1. Understanding how to write methods

a. Write a method according to the following

    1. There is only one parameter and it is an integer

    2. The method does the following:

        • If the value of the integer is between 0 to 99, then return the message "o.k."

        • If the value of the integer is smaller then 0 or larger then 99, then return the message "Mistake!"

First write the method header line for this method. You will need to decide on a method name and what is the type of the result. Next write the method body to do the computation described.

b. Write a method that will convert a number representing a temperature in Fahrenheit to the equivalent Celsius temperature. The formula for converting from Fahrenheit to Celsius is to subtract 32 from the Fahrenheit number and multiply by 5/9. Assuming that the Fahrenheit number is in a variable fahr, one way to write this in code is:

    celsius = (fahr – 32) / (5.0 / 9.0);

Write a method header and body that uses this code to convert from Fahrenheit to Celsius.

2. Understanding Arrays

Assume that a program has the following statements:
        int [ ] values = new int[5];

        for (int index=0; index < values.length; index++)
        {
                if (index == 0)
                { values [index] = 10;   }
                else
                { values [index] = values [index − 1] + 2;   }
        }

After this loop executes, write down the numbers in the array *values*.

values[0]	
values[1]	
values[2]	
values[3]	
values[4]	

3. Creating a GUI application to display a sequence of Fahrenheit temperatures and their equivalent in Celsius

One way for people to get temperature conversion is to consult a table that has a sequence of temperatures in Fahrenheit and shows their equivalent in Celsius. For this problem, you are to write a GUI program that displays such a table.

It is useful for the Fahrenheit numbers to include both 32, the freezing point of water, which is 0 Celsius, and 212, the boiling point of water, which is 100 Celsius. A useful range of numbers then might start with the Fahrenheit number 2 and go by multiples of 10 up to 212. For example the table could look something like:
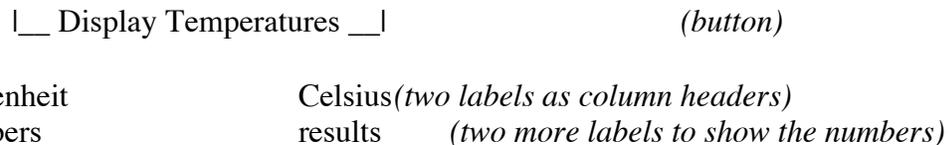
Fahrenheit	Celsius
2	-16.67
12	-11.11
22	
32	0
42	5.55
52	11.11
etc, up to 212	

a. Create the GUI

This program is designed for you to get more experience working with arrays and with methods.

Start a new project and name it something like TempDisplay. Then create a jFrame Form and name it something like TempDisplayGUI and set it to be the main class of the project.

Create a GUI design that has a button to display the table of temperatures as computed. We are first going to compute the squares of all the numbers.

|__ Display Temperatures __| *(button)*

Fahrenheit   Celsius*(two labels as column headers)*
numbers   results   *(two more labels to show the numbers)*

Drag the last two labels to be long and narrow to display a result with 23 lines.

Make the event actionPerformed method for the button, and create the program in the source window. Note that there is no user input.

b. Writing the program

1. Add the following import statement between the package statement and the public class statement so that we can use the Java programs for decimal number output formatting.

       import java.text.*;

2. Put the method that you wrote to convert Fahrenheit to Celsius in part 1 of this lab before the button ActionPerformed method.

3. Write the code for the button actionPerformed method.

Write **two array declarations** for arrays of length 23. The first array is to hold the sequence of numbers representing Fahrenheit, and the second is to hold the sequence of equivalent Celsius temperatures.

Now **declare two Strings** to show the values in the arrays. Since we want this to be in a table with the next number on a new line, make the two strings have the html tags for multi-line label displays.

    // strings to display the numbers and results array values
    String fahrText = "<html>", celsiusText= "<html>";

Next **create a number formatter** to display only 2 significant digits.

    // number formatter displaying only 2 digits after the decimal point
    DecimalFormat df = new DecimalFormat("####.00");

Initialize the fahrenheit array to have the numbers 2, 12, 22, 32, etc, by **writing a for loop** that assigns the appropriate value to each array element.

Also inside the loop, add this statement to put the every value of the array numbers appended to the String fahrText, if the Fahrenheit numbers array is called fahrNumbers:

      fahrText= fahrText + "<p>" + String.valueOf(fahrNumbers[i]);

Now **write another for loop** that assigns a Celsius temperature to every element of the array. This should use the temperature conversion method.

Finally, display the two strings in the two labels on the GUI.
Test your program.

Hand in this lab sheet with the code that you wrote for the TempDisplayGUI by Thursday, March 6.