Agenda / Learning Objectives:

1. Learn 3 Unix commands
    a. chmod
    b. cal (e.g. cal 2018, cal 11 2018)
    c. wc (e.g. wc */etc/passwd*)
2. Review what we have learned from last lab
3. Run the tar command to extract lab11.tar in venus
4. Complete the exercises below for nested loops:
    a. Review the basic building blocks with question 1 in the warm-up exercises
    b. Do the "**3 nested for loops"** exercises in class and make sure you understand completely how that works before you leave the lab (so that you can feel confident to finish hw3 part b)
    c. Complete the other exercises listed below if time permits

CS111 Lab exercise: Drawing patterns

Warm Up Exercises:

1. Set an integer variable called size to 7. Use that as the row and/or column height for the following:
    a. Print a horizontal line
    b. Print a vertical line
    c. Print a square box (size x size)
    d. Print a diagonal from left to right
    e. Print the other diagonal from right to left
2. Combine the basics and do the following:
    a. A big letter ‘O’ (prac1.pdf q.272)
    b. A big letter ‘T’ (q.256)
    c. A big letter ‘U’ (q.252)

Use 3 nested for loops to draw:

1. 3 Big X's: (stacked)

```
*     *
 *   *
  * *
   *
  * *
 *   *
*     *
*     *
 *   *
  * *
   *
  * *
 *   *
*     *
*     *
 *   *
  * *
   *
  * *
 *   *
*     *
```

2. 3 Big +'s in a row:

```
   +         +         +
   +         +         +
   +         +         +
+++++++   +++++++   +++++++
   +         +         +
   +         +         +
   +         +         +
```

Can you re-do lab 2 exercise with nested for loops?

1. Ask for a positive integer n and use it to draw an inverted triangle with n rows and 2*n – 1 columns. (This was our first lab exercise but now you can do more than before.)

```
Inverted triangle:
Please enter a positive integer: 5
*********
 *******
  *****
   ***
    *
```

I have ranked the pattern questions in terms of difficulty found in prac1.pdf from Fall'18.

Easy: 36, 40; 117, 118, 119, 120; 149, 150, 151, 152; 156, 164; 189, 193, 197, 201; 205, 209, 213, 217, 224; 228; 252, 256, 272; 277, 284

Average: 28, 32 (do 284 first); 44, 49; 80, 84; 85, 86, 87, 88; 89, 90, 91, 92; 145, 146, 147, 148; 232; 240; 260; 287

3 Nested Loops: 4, 12, 16, 72, 76; 8, 53, 57, 61, 65; 20, 24; 48; 160, 168; 172, 176, 180, 184

Table questions: 236, 248