```
#include <iostream>
using std::cout;
using std::endl;

//Interchanges the values of variable1 and variable2.
//The assignment operator must work for the type T.
template < typename T>
void swapValues(T & variable1, T & variable2)
{
	T temp;
	temp = variable1;
	variable1 = variable2;
	variable2 = temp;
}

int main()
{
	typedef int* ArrayPointer;
	ArrayPointer a, b, c;
	a = new int[3];
	b = new int[3];
	int i;
	for (i = 0; i < 3; i++)
	{
		a[i] = i;
		b[i] = i * 100;
	}
	c = a;

	cout << "a contains: ";
	for (i = 0; i < 3; i++)
		cout << a[i] << " ";
	cout << endl;
	cout << "b contains: ";
	for (i = 0; i < 3; i++)
		cout << b[i] << " ";
	cout << endl;
	cout << "c contains: ";
	for (i = 0; i < 3; i++)
		cout << c[i] << " ";
	cout << endl;
	swapValues(a, b);
	b[0] = 42;
	cout << "After swapping a and b,\n"
		<< "and changing b:\n";
	cout << "a contains: ";
	for (i = 0; i < 3; i++)
		cout << a[i] << " ";
	cout << endl;
	cout << "b contains: ";
	for (i = 0; i < 3; i++)
		cout << b[i] << " ";
	cout << endl;
	cout << "c contains: ";
	for (i = 0; i < 3; i++)
		cout << c[i] << " ";
	cout << endl;

	return 0;
}
```

The above C++ code outputs

```
a contains: 0 1 2
b contains: 0 100 200
c contains: 0 1 2
After swapping a and b,
and changing b:
a contains: 0 100 200
b contains: 42 1 2
c contains: 42 1 2
```

Explain in detail why and how this output is produced.

2. Write a template-based function that calculates and returns the absolute value of two numeric values passed in. The function should operate with any numeric data types (e.g., float, int, double, char)

3. Create a templated Matrix class. Initially create a matrix of integers and then convert it to a templated class. The class should have the following methods:

- a constructor that creates a 3 X 3 matrix.
- a print method that outputs the matrix to the console.
- A setMatrix method that sets the values in the matrix to the same values as in a same sized 2D vector that is passed into the method. (the method should check that the rows and columns are the same size.

If you wish the matrix can use a suitable std::vector internally as an attribute. In your main program test your Matrix with ints, floats, and doubles.

Post lab sheet questions to our Yammer Group

https://web.yammer.com/main/groups/eyJfdHlwZSI6Ikdyb3VwIiwiaWQiOiI1MzQwNzA2NDA2NCJ9/all