```
Script started on 2021-11-17 15:03:37-06:00 [TERM="xterm" TTY="/dev/pts/0" COLUMNS=
k_gandhi6@ares:~$ pwd
/home/students/k_gandhi6
k_gandhi6@ares:~$ cat ThatWay.info
Name: Kush Gandhi

Course: CSC122-001

Lab: But I wanted it to go THAT way...

Levels: 2

Description: Using template functions to check and

sort the arrays.

k_gandhi6@ares:~$ cat ThatWay.h
#ifndef THAT_WAY_H_INC

#define THAT_WAY_H_INC

#include <iostream>


//bubble sort

template <typename T>

void BubbleSort(T arr[], int size)

{

    for (int i = 0; i < size - 1; i++)

    {

        for (int j = i + 1; j < size; j++)

        {

            if (arr[i] > arr[j])

            {

                std::swap(arr[i], arr[j]);

            }

        }

    }

}


//swap function for bubble sort

template <typename T>

void swap(T &a, T &b)

{

    T temp = a;

    a = b;

    b = temp;

}


//display function for arrays

template <typename T>

void display(T arr[], int size)

{

    for (int i = 0; i < size; i++)

    {

        std::cout << " " << arr[i];

    }

}

#endif

k_gandhi6@ares:~$ cat ThatWay.cpp
#include <iostream>

#include "ThatWay.h"

#include <string>

using namespace std;


int main()
```

```
{
    //types of arrays to put in bubble sort
    char char_array[10] = { 'a', 'h', 'c', 'y', 'a',
                            'f', 'w', 'h', 'd', 'z' };

    int int_array[10] = { 1, 3, 5, 4, 1, 6, 7, 8, 1, 10};

    string string_array[10] = { "A", "B", "C", "F", "E",
                                "S", "G", "H", "L", "J" };

    double double_array[10] = { 90.2, 82.2, 73.6, 64.3, 54.1,
                                40.8, 32.3, 30.6, 20.4, 10.9 };

    cout << "Sorted arrays" << endl << endl;

    //int array
    BubbleSort(int_array, 10);
    display(int_array, 10);
    cout << endl << endl;

    //string array
    BubbleSort(string_array, 10);
    display(string_array, 10);
    cout << endl << endl;

    //char array
    BubbleSort(char_array, 10);
    display(char_array, 10);
    cout << endl << endl;

    //double array
    BubbleSort(double_array, 10);
    display(double_array, 10);
    cout << endl << endl;
}
```

```
k_gandhi6@ares:~$ CPP ThatWay
ThatWay.cpp***

k_gandhi6@ares:~$ ./ThatWay.out
Sorted arrays

 1 1 1 3 4 5 6 7 8 10

 A B C E F G H J L S

 a a c d f h h w y z

 10.9 20.4 30.6 32.3 40.8 54.1 64.3 73.6 82.2 90.2

k_gandhi6@ares:~$ cat ThatWay.tpq
1) What things might cause your new sort template to fail to instantiate?

    - One error could occur is that the parameters are not correct or
    not match up.

2) Where should the overloaded swap form go? (In the library or the main
   application?) If in the library, should it be in the header with the
   swap template or in the implementation file? Does it matter to the
   compiler where it is? Why/Why not?

    - I used a templated swap so it needs to be placed in the header
```

```
    file so it can compile properly. It wouldn't work in the
    implementation file since it would cause some errors.


3) Did you need to make any changes to your original swap template?


    - Yes, the changes I made was a template function and included a
    T in front of the temp variable.


4) Which comparisons did you write as plain functions? Function objects?
   Were any of them templated? Could/Should they have been?


    - In my program I used a templated bubble sort becasue it works with
    all types of arrays tested such as char, int, double, and string
    arrays. The sort function can work with the arrays without the template,
    so it shows how versatile it can be. By maiking them plain functions they
    wouldn't work and could give the wrong output.
k_gandhi6@ares:~$ exit
exit

Script done on 2021-11-17 15:05:06-06:00 [COMMAND_EXIT_CODE="0"]
```