

Assignment No.:

● Problem Statement:

Write a program in C++ to add two values using function template. The values can be integer, float or strings. For strings, perform concatenation of them when added.

● Algorithm:

→ Algorithm for generic method add() :

→ Generic argument type : T

→ Arguments : a, b

Set $c = a + b$

Return c

[End of method add]

→ Algorithm for operator method + on two strings() :

→ Arguments : a, b

Set c = Contents of a

Append contents of b to c

Return c

→ Algorithm for method main() :

Print "Enter two integers : "

Input a, b

Print a " + " b " : " add(a, b)

Print "Enter two doubles : "

Input c, d

Print c " + " d " : " add(c, d)

Print "Enter two strings : "

Input e, f

Print " " e " " + " " f " " : " add(e, f)

● Source Code:

```
#include <iostream>
```

```
using namespace std;
```

```
template <class T>
```

```
T add(T &a, T &b) {
```

```
    return a + b;
```

Date:

```
}

string operator+(string &a, string &b) {
    string c;
    c.append(a);
    c.append(b);
    return c;
}

int main() {
    int a, b;
    cout << "Enter two integers : ";
    cin >> a >> b;
    cout << a << " + " << b << " : " << add<int>(a, b) << endl;
    double c, d;
    cout << "Enter two floats : ";
    cin >> c >> d;
    cout << c << " + " << d << " : " << add<double>(c, d) << endl;
    string e, f;
    cout << "Enter two strings : ";
    cin >> e >> f;
    cout << "" << e << " + " << f << " : " << add<string>(e, f) << endl;
}
```

● **Input & Output:**

Set 1:

Enter two integers : 12 52

12 + 52 : 64

Enter two floats : 23.05 14.36

23.05 + 14.36 : 37.41

Enter two strings : John son

'John' + 'son' : Johnson

Set 2:

Enter two integers : 25 65

25 + 65 : 90

Enter two floats : 14.50 63.02

Date:

14.5 + 63.02 : 77.52

Enter two strings : Virt ual

'Virt' + 'ual' : Virtual

- **Discussion:**

1. In case of template methods, for each type instance of the method, a new specific method is created, and hence more space is required.
2. If a class does not have the '+' operator method implemented for two of its values, then the above 'add' method will fail.