

## Overloading Vectors

The purpose of this lab is to introduce you to vectors and overloading.

### Lab Deliverables

Please upload your code Lab6.cpp. Additionally, please upload a document comments.txt that contains answers to the following questions:

1. What are some pros and cons of using overloading?
2. What are some pros and cons of using templates?
3. Which was easier for you – overloading or templates, and why?
4. If you worked in a group, please note the contributions that you made to the code. If you did not, please write “I worked by myself.”

### Lab

For this lab, we will be working with overloading and templates. Create two functions that have the *same name* (this will be important for getting full credit for the lab). One will take a 1D vector, and the other will take a 2D vector. Then, generalize the vector such that it can be of any type (use templates!)

Each function should take a number from the user and then count the number of occurrences in the vector. You will want a different approach for 1D arrays vs 2D arrays (hence why we are using overloading). Have the code print out the 1D or 2D vector. For the 2D vector, have each inner vector print on a separate line. You should get the number to search for from inside the overloaded functions, to ensure the type of the number matches (it will not work if you retrieve the number in main).

For the purposes of Gradescope, you should use the following vectors:

```
vector<int> v_int = { 4, 6, 2, 1, 9, 3, 5, 1, 2, 0, 3, 2, 1 };
vector<float> v_float = { 7.3, 9.1, 2.0, 4.7, 1.9, 4.7, 3.8, 8.2, 9.1 };
vector<vector<int>> v_v_int = { {7, 2}, {9, 4, 7}, {5, 1}, {5, 9, 6}, {1} };
vector<vector<float>> v_v_float = { {4.2, 9.3}, {1.3}, {8.1, 9.3, 4.5, 1.3},
{7.5}, {3.4, 2.1} };
```

```
Please enter a data type (float or int): int
Please enter a vector type (1D or 2D): 1D
Please enter a number to search for: 1
4 6 2 1 9 3 5 1 2 0 3 2 1
3 instances of 1 found
```

```
Please enter a data type (float or int): float
Please enter a vector type (1D or 2D): 1D
Please enter a number to search for: 1.9
7.3 9.1 2 4.7 1.9 4.7 3.8 8.2 9.1
1 instances of 1.9 found
```

```
Please enter a data type (float or int): int
Please enter a vector type (1D or 2D): 2D
Please enter a number to search for: 5
7 2
9 4 7
5 1
5 9 6
1
2 instances of 5 found
```

```
Please enter a data type (float or int): float
Please enter a vector type (1D or 2D): 2D
Please enter a number to search for: 9.3
4.2 9.3
1.3
8.1 9.3 4.5 1.3
7.5
3.4 2.1
2 instances of 9.3 found
```