**Lab 26 – Birthday Calculator**

Open BlueJ, and create a new BlueJ project titled **Lab26-BirthdayCalculator** in your CS\LABS folder.

Create a new class called **PracticeProblems**. You will write several methods in this class. You should also include a main method that runs various tests of your individual methods so that running the main method will produce the output shown in the sample output.

**Before each problem, insert a COMMENT with the problem number.**

1. Write a method called letterGrade that returns a String containing the letter grade earned based on a grade parameter (double). If you pass in a 73, it should return “C”.
2. Write a method called squareBoard, that prints out a square made up of the ‘#’ symbol. The square’s size should be determined by an integer parameter.

**# #**

**# #**

1. Write a method called checkerBoard, that prints out a checkerboard pattern made up of the ‘#’ symbol. The size should be determined by an integer parameter.

**# # # #**

**# # # #**

**# # # #**

**# # # #**

1. Write a method called printPow2, that prints all the powers of 2 up to (and including) the supplied parameter. Use String concatenation to make your output like this:

Here are the first 3 powers of 2:

2^0 = 1

2^1 = 2

2^2 = 4

1. Complete the method: public static double[] quad(double a, double b, double c), that returns **AN ARRAY OF DOUBLES** containing the roots when solving the quadratic equation with the supplied coefficients. Remember – you can't just print out an array, but the Arrays.toString() method will get a String version of the contents (for printing). For example, if I want to know the solution (roots) of , my values for a, b and c would be the coefficients 7, 8 and -11. The method would return an array containing the two roots:

[-1.949092966, 0.806235823]

1. (Riddle) What is sweetened then soured, boiled then cooled?
2. Complete the method: public static double convertTemp(double temp, boolean isF), that performs a Celsius to Fahrenheit conversion (and vice versa) when called. If the parameter isF is true, then the temp parameter is already in Fahrenheit and you are supposed to convert it to Celsius. If isF is false, then the temp parameter is NOT Fahrenheit, and your goal is to convert it to Fahrenheit.
3. Remember the indexOf() method of the string class? Can you make one for arrays? Complete the method: public static int simpleSearch(int[] nums, int value), that performs a linear (sequential) search on the array parameter, and returns the **INDEX** of the first occurrence the of value parameter. Return -1 if valuedoesn’t exist in nums.

Let’s say your array has the values: 8, 6, 7, 4, 3, 6, 7, and 5

If you pass that array and the number 7 to your simpleSearch method, it will return 2 (because 7 is first found at index 2.)

1. Write a method called printReverse that takes in an integer and **prints** the number backwards. For example, if you pass in 634 it will print 436.
2. Complete the method: public static boolean contains(int[] a, int[] b), that returns true if the sequence of elements in b appears in a. They must appear consecutively and in the same order. You'll need nested loops for this.

Does the array [1, 2, 1, 2, 3] contain [1, 2, 3]? >>> true

Does the array [1, 2, 1, 2, 3] contain [1, 1, 3]? >>> false

1. Complete “Worksheet – Methods #2” worksheet.

**Birthday calculator**

Create a new class called **BirthdayCalculator**:

You have asked for a new laptop for your birthday. Astounded by your burgeoning coding skills, your parents actually said they would buy you one! Unfortunately for you, your parents are also coders, and they’re going to make you work for it.

As your birthday is not for a few months, they have tasked you with writing a method that will calculate how many days away your birthday is.

**Your method should take 4 parameters,** the current day and month, and the day and month of your birthday. The method should return how many days remain until your birthday.

For example, if today is April 5 and your birthday is January 23, the method would return 293, since there are 293 days remaining until your birthday (which isn’t until next year!)

You should get the values of the 4 parameters from the user as part of the main method, then call your method using the 4 parameters entered.

/\* This program is slightly harder than it appears. Your first instinct will probably be to subtract the number of days until your birthday from the current day. However, this will prove quite tricky! You're better off 'adding up' the days from today a little by little until your birthday is reached.

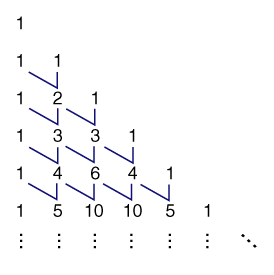
**(Advanced) Pascal’s triangle**

Write the code to complete this method: public static void pascalsTriangle(int n)

that prints Pascal’s triangle with *n* number of rows.

//You may need to google ‘Pascal’s triangle’. This a harder problem, but it can be done! Arrays will be very useful here – remember, you can't change the size of an array, but you CAN re-initialize it

pascalsTriangle(5) would print the pattern on the left below:



1

1 1

1 2 1 

1 3 3 1

1 4 6 4 1