Assignment 1

Lab Explanation

The requirements for this lab were to create a program that would find the two smallest integers in a given list. The first input is the number of values that will be inputted as a list, and the second input will be the list of numbers

Code

Kieran_Llarena_ShiftRight.cpp Lab5

```cpp
#include <iostream>
#include <vector>
using std::cout, std::cin, std::vector;

int main() {
  unsigned int numVals;
  unsigned int i;
  int smallestInt;
  int secondSmallestInt;

  cin >> numVals;

  vector<int> input(numVals);

  for(i = 0; i < input.size(); ++i) {
    cin >> input.at(i);
  }

  smallestInt = input.at(0);
  for(i = 0; i < input.size(); ++i) {
    if(smallestInt > input.at(i))
      smallestInt = input.at(i);
  }

  for(i = 0; i < input.size(); ++i) {
    if(smallestInt == input.at(i))
      input.erase(input.begin() + i);
  }

  secondSmallestInt = input.at(0);
  for(i = 0; i < input.size(); ++i) {
    if(secondSmallestInt > input.at(i))
      secondSmallestInt = input.at(i);
  }

  cout << smallestInt << " and " << secondSmallestInt << '\n';

  return 0;
}
```

The basic logic of my code is to first take in the list of integers and then find the smallest integer value in the list (in this case is instantiated as a vector) and assign it to a variable called smallestInt. Once that value is found, it is removed (by the erase method) and then the new smallest integer value is found and assigned to the variable secondSmallestInt. Finally, these two integers will be printed out. Each case in the switch is assigned to one certain output. Additionally, I decided to only use std::cout, std::cin, std::vector instead of the entire std library to save memory and increase the speed of the application. I also decided to use ‘\n’ instead of std::endl to increase the speed of the application as well.

Test 1

```
MacBook-Air-5:output kllarena$ ./"Kieran_Llarena_ShiftRight"
5
10 5 3 21 2
2 and 3
```

Test 2

```
MacBook-Air-5:output kllarena$ ./"Kieran_Llarena_ShiftRight"
4
1 2 31 15
1 and 2
```

Test 3

```
MacBook-Air-5:output kllarena$ ./"Kieran_Llarena_ShiftRight"
5
1 8 91 23 7
1 and 7
```

Assignment 2

Lab Explanation

The requirements for this lab were to create a program that would shift the values in a list to the right one position.

Code

Kieran_Llarena_TwoSmallestIntegers.cpp > ...

```cpp
#include <iostream>
#include <vector>
using std::cout, std::cin, std::vector;

int main() {
  unsigned int numVals;
  unsigned int i;

  cin >> numVals;

  vector<int> input(numVals);
  vector<int> modified(numVals);

  for(i = 0; i < input.size(); ++i) {
    cin >> input.at(i);
  }

  modified.at(0) = input.back();
  for(i = 1; i < input.size(); ++i) {
    modified.at(i) = input.at(i-1);
  }

  for(i = 0; i < modified.size(); ++i) {
    cout << modified.at(i) << ' ';
  }
  cout << '\n';

  return 0;
}
```

First off, I decided to only use std::cout, std::cin, std::vector, and ‘\n’ to save memory and increase the speed of the application. The thought process of code is to create two vectors of integers. The first vector will take in a list of integers. The second vector will be the modified version of the first vector, the one with the shifted values. The first index of the second vector will be assigned to the value of the last index of the first vector. After that, a for loop propagates the remaining values of the first vector into the second one, excluding the value of the last index of the first vector.

Test 1

```
MacBook-Air-5:output kllarena$ ./"Kieran_Llarena_TwoSmallestIntegers"
6
2 4 6 8 10 12
12 2 4 6 8 10
```

Test 2

```
MacBook-Air-5:output kllarena$ ./"Kieran_Llarena_TwoSmallestIntegers"
3
99 100 101
101 99 100
```

Test 3

```
MacBook-Air-5:output kllarena$ ./"Kieran_Llarena_TwoSmallestIntegers"
2
234 19
19 234
```