

**Assignment No. 01**

➤ **TITLE** – Implement C++ program to demonstrate use of classes and objects.

➤ **CODES & OUTPUTS** –

1. Write a program which will perform addition, multiplication, subtraction and division of 2 numbers using CPP. 3 Ways → (Take user I/p and using class, define outside class, by predefined var)

**First way -**

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

```
class Calculator{
public:
    float add(float a, float b){
        return a + b;
    }
    float sub(float a, float b){
        return a - b;
    }
    float mul(float a, float b){
        return a * b;
    }
    float div(float a, float b){
        return a / b;
    }
};
```

```
int main(){
    Calculator obj;
    float a,b,res;
    int ch;
    cout<<"Enter first value - "<<endl;
    cin>>a;
    cout<<"Enter second value - "<<endl;
    cin>>b;
    cout << "Choose an operation \n 1. Addition\n 2. Subtraction\n 3.
Multiplication\n 4. Division\n";
    cin>>ch;
    switch(ch){
        case 1:
            res = obj.add(a,b);
            cout<<"Addition = "<<res<<endl;
            break;
        case 2:
            res = obj.sub(a,b);
            cout<<"Subtraction = "<<res<<endl;
            break;
        case 3:
            res = obj.mul(a,b);
            cout<<"Product = "<<res<<endl;
            break;
```

```

        case 4:
            res = obj.div(a,b);
            cout<<"Quotient = "<<res<<endl;
            break;
    }
}

```

### Output –

```

Enter first value -
120
Enter second value -
15
Choose an operation
1. Addition
2. Subtraction
3. Multiplication
4. Division
4
Quotient = 8

```

### Second Way -

```

#include <iostream>
using namespace std;

class Calculator{
public:
    float add(float a, float b);
    float sub(float a, float b);
    float mul(float a, float b);
    float div(float a, float b);
};

float Calculator::add(float a, float b){
    return a + b;
}

float Calculator::sub(float a, float b){
    return a - b;
}

float Calculator::mul(float a, float b){
    return a * b;
}

float Calculator::div(float a, float b){
    return a / b;
}

int main(){
    Calculator obj;
    float a,b,res;
    int ch;
    cout<<"Enter first value - "<<endl;
    cin>>a;

```

```

    cout<<"Enter second value - "<<endl;
    cin>>b;
    cout << "Choose an operation \n 1. Addition\n 2. Subtraction\n 3.
Multiplication\n 4. Division\n";
    cin>>ch;
    switch(ch){
        case 1:
            res = obj.add(a,b);
            cout<<"Addition = "<<res<<endl;
            break;
        case 2:
            res = obj.sub(a,b);
            cout<<"Subtraction = "<<res<<endl;
            break;
        case 3:
            res = obj.mul(a,b);
            cout<<"Product = "<<res<<endl;
            break;
        case 4:
            res = obj.div(a,b);
            cout<<"Quotient = "<<res<<endl;
            break;
    }
}

```

**Output –**

```

Enter first value -
30
Enter second value -
4
Choose an operation
1. Addition
2. Subtraction
3. Multiplication
4. Division
2
Subtraction = 26

```

**Third Way -**

```

#include <iostream>
using namespace std;

class Calculator{
public:
    float add(float a, float b){
        return a + b;
    }
    float sub(float a, float b){
        return a - b;
    }
    float mul(float a, float b){
        return a * b;
    }
    float div(float a, float b){

```

```

        return a / b;
    }
};

int main(){
    Calculator obj;
    float a = 20,b = 12,res;
    int ch;
    cout << "Choose an operation \n 1. Addition\n 2. Subtraction\n 3.
Multiplication\n 4. Division\n";
    cin>>ch;
    switch(ch){
        case 1:
            res = obj.add(a,b);
            cout<<"Addition = "<<res<<endl;
            break;
        case 2:
            res = obj.sub(a,b);
            cout<<"Subtraction = "<<res<<endl;
            break;
        case 3:
            res = obj.mul(a,b);
            cout<<"Product = "<<res<<endl;
            break;
        case 4:
            res = obj.div(a,b);
            cout<<"Quotient = "<<res<<endl;
            break;
    }
}

```

**Output –**

```

Choose an operation
1. Addition
2. Subtraction
3. Multiplication
4. Division
3
Product = 240

```

**2. Calculate area of rectangle, circle, triangle. Take I/p from user.**

```

#include <iostream>
using namespace std;

class Area{
public:
    float calculate_rect(float l, float b){
        return l * b;
    }
    float calculate_cir(float r){
        return 3.142 * r * r;
    }
    float calculate_tri(float b, float h){

```

```

        return 0.5 * b * h;
    }
    void display_rect(float res){
        cout<<"Area of rectangle = "<<res<<endl;
    }
    void display_cir(float res){
        cout<<"Area of Circle = "<<res<<endl;
    }
    void display_tri(float res){
        cout<<"Area of Triangle = "<<res<<endl;
    }
};

int main(){
    Area a;
    float length, breadth, radius, base, height;
    float res;
    int ch;
    cout<<"Choose an option: \n 1. Rectangle\n 2. Circle\n 3. Triangle\n";
    cin>>ch;
    switch(ch){
        case 1:
            cout<<"Enter length of rectangle = "<<endl;
            cin>>length;
            cout<<"Enter breadth of rectangle = "<<endl;
            cin>>breadth;
            res = a.calculate_rect(length, breadth);
            a.display_rect(res);
            break;

        case 2:
            cout<<"Enter radius of circle = "<<endl;
            cin>>radius;
            res = a.calculate_cir(radius);
            a.display_cir(res);
            break;

        case 3:
            cout<<"Enter height of triangle = "<<endl;
            cin>>height;
            cout<<"Enter base of triangle = "<<endl;
            cin>>base;
            res = a.calculate_tri(base, height);
            a.display_tri(res);
            break;
    }
    return 0;
}

```

**Output –**

Choose an option:

1. Rectangle
2. Circle
3. Triangle

1

```

Enter length of rectangle =
100
Enter breadth of rectangle =
20
Area of rectangle = 2000
Choose an option:
1. Rectangle
2. Circle
3. Triangle
2
Enter radius of circle =
5
Area of Circle = 78.55
Choose an option:
1. Rectangle
2. Circle
3. Triangle
3
Enter height of triangle =
12
Enter base of triangle =
5
Area of Triangle = 30

```

3. Write a program to check whether the input character is alphabet or not.

```

#include<iostream>
using namespace std;

class A{
public:
    char c;
    void get(){
        cout<<"Enter a character = "<<endl;
        cin>>c;
    }
    void check(){
        if(c>='A' && c<='Z' || c>= 'a' && c<= 'z'){
            cout<<"It is an alphabet"<<endl;
        }
        else{
            cout<<"It is not an alphabet"<<endl;
        }
    }
};

int main(){
    A obj;
    obj.get();
    obj.check();
    return 0;
}

```

**Output –**

```

Enter a character =
A
It is an alphabet

```

4. Write a program to find length of string without using length function.

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

class StrLen{
public:
    char str[100];
    int c;

    void input(){
        cout<<"Enter a string = "<<endl;
        cin.getline(str,100);
    }

    int len(){
        while(str[c]!='\0'){
            c++;
        }
        cout<<"Length of string = "<<c<<endl;
        return c;
    }
};

int main(){
    StrLen a;
    a.input();
    a.len();
    return 0;
}
```

**Output –**

```
Enter a string =
VIT, Pune
Length of string = 9
```

5. Write a program to count the number of vowels from a string.

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

class A{
public:
    char c[100];
    void get(){
        cout<<"Enter a string = "<<endl;
        cin.getline(c,100);
    }
    void check(){
        int count=0;
        for(int i = 0;i < c[i]!='\0';i++){
            char ch = c[i];
            if(ch == 'A' || ch == 'E' || ch == 'I' || ch == 'O' || ch == 'U'
|| ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u'){
```

```

        count++;
    }
}
cout<<"No. of vowels in string = "<<count<<endl;
}
};

int main(){
    A a;
    a.get();
    a.check();
    return 0;
}

```

**Output –**

Enter a string =  
 Apurv Saktepar  
 No. of vowels in string = 5

**6.** Write a program to display sum of first n numbers.

```

#include<iostream>
using namespace std;

class Sum{
public:
    int n;
    int res;
    void get(){
        cout<<"Enter a number = "<<endl;
        cin>>n;
    }
    int sum(){
        for(int i = 0; i<n ;i++){
            res += i;
        }
        cout<<"Sum of "<<n<<" numbers = "<<res<<endl;
        return res;
    }
};

int main(){
    Sum s;
    s.get();
    s.sum();
    return 0;
}

```

**Output –**

Enter a number =  
 9  
 Sum of 9 numbers = 36



7. Write a program to check whether a string is palindrome or not.

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

void palindrome(string n){
    string temp = n;
    reverse(temp.begin(),temp.end());
    if(temp == n){
        cout<<"It is a palindrome"<<endl;
    }
    else{
        cout<<"It is not a palindrome"<<endl;
    }
}

int main(){
    string s;
    cout<<"Insert a string"<<endl;
    cin>>s;
    palindrome(s);
    return 0;
}
```

#### Output –

```
Insert a string
Apurv
It is not a palindrome
Insert a string
NAMAN
It is a palindrome
```

8. WAP to print diamond & triangle pattern using \*.

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

class Pattern{
public:
    int n;
    void get(){
        cout<<"Enter number of * = ";
        cin>>n;
    }
    void display_tri(){
        for(int i = 1;i<=n;i++){
            for(int j = 1;j<=n-i;j++){
                cout<<" ";
            }
            for(int k = 1;k<=i;k++){
                cout<<"* ";
            }
            cout<<endl;
        }
    }
};
```

```

    }
}
void display_diam(){
    for(int i = 1;i<=n;i++){
        for(int j = 1;j<=n-i;j++){
            cout<<" ";
        }
        for(int k = 1;k<=i;k++){
            cout<<"* ";
        }
        cout<<endl;
    }
    for(int i = n-1; i>=1; i--){
        for(int j = 1;j<=n-i;j++){
            cout<<" ";
        }
        for(int k = 1;k<=i;k++){
            cout<<"* ";
        }
        cout<<endl;
    }
}
};

int main(){
    Pattern p;
    p.get();
    p.display_tri();
    cout<<"-----"<<endl;
    p.display_diam();
    cout<<"-----"<<endl;
    return 0;
}

```

**Output –**

Enter number of \* = 5

```

*
* *
* * *
* * * *
* * * * *

```

```

-----
*
* *
* * *
* * * *
* * * * *
* * * * *
* * *
* *
*

```

**Conclusion** – In this assignment, we've implemented programs on basic concepts on class and objects in C++.