

# C++ Class Templates



## Problem Statement

A class template provides a specification for generating classes based on parameters. *Class templates* are generally used to implement containers. A class template is instantiated by passing a given set of types to it as template arguments. Here is an example of a class, `MyTemplate`, that can store one element of any type and that has just one member function `divideBy2`, which divides its value by 2.

```
template <class T>
class MyTemplate {
    T element;
public:
    MyTemplate (T arg) {element=arg;}
    T divideBy2 () {return element/2;}
};
```

It is also possible to define a different implementation of a template for a specific type. This is called *Template Specialization*. For the template given above, we find that a different implementation for type `char` will be more useful, so we write a function `printElement` to print the `char` element:

```
// class template specialization:
template <>
class MyTemplate <char> {
    char element;
public:
    MyTemplate (char arg) {element=arg;}
    char printElement ()
    {
        return element;
    }
};
```

You are given a `main()` function which takes a set of inputs. The type of input governs the kind of operation to be performed, i.e. concatenation for *strings* and addition for *int* or *float*. You need to write the class template `AddElements` which has a function `add()` for giving the sum of *int* or *float* elements. You also need to write a template specialization for the type *string* with a function `concatenate()` to concatenate the second string to the first string.

## Input Format

Input will consist of  $N+1$  lines where  $N$  is the number given in the first line of the input followed by  $N$  lines.

From the second line forward, the type of the following two elements will be provided. The type will be one of *int*, *float* or *string* types only. Out of the following two elements, you have to concatenate or add the second element to the first element.

## Constraints

$1 \leq N \leq 500000$

$1.0 \leq value_{float} \leq 10.0$ , where  $value_{float}$  is any float value

$1 \leq value_{int} \leq 100000$ , where  $value_{int}$  is any int value

$0 \leq len_{string} \leq 10$ , where  $len_{string}$  is the length of any string

**The time limit for this challenge is 4 seconds**

## Output Format

The code provided in the code editor will use your class template to add/append elements and give the output.

## Sample Input

```
3
string John Doe
int 1 2
float 4.0 1.5
```

## Sample Output

```
JohnDoe
3
5.5
```

## Explanation

"Doe" when appended with "John" gives "JohnDoe". 2 added to 1 gives 3, and 1.5 added to 4.0 gives 5.5.