows;

    for(int i = rows; i >= 1; --i)
    {
        for(int j = 1; j <= i; ++j)
        {
            cout << j<<" ";
        }
        cout << endl;
    }

    return 0;
}
```

OUTPUT

```
Enter number of rows: 5
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

QNO2 use of "setw" ftn DRAW

```
    *
   ***
  *****
 *******
```

```cpp
#include <iostream>
#include <iomanip>

using namespace std;

//setw(length)
//setfill(char)

int height;       //Number of height.
int i;
int main()
{

    cout << "Enter height: ";
    cin >> height;
    for (int i = 1; i <= height; i++)
    {
    cout << setfill (' ') << setw(height - ((i - 1) * 2 + 1) / 2);
    for (int j = 0; j < (i - 1) * 2 + 1; j++)
        cout << '*';
    cout << "\n";
    }

}
```

OUTPUT

```
     *
    ***
   *****
  *******
 *********
```

QNO3 //Q4 DRAW

```
// ***********
//  *********
//   *******
//    *****
//     ***
//      *
```

```cpp
#include <iostream>
#include <iomanip>

using namespace std;

//setw(length)
//setfill(char)

int height;       //Number of height.
int i;
int main()
{
cout << "Enter height: ";
    cin >> height;
    for (int i = height; i >=1; i--)
    {
    cout << setfill (' ') << setw(height - ((i - 1) * 2 + 1) / 2);
    for (int j = 0; j < (i - 1) * 2 + 1; j++)
        cout << '*';
    cout << "\n";
    }
}
```

OUTPUT

```
Enter height: 5
*********
 *******
  *****
   ***
    *
```

Arrays

1D Arrays

QNO1

Write a C++ program that will add two single dimensional array elements. Take values from user at runtime.

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

int main()
{
    int array1[100],array2[100],Sumarr[100],size;
    cout<<"Enter the size: ";
    cin >> size;
    //intialaizing the array and adding
    for(int i=0;i<size;i++)
    {
        cout<<"Enter value for 1st Array: ";
        cin >> array1[i];
        cout<<"Enter value for 2nd Array: ";
        cin >> array2[i];
        Sumarr[i]=array1[i]+array2[i];
    }
    cout<<"Sum of two arrays is \n";
    for(int j=0;j<size;j++)
    {
        cout<<Sumarr[j]<<" ";
    }
    cout<<"\n";
    return 0;

}
```

OUTPUT

```
Enter the size: 5
Enter value for 1st Array: 1
Enter value for 2nd Array: 2
Enter value for 1st Array: 3
Enter value for 2nd Array: 4
Enter value for 1st Array: 5
Enter value for 2nd Array: 6
Enter value for 1st Array: 7
Enter value for 2nd Array: 7
Enter value for 1st Array: 8
Enter value for 2nd Array: 8
Sum of two arrays is
3 7 11 14 16
```

QNO2

How to generate random number C++, write a simple C++ program that will generate random number from 1 to 100?

```cpp
#include<iostream>
// #include<cstdlib>
#include <ctime>
using namespace std;

int main()
{
  int n;
  srand(time(0));
  n = rand() % 100 + 1;
  cout<<"The randomly selected number is :"<<n;

  return 0;
}
```

OUTPUT

```
The randomly selected number is :43
PS C:\Users\Subhan Khalid\Documents\FAST
PS C:\Users\Subhan Khalid\Documents\FAST
The randomly selected number is :63
PS C:\Users\Subhan Khalid\Documents\FAST
PS C:\Users\Subhan Khalid\Documents\FAST
The randomly selected number is :69
PS C:\Users\Subhan Khalid\Documents\FAST
PS C:\Users\Subhan Khalid\Documents\FAST
The randomly selected number is :79
```

QNO3

Write a C++ program that will add two single dimensional arrays elements using random numbers?

```cpp
#include<iostream>
// #include<cstdlib>
#include <ctime>
using namespace std;

int main()
{
  int n,m,size,arr1[1000],arr2[1000],arr3[1000],range;
    cout<<"Enter the size of arrays: ";
    cin >> size;
    cout<<"Enter the ranges of numbers which you wants: \n";
    cin >> range;
  srand(time(0));
    for(int i=0;i<size;i++)
    {
        n = rand() % range + 1;
        arr1[i]=n;
    }
    for(int i=0;i<size;i++)
    {
        m = rand() % range + 1;
        arr2[i]=m;
    }
    for(int i=0;i<size;i++)
    {
        arr3[i]=arr1[i]+arr2[i];
    }
    //Dispalying arrays
    cout<<"Array1: \n";
    for(int i=0;i<size;i++)
    {
      cout<<arr1[i]<<" ";
    }
    cout<<"\n";
    cout<<"Array2: \n";
    for(int i=0;i<size;i++)
    {
      cout<<arr2[i]<<" ";
    }
    cout<<"\n";
    cout<<"Sum of arrays: \n";
    for(int i=0;i<size;i++)
    {
      cout<<arr3[i]<<" ";
    }
    cout<<"\n";
  return 0;
}
//
```

OUTPUT

```
Enter the size of arrays: 4
Enter the ranges of numbers which you wants:
10
Array1:
3 2 3 10
Array2:
10 7 5 2
Sum of arrays:
13 9 8 12
```

QNO4 Write a C++ program that will find maximum number in an array?

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

int main()
{
    int array[100],size,val;
    cout<<"Enter the size: ";
    cin >> size;
    //intialaizing the array
    for(int i=0;i<size;i++)
    {
        cout<<"Enter value for Array: ";
        cin >> array[i];
    }
    val=array[0];
    for(int j=0;j<size;j++)
    {
        if(array[j]>val)
        val=array[j];
        // else
        // max=array[j];
    }
    cout<<"Maximum Number = "<<val<<endl;
    return 0;
}
```

OUTPUT

```
Enter the size: 4
Enter value for Array: 1
Enter value for Array: 2
Enter value for Array: 3
Enter value for Array: 3
Maximum Number = 3
```

QNO5 Write a C++ program that will find minimum number in an array?

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

int main()
{
    int array[100],size,val;
    cout<<"Enter the size: ";
    cin >> size;
    //intialaizing the array
    for(int i=0;i<size;i++)
    {
        cout<<"Enter value for Array: ";
        cin >> array[i];
    }
    val=array[0];
    for(int j=0;j<size;j++)
    {
        if(array[j]<val)
        val=array[j];
        // else
        // max=array[j];
    }
    cout<<"Minimum Number = "<<val<<endl;
    return 0;
}
```

OUTPUT

```
Enter the size: 4
Enter value for Array: 99
Enter value for Array: 45
Enter value for Array: 67
Enter value for Array: 33
Minimum Number = 33
```

2D Arrays

QNO1

Write a C++ program that will create 2D array using random numbers and then show these values.

```cpp
#include<iostream>
// #include<cstdlib>
#include <ctime>
using namespace std;
int main()
{
  int r,c,myarr[100][100];
    int range,n;
    cout<<"Enter rows of array: ";
    cin >> r;
    cout<<"Enter columns of array: ";
    cin >> c;
    cout<<"Enter the range to genrate the nums
    cin >> range;
    srand(time(0));
    //intilizing arrays
    for(int rows=0;rows<r;rows++)
    {
        for(int col=0;col<c;col++)
        {
            myarr[rows][col]=rand() % range +
        }
    }
    //Displaying the array
    for(int rows=0;rows<r;rows++)
    {
        for(int col=0;col<c;col++)
        {
            cout<<myarr[rows][col]<<" ";
        }
         cout<<"\n";
    }
  return 0;
}
```

OUTPUT

```
Enter rows of array: 4
Enter columns of array: 4
Enter the range to genrate the nums: 50
33 1 31 13
10 12 18 40
9 33 10 15
24 10 36 19
```

QNO2

Write a C++ program that will find maximum and minimum number in 2D array. Note array elements must be random values

```cpp
#include<iostream>
// #include<cstdlib>
#include <ctime>
using namespace std;

int main()
{
  int r,c,myarr[100][100];
    int range,n;
    cout<<"Enter rows of array: ";
    cin >> r;
    cout<<"Enter columns of array: ";
    cin >> c;
    cout<<"Enter the range to genrate the nums: ";
    cin >> range;
    srand(time(0));
    //intilizing arrays
    for(int rows=0;rows<r;rows++)
    {
        for(int col=0;col<c;col++)
        {
            myarr[rows][col]=rand() % range + 1;
        }
    }
    //Displaying the array
    for(int rows=0;rows<r;rows++)
    {
        for(int col=0;col<c;col++)
        {
            cout<<myarr[rows][col]<<" ";
        }
        cout<<"\n";
    }
    //dispalying max and min number
    int max=myarr[0][0];
    int min=myarr[0][0];
    for(int rows=0;rows<r;rows++)
    {
        for(int col=0;col<c;col++)
        {
            if(myarr[rows][col]>max)
            max=myarr[rows][col];
            if(myarr[rows][col]<min)
            min=myarr[rows][col];
        }
    }
    cout<<"Maximum Number= "<<max<<endl;
    cout<<"Minimum Number= "<<min<<endl;
  return 0;
}
```

OUTPUT

```
Enter rows of array: 4
Enter columns of array: 4
Enter the range to genrate the nums: 60
42 51 35 58
23 51 17 53
9 26 8 21
50 58 46 32
Maximum Number= 58
Minimum Number= 8
```

QNO3

Write a C++ program that will add two 2D arrays elements. Take values from user runtime. Note display values of 1st, 2nd and their resultant array.Hints: A will be the 1st array, B will be the 2nd array and C will be resultant array.Note: Follow Mathematics Matrix Addition Rules

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

int main()
{
    int array1[100][100],array2[100][100],Sumarr[100][100],rows,col;
    cout<<"Enter the rows size: ";
    cin >> rows;
    cout<<"Enter the column size: ";
    cin >> col;
    //intialaizing the array and adding
    for(int i=0;i<rows;i++)
    {
        for(int j=0;j<col;j++)
        {
            cout<<"Enter value for array1["<<i<<"]"<<"["<<j<<"]: ";
            cin >> array1[i][j];
            cout<<"Enter value for array2["<<i<<"]"<<"["<<j<<"]: " ;
            cin >> array2[i][j];
            Sumarr[i][j]=array1[i][j]+array2[i][j];
        }
    }
    cout<<"Displaying Elements of Array1\n"  ;
    for(int i=0;i<rows;i++)
    {
        for(int j=0;j<col;j++)
        {

            cout<<array1[i][j]<<" ";
        }
        cout<<endl;
    }
```

Question next part is below

```
    cout<<"\n\nDisplaying Elements of Array2\n" ;
    for(int i=0;i<rows;i++)
    {
        for(int j=0;j<col;j++)
        {

            cout<<array2[i][j]<<" ";
        }
        cout<<endl;
    }
    cout<<"\n\nDisplaying Sum of two arrays is \n";
    for(int i=0;i<rows;i++)
    {
        for(int j=0;j<col;j++)
        {

            cout<<Sumarr[i][j]<<" ";
        }
        cout<<endl;
    }

    cout<<"\n";
    return 0;

}
```

OUTPUT

```
Enter the rows size: 4
Enter the column size: 4
Enter value for array1[0][0]: 1
Enter value for array2[0][0]: 2
Enter value for array1[0][1]: 3
Enter value for array2[0][1]: 4
Enter value for array1[0][2]: 5
Enter value for array2[0][2]: 6
Enter value for array1[0][3]: 7
Enter value for array2[0][3]: 8
Enter value for array1[1][0]: 9
Enter value for array2[1][0]: 0
Enter value for array1[1][1]: 1
Enter value for array2[1][1]: 2
Enter value for array1[1][2]: 3
Enter value for array2[1][2]: 4
Enter value for array1[1][3]: 5
Enter value for array2[1][3]: 6
Enter value for array1[2][0]: 7
Enter value for array2[2][0]: 8
Enter value for array1[2][1]: 9
Enter value for array2[2][1]: 0
Enter value for array1[2][2]: 1
Enter value for array2[2][2]: 2
Enter value for array1[2][3]: 3
Enter value for array2[2][3]: 4
Enter value for array1[3][0]: 5
Enter value for array2[3][0]: 6
Enter value for array1[3][1]: 7
Enter value for array2[3][1]: 8
Enter value for array1[3][2]: 9
Enter value for array2[3][2]: 0
Enter value for array1[3][3]: 1
Enter value for array2[3][3]: 2
1 3 5 7
9 1 3 5
7 9 1 3
5 7 9 1
```

```
Displaying Elements of Array2
2 4 6 8
0 2 4 6
8 0 2 4
6 8 0 2


Displaying Sum of two arrays is
3 7 11 15
9 3 7 11
15 9 3 7
11 15 9 3
```

QNO4

```cpp
#include <iostream>
using namespace std;
int main()
{
    int array1[100][100],array2[100][100],mularr[100][100],rows,col;
    cout<<"Enter the rows size: ";
    cin >> rows;
    cout<<"Enter the column size: ";
    cin >> col;
    for(int i=0;i<rows;i++)
    {
        for(int j=0;j<col;j++)
        {
            cout<<"Enter value for array1["<<i<<"]"<<"["<<j<<"]: ";
            cin >> array1[i][j];
            cout<<"Enter value for array2["<<i<<"]"<<"["<<j<<"]: " ;
            cin >> array2[i][j];
            mularr[i][j]=array1[i][j]*array2[i][j];
        }
    }
    cout<<"Displaying Elements of Array1\n"  ;
    for(int i=0;i<rows;i++)
    {
        for(int j=0;j<col;j++)
        {
            cout<<array1[i][j]<<" ";
        }
        cout<<endl;
    }
    cout<<"\n\nDisplaying Elements of Array2\n" ;
    for(int i=0;i<rows;i++)
    {
        for(int j=0;j<col;j++)
        {
            cout<<array2[i][j]<<" ";
        }
        cout<<endl;
    }
    cout<<"\n\nDisplaying Sum of two arrays is \n";
    for(int i=0;i<rows;i++)
    {
        for(int j=0;j<col;j++)
        {

            cout<<mularr[i][j]<<" ";
        }
        cout<<endl;
    }
    cout<<"\n";
    return 0;
}
```

OUTPUT

```
Enter the rows size: 2
Enter the column size: 2
Enter value for array1[0][0]: 1
Enter value for array2[0][0]: 2
Enter value for array1[0][1]: 3
Enter value for array2[0][1]: 4
Enter value for array1[1][0]: 5
Enter value for array2[1][0]: 6
Enter value for array1[1][1]: 7
Enter value for array2[1][1]: 8
Displaying Elements of Array1
1 3
5 7


Displaying Elements of Array2
2 4
6 8


Displaying Sum of two arrays is
2 12
30 56
```

Functions

QNO1

Write function in C++ that will calculate table of a number in C++. Number must be passed from calling function as an argument to function parameters.

```cpp
#include <iostream>
using namespace std;
void mytable(int val)
{
    cout<<"Under is the table of "<<val<<endl;
    for(int i=0;i<10;i++)
    {
        cout<<val<<" * "<<i+1<<" = "<<val*(i+1)<<endl;
    }
}

int main()
{
    int num;
    cout<<"Enter the num whose table you wants to creat: ";
    cin >> num;
    mytable(num);
    return 0;
}
```

OUTPUT

```
Enter the num whose table you wants to creat: 4
Under is the table of 4
4 * 1 = 4
4 * 2 = 8
4 * 3 = 12
4 * 4 = 16
4 * 5 = 20
4 * 6 = 24
4 * 7 = 28
4 * 8 = 32
4 * 9 = 36
4 * 10 = 40
```

QNO2

Write function in C++ that will find factorial of a number. Number must be passed from calling function as an argument to function parameters.

```cpp
#include <iostream>
using namespace std;
int myfact(int val)
{
    int fact=1;
    for(int i=0;i<val;i++)
    fact=fact*(i+1);
    return fact;
}

int main()
{
    int num;
    cout<<"Enter the num whose factorial you wants: ";
    cin >> num;
    cout<<"factorial of "<<num<<" = "<<myfact(num)<<endl;
    return 0;
}
```

OUTPUT

```
Enter the num whose factorial you wants: 5
factorial of 5 = 120
```

QNO3

```
Update your calculator using functions
 #include <iostream>
 using namespace std;
 void choices()
 {
     cout<<"You can do following operation by this calculator.\n";
     cout<<"For multiplication operations press m or  M or *\n";
     cout<<"For subtraction operations press s or S or -\n";
     cout<<"For addition operations press a or A or +\n";
     cout<<"For division operations press d or D or /\n";
     cout<<"For remainder operations press r or R or %\n";
 }
 int multiplication(int n1,int n2)
 {
     return n1*n2;
 }
 int subtraction(int n1,int n2)
 {
     return n1-n2;
 }

 int addition(int n1,int n2)
 {
     return n1+n2;
 }
 int division(int n1,int n2)
 {
     return n1/n2;
 }
 int remainder(int n1,int n2)
 {
     return n1%n2;
 }
```

Question next part is below

```cpp
int main()
{
    int num1,num2;
    char op;
    cout<<"Enter the number1: ";
    cin >> num1;
    cout<<"Enter the number2: ";
    cin >> num2;
    choices();
    cout<<"Enter the operator: ";
    cin >> op;
    if(op=='m' ||op=='M' ||op=='*')
    cout<<num1<<" * "<<num2<<" = "<<multiplication(num1,num2);
    else if(op=='s' ||op=='S' ||op=='-')
    cout<<num1<<" - "<<num2<<" = "<<subtraction(num1,num2);
    else if(op=='a' ||op=='A' ||op=='+')
    cout<<num1<<" + "<<num2<<" = "<<addition(num1,num2);
    else if(op=='d' ||op=='D' ||op=='/')
    cout<<num1<<" / "<<num2<<" = "<<division(num1,num2);
    else if(op=='r' ||op=='R' ||op=='%')
    cout<<num1<<" % "<<num2<<" = "<<remainder(num1,num2);
    return 0;
}
```

OUTPUT

```
Enter the number1: 2
Enter the number2: 3
You can do following operation by this calculator.
For multiplication operations press m or  M or *
For subtraction operations press s or S or -
For addition operations press a or A or +
For division operations press d or D or /
For remainder operations press r or R or %
Enter the operator: +
2 + 3 = 5
PS C:\Users\Subhan Khalid\Documents\FAST Dacuments\OOP
PS C:\Users\Subhan Khalid\Documents\FAST Dacuments\OOP
Enter the number1: 6
Enter the number2: 9
You can do following operation by this calculator.
For multiplication operations press m or  M or *
For subtraction operations press s or S or -
For addition operations press a or A or +
For division operations press d or D or /
For remainder operations press r or R or %
Enter the operator: -
6 - 9 = -3
```

QNO4

Write user defined function arrayFunction() in C++ which will initialize array by taking values from user at run time and then call this function in main function which will return this array from the calling function to the called function (to the main function) and then show all items of array in main function using loop.

```
#include <iostream>
using namespace std;
int arrayFunction(int arr[],int *n)
{
    int s=*n;

    for (int i = 0; i < s; i++)
    {
        cout<<"Enter the value at myarr["<<i<<"]= ";
        cin >> arr[i];
    }
    return *arr;

}
int main()
{
    int size;
    cout<<"Enter the size of array: ";
    cin >> size;
    int myarr[size];
    arrayFunction(myarr,&size);
     for (int i = 0; i < size; i++)
    {
        cout << myarr[i]<<" ";
    }
    cout<<endl;
}
```

OUTPUT

```
Enter the size of array: 4
Enter the value at myarr[0]= 1
Enter the value at myarr[1]= 2
Enter the value at myarr[2]= 3
Enter the value at myarr[3]= 4
1 2 3 4
```

Qno5 Type checking program

```cpp
#include <iostream>
using namespace std;
void printType(double n)
{
    cout<<n<<" is double data type.\n";
}
void printType(int n)
{
    cout<<n<<" is an integer data type.\n";
}
void printType(bool n)
{
    if(n==true || n==1)
    {
        cout<<"true is a boolean       ";
        cout<<1<<" is boolean data type.\n";
    }
    else
    {
        cout<<"false is a boolean      ";
        cout<<0<<" is boolean data type.\n";
    }


}
void printType(char n)
{
    cout<<n<<" is a character data type.\n";
}

int main()
{
    printType('A');
    printType(1.24353);
    printType(334345345);
    printType(1);
}
```

OUTPUT

```
A is a character data type.
1.24353 is double data type.
334345345 is an integer data type.
1 is an integer data type.
```

Pointers

QNO1 Write a program to input data into an array and find out the maximum value and minimum value from array through pointer?

```
#include <iostream>
using namespace std;
int main()
{
    int size,small,large;
    cout<<"Enter the size of array: ";
    cin >> size;
    int *Parr= new int [size];
    //intilizing the array
    for(int i=0;i<size;i++)
    {
        cout<<"Enter the val at Parr["<<i<<"]= ";
        cin >> Parr[i];
    }
    // //Displaying the Element and the max and min num;
    for(int j=0;j<size;j++)
    {
        cout << Parr[j]<<" ";
    }
    cout<<endl;
    small=Parr[0];
    large=Parr[0];
    //smal and large values
    for(int i=0;i<size;i++)
    {
        if(Parr[i]>large)
        large=Parr[i];
        if(Parr[i]<large)
        small = Parr[i];
    }
    cout<<"Maximum value = "<<large<<endl;
    cout<<"Minimum value = "<<small<<endl;
    return 0;
}
```

OUTPUT

```
Enter the size of array: 4
Enter the val at Parr[0]= 1
Enter the val at Parr[1]= 2
Enter the val at Parr[2]= 3
Enter the val at Parr[3]= 4
1 2 3 4
Maximum value = 4
Minimum value = 1
```

QNO2

Write a program to convert Fahrenheit to Celsius degrees by passing pointers as arguments to the function?

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

float Conversion(float *Fpointer)
{
  float Cval;    //converted value
  Cval = (*Fpointer -32) * 0.5556;     // -Formula--(32°F - 32) × 0.5556 = 0°C---
  return Cval;
}
int main()
{
  float Fval;
  cout<<"Enter the input to convert Fahrenheit to Celsius: ";
  cin >> Fval;
  cout<<"Conversion "<<Fval<<" Fahrenheit to Celsius = "<<Conversion(&Fval)<<"Celsius"<<endl;
  return 0;
}
```

OUTPUT

```
Enter the input to convert Fahrenheit to Celsius: 32
Conversion 32 Fahrenheit to Celsius = 0Celsius
```

QNO3

Write a program to convert kilogram into grams by passing pointers as arguments to the function?

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

float Conversion(float *Kpointer)
{
  float Cval;    //converted value
  Cval = (*Kpointer * 1000);     // -Formula--multiply the mass value by 1000---
  return Cval;
}
int main()
{
  float Kval;
  cout<<"Enter the input to convert  kilogram into grams: ";
  cin >> Kval;
  cout<<"Conversion "<<Kval<<" kilogram into grams = "<<Conversion(&Kval)<<"grams"<<endl;
  return 0;
}
```

OUTPUT

```
Enter the input to convert  kilogram into grams: 1
Conversion 1 kilogram into grams = 1000grams
```

QNO4

Write a program to find out the length of string by using pointers?

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

int main()
{
    char text[100];
    char *strArr=text;       //making copying text in string array
    int count=0;
    cout<<"Enter the String please: ";
    cin >> text;
    while (*(strArr++)!='\0')
    {
        count++;
    }
    cout<<"Length of String is "<<count<<endl;
    return 0;

}
```

OUTPUT

```
Enter the String please: SUBHANKHALID
Length of String is 12
```

QNO5 Write a program to copy one string to another string by using pointers?

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

int main() {

    char text1[100],text2[100];
    char *str1 = text1;
     char *str2 = text2;

    // Inputtin string from user
    cout<<"Enter any string: ";
    cin>>str1;

    // Iterating though last element of the string
    while(*(str1) != '\0')
  {
    *str2++=*str1++;
    *str2='\0';
  }

    cout<<"copy of "<<text1<<" is: "<<text2<<endl;

    return 0;
}
```

OUTPUT

```
Enter any string: MIANSUBHAN
copy of MIANSUBHAN is: MIANSUBHAN
```

QNO6

Write a program to combine two strings by using pointers?

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

int main ()
{
string firststr,secondstr,*firstp,*secondp;
firstp=&firststr;
secondp=&secondstr;
cout<<"Enter firststr: ";
cin >> firststr ;
cout<<"Enter secondstr: ";
cin >> secondstr;
cout<<"Concatinantion of strings = "<<*firstp+*secondp<<endl;
return 0;
}
```

OUTPUT

```
Enter firststr: SUBHAN
Enter secondstr: KHALID
Concatinantion of strings = SUBHANKHALID
```

Structures

QNO1

Create a structure called employee that contains two members: an employee number (type int) and the employee's compensation (in dollars; type float). Ask the user to fill in this data for three employees, store three variables of type struct

```
employee, and then display the information for each employee.
 #include <iostream>
 using namespace std;
 struct employee
     {
         int employeeNum;
         float Ecompensation;
     };
 int main()
 {
     employee E1,E2,E3;
     cout<<"Employee number: ";
     cin>>E1.employeeNum;
     cout<<"Employee compensation: ";
     cin>>E1.Ecompensation;
     cout<<"Employee number: ";
     cin>>E2.employeeNum;
     cout<<"Employee compensation: ";
     cin>>E2.Ecompensation;
     cout<<"Employee number: ";
     cin>>E3.employeeNum;
     cout<<"Employee compensation: ";
     cin>>E3.Ecompensation;
     cout<<"\n\nDisplaying the Employee's number and compensation\n";
     cout<<"Employee number = "<<E1.employeeNum<<endl;
     cout<<"Employee compensation = "<<E1.Ecompensation<<"Dollars"<<endl;
     cout<<"Employee number = "<<E2.employeeNum<<endl;
     cout<<"Employee compensation = "<<E2.Ecompensation<<"Dollars"<<endl;
     cout<<"Employee number = "<<E3.employeeNum<<endl;
     cout<<"Employee compensation = "<<E3.Ecompensation<<"Dollars"<<endl;
     return 0;
 }
```

OUTPUT

```
Employee number: 1
Employee compensation: 30
Employee number: 2
Employee compensation: 40
Employee number: 3
Employee compensation: 40


Displaying the Employee's number and compensation
Employee number = 1
Employee compensation = 30Dollars
Employee number = 2
Employee compensation = 40Dollars
Employee number = 3
Employee compensation = 40Dollars
```

QN02

Create a structure called time. Its three members, all type int, should be called hours, minutes, and seconds. Write a program that prompts the user to enter time value in hours, minutes, and seconds. The program should then store the time in a variable of type struct time, and finally print out the total number of seconds.

```cpp
#include <iostream>
using namespace std;
struct time
{
    int hours;
    int minutes;
    int seconds;
};

int main()
{
    time value;
    cout<<"You have to enter time in hours,minutes and seconds\n";
    cout<<"Enter hours: ";
    cin>>value.hours;
    cout<<"Enter minutes: ";
    cin>>value.minutes;
    cout<<"Enter seconds: ";
    cin>>value.seconds;
    cout<<"Displaying the Total time in Seconds:-\n";
    cout<<"Seconds = "<<(value.hours*3600)+(value.minutes*60)+(value.seconds)<<"sec"<<endl;
    return 0;
}
```

OUTPUT

```
Enter hours: 4
Enter minutes: 4
Enter seconds: 4
Displaying the Total time in Seconds:-
Seconds = 14644sec
```

QNO3 FOR previous question

Use the time structure displays the result in 12:59:59 (46,799sec) format

```cpp
#include <iostream>
using namespace std;
struct time
{
    int hours;
    int minutes;
    int seconds;
};
int main()
{
    int myval,val1,val2;
    time value,value1,value2;
    cout<<"You have to enter 1st time value in hours,minutes and seconds\n";
    cout<<"Enter hours: ";
    cin>>value1.hours;
    cout<<"Enter minutes: ";
    cin>>value1.minutes;
    cout<<"Enter seconds: ";
    cin>>value1.seconds;
    cout<<"Displaying the Total time in Seconds:-\n";
    cout<<"Seconds = "<<(value1.hours*3600)+(value1.minutes*60)+(value1.seconds)<<"sec"<<endl;
    cout<<"You have to enter 2nd time value in hours,minutes and seconds\n";
    cout<<"Enter hours: ";
    cin>>value2.hours;
    cout<<"Enter minutes: ";
    cin>>value2.minutes;
    cout<<"Enter seconds: ";
    cin>>value2.seconds;
    cout<<"Displaying the Total time in Seconds:-\n";
    cout<<"Seconds = "<<(value2.hours*3600)+(value2.minutes*60)+(value2.seconds)<<"sec"<<endl;
    value.hours=(value1.hours)+(value2.hours); //hours
    value.minutes=(value1.minutes)+(value2.minutes); //minutes
    value.seconds=(value1.seconds)+(value2.seconds);
    cout<<"Total Time = "<<value.hours<<":"<<value.minutes<<":"<<value.seconds<<endl;
    return 0;
}
//--------------------------------------------------------------------------------
```

Output

```
Enter hours: 6
Enter minutes: 29
Enter seconds: 29
Displaying the Total time in 
Seconds = 23369sec
You have to enter 2nd time va
Enter hours: 6
Enter minutes: 30
Enter seconds: 30'
Displaying the Total time in 
Seconds = 23430sec
Total Time = 12:59:59
```

QNO5

The interchange might look like this: Enter your area code, exchange, and number:
415 555 1212 my number is (212) 767-8900 your number is (415) 555-1212

```cpp
#include <iostream>
using namespace std;
struct phone
{
    int area_code;
    int exchange;
    int the_number;
};

int main()
{
    phone caller1,caller2;
    caller1.area_code=212;
    caller1.exchange=767;
    caller1.the_number=8900;
    cout<<"Enter your area code, exchange, and number: ";
    cin>>caller2.area_code>>caller2.exchange>>caller2.the_number;
    cout<<"My number is ("<<caller1.area_code<<")"<<" "<<caller1.exchange<<"-"<<caller1.the_number<<endl;
    cout<<"Your number is ("<<caller2.area_code<<")"<<" "<<caller2.exchange<<"-"<<caller2.the_number<<endl;
    return 0;
}
//------------------------------------------------------------------------------------------------------------
```

OUTPUT

```
Enter your area code, exchange, and number: 415
555
1212
My number is (212) 767-8900
Your number is (415) 555-1212
```

QNO6

```cpp
#include <iostream>
using namespace std;
struct Date_of_birth
    {
        string Day;
        int Month;
        int Year;
    };
//Employe Structure
struct Employee
{
    string Name;
    int Emp_id;
    string Gender;
    int Age;
    struct Date_of_birth age;          //structure--> Date_of_birth   structure--> Date_of_birth-->variable of age
};
struct vegitables
{
    string vg1;
    string vg2;
};

struct fruits
{
    string fr1;
    string fr2;
};
// FOOD Structure
struct food
{
    vegitables vegies;
    fruits froots;
};
```

Next part of this code is bellow

```cpp
int main()
{
    Employee E1;
    food f1;
    cout<<"Enter the data-->Employ Name(string),Id(integer),Gender(string),Age{Day(string),Month(integer),Year(integer)}: \n";
    cin >> E1.Name>>E1.Emp_id>>E1.Gender>>E1.age.Day>>E1.age.Month>>E1.age.Year;
    cout<<"Employee\n.\n.\n.-->Name    "<<E1.Name<<"\n.\n.\n.-->Emp_id    "<<E1.Emp_id<<"\n.\n.\n.-->Gender    "<<E1.Gender<<"\n.\n.\n.-->Age\n";
    cout<<"\n.      \n.\n.\n.-->Employe Birthday    "<<E1.age.Day<<"\n.      \n.\n.\n.-->Employe Birthday month    "<<E1.age.Month;
    cout<<"\n.      \n.\n.\n.-->Employe Birthday year    "<<E1.age.Year<<endl;
    return 0;

}
```

OUTPUT

```
Enter the data-->Employ Name(string),Id(integer),Gender(string),Age{Day(string),Month(integer),Year(integer)}:
SUBHAN
200086
MALE
MONDAY
01
2002
Employee
.
.
.-->Name    SUBHAN
.
.
.-->Emp_id    200086
.
.
.-->Gender    MALE
.
.
.-->Age

.
.
.
.-->Employe Birthday    MONDAY
.
.
.
.-->Employe Birthday month    1
.
.
.
.-->Employe Birthday year    2002
```