Assignment - 2

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1.

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

int main(){
	int a , fact = 1;
	cout<<"Enter a num : ";
	cin>>a;
	if(a<2){
		fact = 1;
	}
	for(int i = 1; i<=a ; i++)
		fact = fact*i;
	cout<<"Factorial of "<<a<<" is "<<fact;
	return 0;
}
```

INPUT	EXPECTED OUTPUT	MY OUTPUT
4	24	24
6	720	720

2.

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

int main(){
	int a ;
	double s = 0;
	cout<<"Enter a num : ";
	cin>>a;
	for(double i = 1 ; i<=a ; i++)
	s = s + 1/i;
	cout<<"Sum = "<<s;
}
```

INPUT	EXPECTED OUTPUT	MY OUTPUT
4	2.08333	2.08333
6	2.45	2.45

3.

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

int main(){
	int n , a = 0, b = 0 , s = 0;
```

```
        cout<<"Enter num : ";
        cin>>n;
        for(int i; i<=n ; i++){
                if(i%2==0){
                        a = a + i;
                }
                else{
                        b = b + i;
                }
        }
        s = b - a;
        cout<<"Sum upto n series = "<<s;
        return 0;

}
```

INPUT	EXPECTED OUTPUT	MY OUTPUT
7	4	4
9	5	5

4.

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

double sum(int a)
{
```

```
        double s = 0;
        int fact = 1;
    for (int i = 1; i <= a; i++){
        fact = fact*i;
        s = s + 1.0/fact;
        }
    return s;
}
int main(){
        int a;
        cout<<"Enter a num : ";
        cin>>a;
        cout<<"Sum = "<<sum(a);
        return 0;

}
```

INPUT	EXPECTED OUTPUT	MY OUTPUT
5	1.71667	1.71667
6	1.71806	1.71806

5.

```
#include <iostream>
#include<math.h>
using namespace std;

double series(int a)
```

```
{
        double s = 0 , c = 0  , d = 0;
        for(int i = 1 ; i<=a ; i++){

                if(i%2==0){
                        c = c + 1 / pow(i , i);
                }
                else{
                        d = d + 1 / pow(i , i);
                }
                s = d - c ;
        }
        return s;
}


int main(){
        int a;
        cout<<"Enter a num : ";
        cin>>a;
        cout<<"Sum of series = "<<series(a);
        return 0;


}
```

INPUT	**EXPECTED OUTPUT**	**MY OUTPUT**
6	0.783429	0.783429
9	0.783431	0.783431

6.

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

void isprime()
{
        int a, i , c=0;
        cout << "Enter the Number to check Prime: ";
        cin >> a;

        for(i = 1 ; i <= a; i++)
 {
    if(a % i == 0)
    {
      c++;
    }
 }
 if (c==2){
        cout << "Number is Prime."<<endl;
 }
   else{
        cout << "Number is not Prime."<<endl;
        }

        cout<<endl;

        int k=0, j;
   cout<<"Prime Numbers Between 1 to 100 are:\n";
   for(i=1; i<=100; i++)
   {
      for(j=2; j<i; j++)
      {
        if(i%j==0)
```

```
        {
            k++;
            break;
        }
    }
    if(k==0 && i!=1)
        cout<<i<<endl;
    k = 0;


}
}

int main()
{
  isprime();
  return 0;
}
```

INPUT	EXPECTED OUTPUT	MY OUTPUT
49	Not prime	Not prime
13	Prime	prime

7.

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

```
int main(){

	int p ;
	cout<<"Enter a number : ";
	cin>>p;

	cout<<"Factors : ";

	for(int i=1 ; i<p ; i++){

		if(p%i==0){
			cout<<i<<",";
		}
	}
	return 0;
}
```

INPUT	EXPECTED OUTPUT	MY OUTPUT
60	1,2,3,4,5,6,10,12,15,20,30,60	1,2,3,4,5,6,10,12,15,20,30,60
48	1,2,3,4,6,8,12,16,24,48	1,2,3,4,6,8,12,16,24,48

8.
(i) #include<iostream>
using namespace std;

```
int main()
{
int n, s, i, j;
cout << "Enter number of rows: ";
cin >> n;
for(i = 1; i <= n; i++)
{

for(s = i; s < n; s++)
{
        cout << " ";
}

for(j = 1; j <= (2 * i - 1); j++)
        {
                cout << "*" ;
        }
cout << "\n";
                }
return 0;
}
```

(ii)

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

void star(int n)
{

   for (int i = 0; i < n; i++) {

       for (int j = 0; j <= i; j++) {

           cout << "* ";
       }
       cout << endl;
```

```
    }
}

int main()
{
    int n;
    cout<<"Enter number of rows = ";
    cin>>n;
    star(n);
    return 0;
}
```

(iii)

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

int main()
{
    int i, j, k,n;
    cout<<"Enter number of rows = ";
    cin>>n;
    for(i=n;i>=1;i--)
    {
        for(j=1;j<i;j++)
        {
            cout << " ";
        }
        for(k=n;k>=i;k--)
        {
            cout << "*";
        }
        cout << endl;
    }
    return 0;
}
```

(iv)
```
#include<iostream>
using namespace std;

int main()
{
    int i, j, k , n;
    cout<<"Enter number of Rows = ";
    cin>>n;
    for(i=1;i<=n;i++)
    {
        for(j=i;j<n;j++)
        {
         cout << " ";
        }
        for(k=1;k<(i*2);k++)
        {
            cout << "*";
        }
        cout <<endl;
    }
        for(i=n-1;i>=1;i--)
    {
        for(j=n;j>i;j--)
        {
            cout << " ";
        }
        for(k=1;k<(i*2);k++)
        {
            cout << "*";
        }
        cout <<endl;
    }
    return 0;
}
```

(v)
```
#include <iostream>
using namespace std;
int main()
{
int i, j, k, space, n;
cout<<"Enter number of rows = ";
cin >> n;
cout << " ";
for (i=1; i<=n; i++)
{

for (j=1; j<=n-i; j++)
cout << " ";

for (j=1,k=2*i-1; j<=2*i-1; j++,k--)
{
if (j <= k)
        cout << j;
else
        cout << k;
}
cout << endl;
cout << " ";

}
return 0;
}
```

(vi)
```
void pat(int rows){
        int i,j;
        char character = 'A';
```

```
 for(i=rows;i>=1;i--)
 {
        for(j=1;j<=i;j++){
                cout<<character;
                character++;
 }
 for(j=1;j<=2*(rows-i);j++)
        cout<<" ";
 for(j=1;j<=i;j++){
        cout<<character;
character++;
}
cout<<"\n";
character = 'A';
        }
}
```

9.

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

int main() {
  int x, y;

  cout << "Enter two numbers: ";
  cin >> x >> y;
```

```
  while(x != y) {
    if(x > y)
      x = x - y;
    else
      y = y - x;
  }

  cout << "GCD = " << x;

  return 0;
}
```

INPUT	EXPECTED OUTPUT	MY OUTPUT
34,24	2	2
45,30	15	15

10.

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

int fibonacci(){
        int t , count , n1, n2 ,n3;
        cout<<"Number of terms : ";
        cin>>t;

        n1 = 0;
```

```
        n2 = 1;
        count = 0;

        cout<<"Fibonacci sequence : ";

        while(count<t){
                cout<<n1<<",";
                n3 = n1 + n2;
                n1 = n2;
                n2 = n3;
                count++;
        }
}
        int main(){
                fibonacci();
                return 0;
        }
```

INPUT	EXPECTED OUTPUT	MY OUTPUT
8	0,1,1,2,3,5,8,13	0,1,1,2,3,5,8,13
6	0,1,1,2,3,5	0,1,1,2,3,5

11.

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

```
int main(){

	int *arr;
	int size;

	cout<<"Enter size of array : ";
		cin>>size;
		arr = new int[size];

	cout<<"Enter elements of array : "<<endl;
		for(int i=0 ; i<size ; i++)
		cin>>arr[i];

		for(int i=0 ; i<size ; i++)
		{
			for( int j=i+1 ; j<size  ; j++)
			{
				if(arr[i]==arr[j])
				{
					for(int k=j ; k<size ; k++)
						arr[k]=arr[k+1];
						size--;
					j--;
				}
			}
		}

	cout<<"Array elements after deletion of the duplicate elements: ";
	cout<<"{";
   for (int i = 0; i < size; i++)
   {
      cout<<arr[i]<<",";
   }
   cout<<"}";
```

}

INPUT	EXPECTED OUTPUT	MY OUTPUT
1,2,3,1,3,6,2	1,2,3,6	1,2,3,6
2,3,5,6,6,7,8,5	2,3,5,6,7,8	2,3,5,6,7,8

12.

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

int main(){

	char a[1000] , c;
	int count=0;

	cout<<"Enter the string = ";
	cin>>a;

	cout<<"Enter character to be searched = ";
	cin>>c;

	for(int i = 0; a[i] ; i++){

		if(a[i]==c){
			count++;
		}
	}
```

```
        cout<<"Character "<<c<<" occurred "<<count<<" times.";
        return 0;
}
```

13.

```
#include<iostream>
#include<conio.h>
#include <cstring>
using namespace std;

void concetation(char* s1,char* s2);
void compare(char* s1,char* s2);
int length(char* s1);
void Address(char* s1);
void reverse(char* s1);
void UpperCase(char* s1);
//int reverse(char s1[]);
int main() {
  char s1[100], s2[100] ;
  int choice;
 do {
       cout<<endl;
cout << "1. To Show the address of each character in the string"<<endl;
```

```
cout << "2. Concatenate two strings"<<endl;
cout << "3. Compare two strings"<<endl;
cout << "4. Length of string"<<endl;
cout << "5. Lowercase characters to uppercase characters"<<endl;
cout << "6. Reverse the string"<<endl;
cout << "7. Exit"<<endl;
cout << "Enter your choice: ";
cin >> choice;

switch(choice){
 case 1:
        cout << "Enter a string: ";
        cin >> s1;
        Address(s1);
        break;
 case 2:
        cout << "Enter first string: ";
        cin >> s1;
        cout << "Enter second string: ";
        cin >> s2;
        concetation(s1,s2);
        break;
```

```
case 3:
        cout << "Enter first string: ";
        cin >> s1;
        cout << "Enter second string: ";
        cin >> s2;
        compare(s1,s2);
        break;
 case 4:
        cout << "Enter a string: ";
        cin >> s1;
        cout << "Length of the string is " << length(s1) << endl; break;
 case 5:
        cout << "Enter a string: ";
        cin >> s1;
        UpperCase(s1);
        cout << "Uppercase string is " << s1 << endl;
        break;
 case 6:
        cout << "Enter a string: ";
        cin >> s1;
        reverse(s1);
        cout << "Reversed string is " << s1 << endl;
        break;
```

```
case 7:
        cout << "Exiting program.\n";
        break;
 default:
        cout << "Invalid choice. Please try again.\n";
 }

 } while(choice != 7);
 return 0;
}

void concetation(char* s1,char* s2){
        int length, j;
        variable length = 0;

  while (s1[length] ! =
   '\0') { ++length;

 }
 for (j = 0; s2[j] != '\0'; ++j, ++length) {
 s1[length] = s2[j];
 }
```

```
 s1[length] = '\0';
cout<<"\n After concatenation: ";
cout<<s1;
}

void compare(char* s1,char* s2){
        int flag = 0;
        if(length(s1) == length(s2))
 {
 for(int i=0; i<length(s1); i++)
{
        if(s1[i] != s2[i])
{
        flag = 1;
        break;
 }
 }
        if(flag == 0)
                cout << "Strings are equal\n";
        else
                cout << "Strings are not equal\n";
}
```

```
else
        cout << "Strings are not equal\n";
}
int length(char* str)
{
int len = 0;
while(*(str+len) != '\0')
len++;
return len;
}
void Address(char* s1)
 {
 for(int i=0; i<length(s1); i++)
        cout << "Address of " << s1[i] << " is " << (void*)&s1[i] << endl;
}
void reverse(char* s1)
{
 int len = length(s1);
 for(int i=0; i<len/2; i++)
 {
 char temp = s1[i];
s1[i] = s1[len-1-i];
s1[len-1-i] = temp;
 }
}
```

```
void UpperCase(char* s1)
{
for(int i=0; i<length(s1); i++)
{
if(s1[i] >= 'a' && s1[i] <= 'z')
        s1[i] -= 32;
 }
}
```

INPUT	EXPECTED OUTPUT	MY OUTPUT
vinayy,vinay	Not equal	Strings are not equal
vinay	yaniv	yaniv

14.

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

void mergeArrays(int arr1[], int arr2[], int n1,int n2, int arr3[])
{
        int i = 0, j = 0, k = 0;
```

```
	while (i<n1 && j <n2)
	{

		if (arr1[i] < arr2[j])
			arr3[k++] = arr1[i++];
		else
			arr3[k++] = arr2[j++];
	}


	while (i < n1)
		arr3[k++] = arr1[i++];


	while (j < n2)
		arr3[k++] = arr2[j++];
}


int main()
{
	int arr1[] = {1, 3, 5, 7};
	cout<<"First array = {";
	for(int i = 0 ; i<4 ; i++){
		cout<<arr1[i]<<",";
	}
	cout<<"}"<<endl;

	int n1 = sizeof(arr1) / sizeof(arr1[0]);

	int arr2[] = {2, 4, 6, 8};
	cout<<"Second array = {";
	for(int i = 0 ; i<4 ; i++){
		cout<<arr2[i]<<",";
	}
```

```
        cout<<"}"<<endl;
        int n2 = sizeof(arr2) / sizeof(arr2[0]);

        int arr3[n1+n2];
        mergeArrays(arr1, arr2, n1, n2, arr3);

        cout << "Array after merging = {" ;
        for (int i=0; i < n1+n2; i++)
                cout << arr3[i] << ",";
        cout<<"}";
        return 0;
}
```

15.

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

int main(){

        int *arr;
        int size;
        int element , flag=0;

        cout<<"Enter size of array : ";
                cin>>size;
                arr = new int[size];

        cout<<"Enter elements of array : "<<endl;
                for(int i=0 ; i<size ; i++)
                cin>>arr[i];


                cout<<"Enter element to be searched : ";
                cin>>element;
```

```
        for(int i=0 ; i<size ; i++)
        {
            if(arr[i]==element)
            {
                cout<<"Element is present in the set"<<endl<<endl;
                flag=1;
                break;
            }
        }

        if(flag==0){
            cout<<"Element is not present in the set"<<endl<<endl;
        }

    return 0;
}
```

INPUT	EXPECTED OUTPUT	MY OUTPUT
8	Not present	Not present
1	present	present

16.

FRACTION

```
#include <iostream>
using namespace std;
class FRACTION
{
public:
    int nr, dr;
    void fraction(int nr, int dr)
    {
        cout<< "Fraction: " << nr << "/" << dr;
    }
    void sumfraction(int n1, int d1, int n2, int d2)
    {
        cout << "\nSum of two given fractions " << (n1 * d2 + n2 * d1) << "/"
<< (d1 * d2);
    }
    void prodfraction(int n1, int d1, int n2, int d2)
    {
         cout << "\nProduct of given fractions " << n1 * n2<<"/"<<d1*d2;
    }
};
int main()
{
```

```
    FRACTION A, B, S, D;
    A.fraction(1, 2);
    cout<<endl;
    B.fraction(1, 3);
    S.sumfraction(1, 2, 1, 3);
    A.prodfraction(1, 2, 1, 3);
    // A.fractiontype(nr, dr);
    return 0;
}
```

MATRIX

```
#include <iostream>
using namespace std;
class MATRIX
{
    int mat[3][3];

public:
    MATRIX(int arr[3][3])
```

```
{
    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            mat[i][j] = arr[i][j];
        }
    }
}
void printmatrix()
{
    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            cout << mat[i][j] << " ";
        }
        cout << endl;
    }
}
void add_matrices(int mat1[3][3], int mat2[3][3], int sum[3][3])
```

```
{
    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            sum[i][j] = mat1[i][j] + mat2[i][j];
        }
    }
}
void productmatrices(int mat1[3][3], int mat2[3][3], int product[3][3])
{
    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            product[i][j] = 0;
            for (int k = 0; k < 3; k++)
            {
                product[i][j] += mat1[i][k] * mat2[k][j];
            }
        }
```

```
        }
    }
};
int main()
{
    int A[3][3] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};
    int B[3][3] = {{3, 2, 1}, {6, 5, 4}, {9, 8, 7}};
    int C[3][3];
    int D[3][3];
    MATRIX matA(A);
    MATRIX matB(B);
    MATRIX matC(C);
    MATRIX matD(D);
    matA.printmatrix();
    cout << endl;
    matB.printmatrix();
    matC.add_matrices(A, B, C);
    cout << "Sum of two given matrices:" << endl;
    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
```

```
        {
            cout << C[i][j] << " ";
        }
        cout << endl;
    }
    matD.productmatrices(A, B, D);
    cout << endl
         << "The product of two given matrices is: " << endl;
    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            cout << D[i][j] << " ";
        }
        cout << endl;
    }
    return 0;
}
```

TRIANGLE

```
#include <iostream>
```

```
#include <cmath>

using namespace std;

class TRIANGLE
{
private:
    int side1, side2, side3;

public:
    TRIANGLE(int s1, int s2, int s3)
    {
        side1 = s1;
        side2 = s2;
        side3 = s3;
    }
    double Perimeter()
    {
        return side1 + side2 + side3;
    }
    double Area()
```

```
    {
        double s = Perimeter() / 2;
        return sqrt(s * (s - side1) * (s - side2) * (s - side3));
    }
    void printSides()
    {
        cout << "Side 1: " << side1 << endl;
        cout << "Side 2: " << side2 << endl;
        cout << "Side 3: " << side3 << endl;
    }
};

int main()
{
    TRIANGLE A(3, 4, 5);
    A.printSides();
    cout << "Perimeter of triangle A: " << A.Perimeter() << endl;
    cout << "Area of A: " << A.Area() << endl;

    TRIANGLE B(5, 12, 13);
    B.printSides();
```

```
    cout << "Perimeter of  trianle B: " << B.Perimeter() << endl;
    cout << "Area of B: " << B.Area() << endl;

    return 0;
}
```