Scavenger Hunt!

1 The game is afoot

A scavenger hunt awaits you! You will need to write a program that performs certain calculations (on year numbers) in order to follow the clues. The program’s calculations are described below, instructions for writing the program are in Section 2.1 and the starting clue is then provided in Section 2.2. Note the map on the last page of this document—it divides the campus into a coordinate grid that will allow you to figure out where to go at each step.

The calculations: To perform this hunt, you will be finding clues in the form of year numbers. Each year number will be an input to a program that performs a byzantine calculation that yields coordinates. Using the attached map, you will go to those coordinates to find the next year-number clue.

Part of the calculation performed by this program depends on whether the given year is a leap year, as determined by these rules:

- If it is a multiple of 4, then it is a leap year, unless . . .
- If it is a multiple of 100, then it is not a leap year, unless . . .
- If it is a multiple of 400, then it is a leap year.

Therefore, 1924 was a leap year, but 1900 was not, yet 2000 was.

Once your program determines whether the given year is a leap year, it can then apply the correct one of the following two calculations to produce coordinates:

- If the year is a leap year, then:
  - The first coordinate is the absolute value of the difference between the first two digits and the last two digits of the number (e.g., if the year is 1908, the first coordinate is $19 - 8 = 11$).
  - The second coordinate is obtained by dividing the year by 4, adding the first and last digits of that result plus 1, and dividing that sum by 2.
• If the year is not a leap year, then:
  – To obtain the first coordinate, first sum all the digits, and then:
    ∗ If that sum is a multiple of 7, then divide by 3 and add 1.
    ∗ If the sum is not a multiple of 7 but is greater than 10, then divide the sum by 3
      and then add 7.
    ∗ If the sum is not a multiple of 7 and is not greater than 10, then add 7 to that sum.
  – To get the second coordinate, first check if the year number is divisible by its first
    two digits or the first digit is not divisible by the last digit. If either of those conditions
    holds, the second coordinate is one less than the result when the last 2 digits are divided
    by the first 2 digits. If neither condition holds, subtract the square of the first digit from
    the last two digits.

2 Your assignment

2.1 Getting started

Open a terminal, create a directory for this project, change into it, and grab some starting source
code:

    $ mkdir project-1
    $ cd project-1
    $ wget -nv --trust-server-names https://goo.gl/HDqf9G
    $ emacs ScavengerHunt.java &

    Complete the ScavengerHunt program so that it takes a year number as input, performs the
    calculation described in Section[1] and emits the coordinates that it calculates. The program should
    look like this:

    $ java ScavengerHunt
    Enter the year: 1908
    11 6

    If you check the map, you will find that those coordinates lead you to Charles Pratt Dormitory.
    As an additional test, the year 1933 should provide coordinates to Valentine Hall.

2.2 Hunt!

To begin, enter the year 3232. That should yield coordinates on the map, and you should go to
that place. At each location there is a sign with a date on it (if there are multiple dates, use the
first one). There are six locations to find, including this first one. At the fifth location, go into
the building and find and write down a fun fact. At the sixth and final location, visit room 405,
provide the fun fact you found at the previous location, and you will receive a prize.
3 Submitting your work

Submit your ScavengerHunt.java source code file with the CS submission system, using one of the two methods:

- **Web-based**: Visit the submission system web page.
- **Command-line based**: Use the cssubmit command at your shell prompt.

This assignment is due on Sunday, October 8, 11:59 pm.