# 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:

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

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 .

