COP3331 Lab 4

Submission Instructions:

1. Create a folder named Lab4_LastName_FirstInitial (e.g. Lab4_Neal_T).
2. In your folder, place a **PDF** file containing your answers to questions with a ♢.
3. Copy your directories containing your programs for questions with a ♠ into the folder; **these directories should only contain files needed to run your program, which may include one or more of the following file types: .cpp, .h., and .txt**. Do NOT include the full project (e.g., solution file). Test your program on CIRCE before submitting by compiling and running with g++. Your file containing main() should **always** be named main.cpp.
4. Ensure that all programs have block comments at the very beginning (starting at the first line) in the file containing main() with your name and the program's description. **The block comment's format should be identical to what's provided in Figure 2-1.**
5. Use single-line comments to describe your code's functionality as needed.
6. Do not submit anything for questions with a ♣.
7. Zip the folder and submit it via Canvas.

♢ = 5 points each, ♠ = 15 points each

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1. ♣ Read *Chapter 9: How to work with structures and enumerations.*
2. ♢ The advantage of returning a structure type from a function when compared to returning a fundamental type is that
   a. the function can return multiple values
   b. the function can return an object
   c. the function doesn't need to include a return statement
   d. all of the above
   e. a and b only
3. ♢ What are the values of the enumerators in the enumeration that follows?

```
enum class Terms {
    net_30_days = 30,
    net_60_days,
    net_90_days
};
```

   a. 30, 60, 90
   b. 30, 1, 2
   c. 30, 31, 32
   d. 30, 0, 1

4. ♣ Read *Chapter 10: How to work with STL containers and iterators*.
5. ♢ What are the values of the elements in the vector named names_1 after the following code is executed?

```
vector<string> names_1 { "Mike", "Ben", "Joel", "Anne" };
vector<string> names_2 { "Judy", "Samantha", "Kelly" };

names_1.insert(names_1.end(), "Mary");
names_1.erase(names_1.begin());
names_1.insert(names_1.begin() + 2, ++names_2.begin(), names_2.end());
names_1.swap(names_2);
names_1.erase(++names_1.begin());
names_1.insert(names_1.begin(), ++names_2.begin(), names_2.begin() + 2);
```

a. Joel, Judy, Kelly
b. Judy, Mary, Joel, Mary
c. Joel, Judy, Samantha
d. Joel, Anne, Judy, Samantha

6. ♢ When you dereference an iterator, you
a. set the value of the iterator variable to null
b. set the iterator so it points one memory location past the last element in the container
c. get the value of the element that the iterator points to
d. get the memory address of the element that the iterator points to

7. ♠ **Program Champion Counter**

Create a program that reads a text file that contains a list of FIFA World Cup champions and determines the country that has won the most championships. Place your solution in folder lab4-q7 for submission.

Console

```
FIFA World Cup Winners

Country         Wins  Years
=======         ====  =====
Argentina       2     1978, 1986
Brazil          5     1958, 1962, 1970, 1994, 2002
England         1     1966
France          1     1998, 2018
Germany         4     1954, 1974, 1990, 2014
Italy           4     1934, 1938, 1982, 2006
Spain           1     2010
Uruguay         2     1930, 1950
```

Specifications

- You have been provided a text file named world_cup_champions.txt that contains data like this:

```
Year\tCountry\tCoach\tCaptain\n
1930\tUruguay\tAlberto Suppici\tJosé Nasazzi\n
1934\tItaly\tVittorio Pozzo\tGianpiero Combi\n
1938\tItaly\tVittorio Pozzo\tGiuseppe Meazza\n
1950\tUruguay\tJuan López\tObdulio Varela\n
1954\tGermany\tSepp Herberger\tFritz Walter\n
1958\tBrazil\tVicente Feola\tHilderaldo Bellini\n
1962\tBrazil\tAymoré Moreira\tMauro Ramos\n
1966\tEngland\tAlf Ramsey\tBobby Moore\n
1970\tBrazil\tMário Zagallo\tCarlos Alberto\n
1974\tGermany\tHelmut Schön\tFranz Beckenbauer\n
1978\tArgentina\tCésar Luis Menotti\tDaniel Passarella\n
1982\tItaly\tEnzo Bearzot\tDino Zoff\n
1986\tArgentina\tCarlos Bilardo\tDiego Maradona\n
1990\tGermany\tFranz Beckenbauer\tLothar Matthäus\n
1994\tBrazil\tCarlos Alberto Parreira\tDunga\n
1998\tFrance\tAimé Jacquet\tDidier Deschamps\n
2002\tBrazil\tLuiz Felipe Scolari\tCafu\n
```

```
2006\tItaly\tMarcello Lippi\tFabio Cannavaro\n
2010\tSpain\tVicente del Bosque\tIker Casillas\n
2014\tGermany\tJoachim Löw\tPhilipp Lahm\n
2018\tFrance\tDidier Deschamps\tHugo Lloris\n
```

- When the program starts, it should read the text file and use a map to store the required data using the name of each country as the key.
- The program should display the countries in alphabetical order.