## Carnegie Mellon University in Qatar

Principles of Computing 15-110 - Fall 2018

Lecture 10

- 1. A year is a leap year if it is divisible by 4, unless it is a century year that is not divisible by 400 (e.g., 1800 and 1900 are *not* leap years while 1600 and 2000 *are*). Write a Python program that calculates whether a year is a leap year.
- 2. Write a Python program that accepts a date in the form month/day/year and outputs whether or not the date is valid. For example, 5/24/1962 is valid, but 9/31/2000 is not (September has only 30 days!).
- 3. The days of the year are often numbered from 1 through 365 (or 366). This number can be computed in three steps using int arithmetic:
  - dayNum = 31(month 1) + day
  - if the month is after February subtract (4(month) + 23)//10
  - if it is a leap year and after February 29, add 1

Write a Python program that accepts a date as month/day/year, verifies that it is a valid date (as in the previous problem), and then calculates the corresponding day number.

4. The National Weather Service computes the windchill index using the following formula:

$$35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where T is the temperature in degrees Fahrenheit, and V is the wind speed in miles per hour.

Write a Python program that prints a nicely formatted table of windchill values. Rows should represent wind speed for 0 to 50 in 5 mph increments, and the columns represent temperatures from -20 to +60 in 10-degree increments. Note: the formula only applies for wind speeds in excess of 3 mph.