CS234 Computer Science II
Lab 2
Total points: 100

Read the instructions carefully.

P2.1 (50 points) Easter Sunday is the first Sunday after the first full moon of spring. To compute the date, you can use this algorithm, invented by the mathematician Carl Friedrich Gauss in 1800:

1. Get y (the year such as 1800 or 2001).
2. Divide y by 19 and call the remainder a. Ignore the quotient.
3. Divide y by 100 to get a quotient b and a remainder c.
4. Divide b by 4 to get a quotient d and a remainder e.
5. Divide 8 * b + 13 by 25 to get a quotient g. Ignore the remainder.
6. Divide 19 * a + b - d - g + 15 by 30 to get a remainder h. Ignore the quotient.
7. Divide c by 4 to get a quotient j and a remainder k.
8. Divide a + 11 * h by 319 to get a quotient m. Ignore the remainder.
9. Divide 2 * e + 2 * j - k - h + m + 32 by 7 to get a remainder r. Ignore the quotient.
10. Divide h - m + r + 90 by 25 to get a quotient n. Ignore the remainder.
11. Divide h - m + r + n + 19 by 32 to get a remainder p. Ignore the quotient.

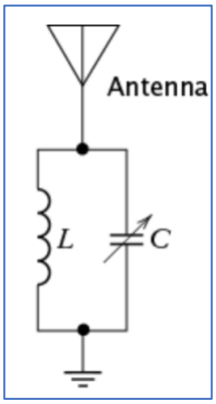
Then Easter falls on day p of month n. For example, if y is 2001:

a = 6	g = 6	m = 0	**n = 4**
b = 20, c = 1	h = 18	r = 6	**p = 15**
d = 5, e = 0	j = 0, k = 1		

Therefore, in 2001, Easter Sunday fell on April 15.
Write a Java program that prompts the user for a year and prints out the month and day of Easter Sunday.
Important: You need to use the *most memory efficient* data type for your variables.
An example of the output is the following:

```
Enter year:
2001
Easter is on 4/15/2001
```

P2.13 (50 points) Consider the following tuning circuit connected to an antenna, where C is a variable capacitor whose capacitance ranges from C_{min} to C_{max}.



The tuning circuit selects the frequency $f = \frac{1}{2\pi\sqrt{LC}}$.
To design this circuit for a given frequency, take $C = \sqrt{C_{min}C_{max}}$ and calculate the required inductance L from f and C. Now the circuit can be tuned to any frequency in the range $f_{min} = \frac{1}{2\pi\sqrt{LC_{max}}}$ to $f_{max} = \frac{1}{2\pi\sqrt{LC_{min}}}$.

Write a Java program to design a tuning circuit for a given frequency, using a variable capacitor with given values for C_{min} and C_{max}. (A typical input is f=16.7 MHz, C_{min} = 14 pF, and C_{max} = 365 pF.)
The program should read in f (**in Hz**), C_{min} and C_{max} (**in F**), and print the required inductance ***L*** value and the range of frequencies (***f_{min}*** and ***f_{max}***) to which the circuit can be tuned by varying the capacitance.
Notes: You need to use Hz and F.
For example, 16.7 MHz is 1.67E6 Hz(or 1670000 Hz) and 14 pF is 1.4E-11 F (or 0.000000000014 F)
You can use the Math library if needed.
Important: You need to use the *most memory efficient data type* for your variables.

An example of the output is the following:

```
Enter f (in Hz): 1670000
Enter cMin (in F): 0.000000000014
Enter cMax (in F): 0.000000000050
C:2.6457513110645906E-11
L = 3.4328774588589884E-4 H.
1214803.3446964193 Hz < f < 2295762.5299401437 Hz.
```

Submission details:

Upload a **single ZIP** file.
Name your file as follows: **Lab2_Lastname_Firstname.zip**

Your **.zip** file must contain the following:
1. Your two **.java** source files (no .class).

2. A .txt file (readme.txt) with simple instruction on how to **compile** and **execute** your programs (I reviewed in class how to compile your .java files)
3. A **SINGLE PDF** with **screenshots** from your program running showing different examples of their execution. Do not send .jpg files.

In each .java file, write as a *multiline* comment at the beginning of the file the following: Your name

The **zip** file must be uploaded to Canvas. I do not accept answers via email or as comments on Canvas.
I do not accept image files; it must be a PDF file with the screenshots.

Make sure to check the **due date** for this activity on Canvas. Try to submit it before the due date so you can have time to check for improvements. **No late submissions.**

Make sure you are **submitting the correct files**. I will grade the files uploaded to Canvas.
Use the ***javac*** **and** ***java*** commands **before** submitting your solution to test if they work outside any IDE.

Make sure to review the **grading rubric.**
Read all the instructions carefully.

Do not assume requirements, contact me if you have questions!