CSC 1101 – Problem Solving and Programming Laboratory
Lab 6 – [your name]
25 points – Due February 8, 11pm

a) Save this document with your name and the lab assignment number somewhere in the file name.
b) Type/paste your answers into the document.
c) Submit the following documents to the Canvas assignment link where you downloaded this document:

- ✓ This document.
- ✓ Your .cpp files renamed to .txt.

Submit the documents separately, not as one .zip file.

1) **[13 points]** You've been hired by *Tea Tempests* to write a C++ console application that determines how long it takes for something left on the kitchen counter to assume room temperature. Prompt for and get from the user the item left out, and the current room and item starting temperatures. Assuming a cooling/warming rate of 2°C per minute, calculate how long it takes for the item to reach room temperature. Use formatted output manipulators (setw, left/right) to print the following rows:

- Item
- Room temperature (°C)
- Item starting temperature (°C)
- Time to room temperature (seconds)

And three columns:

- A left-justified label.
- A right-justified value.
- A left-justified units.

Define constants for the cooling/warming rate and column widths. Format all real numbers to one decimal place. Include the degree symbol in the prompts and output:

- Windows users – you may use:

```
(char) 167
```

- macOS users – you may copy and paste the degree symbol to your code.

In the calculation for cooling/warming time, use the absolute value function to get a positive time:

```
abs(…)
```

The output should look like this:

```
Welcome to Tea Tempests
-----------------------

Enter the item you left on the counter: Milk
Enter the current room temperature (°C): 20
Enter the current item temperature (°C): 4

Item:                          Milk
Room temperature:              20.0 °C
Item temperature:               4.0 °C
Cooling/warming time:        480.0 seconds

End of Tea Tempests
```

Do not use this sample input for the final run that is pasted below. Run the program three times with different values for item and room and item temperatures.

Run	Item	Room temp (°C)	Item temp (°C)	Cooling/warming time (seconds)
1	laptop	22	31	270
2	Water bottle	19	16	90
3	Book	27	19	240

```
//=========================================================
//
// Title:      Lab 06
// Course:     CSC 1101
// Lab Number: 06
// Author:     Rory Lange
// Date:       2/5/21
// Description:
//   Create an app that tells when an item reaches
// room temp.
//
//=========================================================
#include <cstdlib> // For several general-purpose functions
#include <fstream> // For file handling
#include <iomanip> // For formatted output
#include <iostream> // For cin, cout, and system
#include <string> // For string data type
using namespace std; // So "std::cout" may be abbreviated to "cout"

int main()
{

  // Declare variables
       string item;
       char degree = 167;
       int room;
       int itemTemp;
       int tempDiff;
       const int tempIncrease = 2;
       const int width = 25;
       const int widthr = 20;
```

```
  // Show application header
  cout << "Item Room Temperature Calculator" << endl;
  cout << "-------------------------" << endl << endl;

  //collect data
  cout << setw(width) << left << "Name of item: ";
  cout << setw(widthr) << right;
  getline(cin, item);


  cout << setw(width) << left << "Room Temperature (C): ";
  cin >> setw(widthr) >> right >> room;


  cout << setw(width) << left << "Item Temperature (C): ";
  cin >> itemTemp;
  cout << endl;

  //do math
  if (itemTemp > room) {
        tempDiff = itemTemp - room;
  }
  else {
        tempDiff = room - itemTemp;
  }
  float time = (float) tempDiff / tempIncrease * 60;

  //report results
  cout << setw(width) << left << "Nam of Item: "
       << setw(widthr) << right << item << endl;
  cout << setw(width) << left << "Room Temperature: "
       << setw(widthr) << right << room << " " << left << degree << "C" << endl;
  cout << setw(width) << left << "Item Temperature: "
       << setw(widthr) << right << itemTemp << " " << left << degree << "C" << endl;
  cout << setw(width) << left << "Cooling/Warming time: "
       << setw(widthr) << right << time << left << " Seconds" << endl;




  // Show application close
  cout << "\nEnd of my Application" << endl;

}


If possible, format your code like this:
Font "Courier New"
       Font size "9"
       Bold
```

```
Item Room Temperature Calculator
-------------------------

Name of item:           laptop
Room Temperature (C):   22
Item Temperature (C):   31

Nam of Item:                        laptop
Room Temperature:                     22 ºC
Item Temperature:                     31 ºC
Cooling/Warming time:                270 Seconds

End of my Application

C:\Users\rorys\OneDrive - Wayne State University\CSC1101\labs\lab06\lab06\Debug\lab06.exe (process 15984) exited with co
de 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

2) [12 points] You've been hired by *Planet Pals* to write a C++ console application that calculates and displays the distance from Earth to another planet in parsecs. Prompt the user for a planet and the distance to the planet from Earth in astronomical units (AUs). See theplanets.org/distances-between-planets/ for AU distances. There are 206264.8 AUs per parsec. Calculate the distance to the planet in parsecs. Use formatted output manipulators (setw, left/right) to print the following rows:

- Planet
- Distance to planet in AUs
- Distance to planet in parsecs

And two columns:

- A left-justified label.
- A right-justified value.

Define constants for the conversion rate and column widths. Format all real numbers to ten decimal places. The output should look like this:

```
Welcome to Planet Pals
----------------------

Enter the planet to travel to from Earth: Mars
Distance to planet (AUs): .52

Planet:                              Mars
Distance to (AUs):          0.5200000000
Distance to (parsecs):      0.0000025210

End of Planet Pals
```

Do not use this sample input for the final run that is pasted below. Run the program three times with different values for planet and AUs.

Run	Planet	AUs	Parsecs
1	Mercury	.61	.0000029574
2	Neptune	29.09	.0001410323
3	Uranus	18.21	.0000882846

```
//============================================================
//
// Title:      Lab 06
// Course:     CSC 1101
// Lab Number: 06
// Author:     Rory Lange
// Date:       2/5/21
// Description:
//   Create an app that tells when an item reaches
// room temp.
//
//============================================================
#include <cstdlib> // For several general-purpose functions
#include <fstream> // For file handling
#include <iomanip> // For formatted output
#include <iostream> // For cin, cout, and system
#include <string> // For string data type
using namespace std; // So "std::cout" may be abbreviated to "cout"

int main() {
    //declare variables
    const float conversion = 206264.8;
    const int w = 25;
    const int w1 = 20;

    string planet;
    double AU;
    double PSC;

    //header
    cout << "PLANET PALS DISTANCE CONVERSIONS" << endl;
    cout << "----------------------------------------" << endl << endl;

    //user input
    cout << setw(w) << left << "Enter planet to travel to: ";
    getline(cin, planet);

    cout << setw(w) << left << "Distance to planet (AU): ";
    cin >> AU;
    cout << endl;

    //math
    PSC = AU / conversion;

    //report results
    cout << fixed << setprecision(10);
    cout << setw(w) << left << "Planet: "
        << right << setw(w1) << planet << endl;
    cout << setw(w) << left << "Distance to (AU): "
        << right << setw(w1) << AU << endl;
    cout << setw(w) << left << "Distance to (Parsec): "
        << right << setw(w1) << PSC << endl;

    //ending
    cout << "\nEnd of application.";


}
```

```
If possible, format your code like this:
Font "Courier New"
       Font size "9"
       Bold
```

```
PLANET PALS DISTANCE CONVERSIONS
----------------------------------------

Enter planet to travel to: mercury
Distance to planet (AU): .61

Planet:                              mercury
Distance to (AU):                0.6100000000
Distance to (Parsec):            0.0000029574

End of application.
PS C:\Users\rorys\OneDrive - Wayne State University\CSC1100-C++>
```

* Copying-and-pasting C++ code to a Word document

macOS

1) From within the C++ program, press **command-A** and press **command-C**.
2) From within the Word document, press **command-V**.

Windows

1) From within the C++ program, press **CTRL-A** and press **CTRL-C**.
2) From within the Word document, press **CTRL-V**.

** Copying-and-pasting C++ console application output to a Word document

macOS

1) From the C++ console, press **shift-command-4-space**.
2) From within the Word document, **command-V**.

Windows

1) From the C++ console, press **ALT-PrintScreen**.
2) From within the Word document, press **CTRL-V**.