

2022F CS234 Computer Science II

Lab 2

Total points: 100

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. Let y be 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 program that prompts the user for a year and prints out the month and day of Easter Sunday.

(P2.10) (50 points) The dew point is the temperature the air needs to be cooled to (at constant pressure) to achieve a relative humidity (RH) of 100%. The dew point temperature T_d can be calculated (approximately) from the relative humidity RH and the actual temperature T by

$$T_d = \frac{b \cdot f(T, RH)}{a - f(T, RH)}$$

$$f(T, RH) = \frac{a \cdot T}{b + T} + \ln(RH)$$

where $a=17.27$ and $b=237.7^\circ \text{ C}$.

Write a program that read the relative humidity (between 0 and 1) and the temperature (in degrees C) and prints the dew point value using two decimal numbers.

Use the Java method `Math.log` to compute the natural logarithm.

Sample of execution:

```
Relative humidity (betwwen 0 and 1):
0.5
Temperature (in degrees C):
36
Dew point: 23.91
```

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 the instruction on how to **compile** your programs (I reviewed how to compile your **.java** files)
3. A **PDF** with screenshots showing your programs running

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

1. Your name
2. The ID of the problem (e.g., P2.1)

The **zip** file must be uploaded to Canvas. **I do not accept answers via email.**
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.

Make sure you are **submitting the correct files**. I will grade the file uploaded to Canvas.

Make sure to review the grading rubric.

There are no late submissions.