BF550: Fall 2022
Problem Set 2 is due by 12:20 pm on Monday, October 10

Reading Assignment
Using Python documentation (`https://docs.python.org/3/`) or any other source familiarize yourself with (i) built-in functions for lists, sets, and dictionaries; (ii) reading and writing operations with files; and (iii) classes and objects. Familiarize yourself with the Matplotlib capabilities (`https://matplotlib.org/`). Get yourself familiar with NumPy (`https://numpy.org/`) and pandas (`https://pandas.org`).

Submission instructions
Homework is to be submitted by uploading to Blackboard in the appropriate assignment. I ask that each homework is submitted as a single iPython notebook with commented code and the answers to each problem displayed in the cell output when appropriate. In addition to the notebook itself, please submit the notebook converted to PDF. You can convert iPython notebooks to PDF from their menu. Sometimes this doesn't work. If so, don't worry and just submit the notebook itself.

Problem 1
Reference the following *Wikipedia* article: `https://en.wikipedia.org/wiki/Pascal%27s_triangle` about binomial coefficients and Pascal's triangle. Implement a class: `binomial_coefficients` that computes binomial coefficients using Pascal's rule. This is the recursion relation, not the formula with factorials.

The class should have the following public methods:

- `get_n(self, n)` should return a list of binomial coefficients for the expansion of the n-th order polynomial $(x+y)^n$, which form the n-th line of Pascal's triangle. Zeroth line is just 1.
- `get_nk(self, n, k)` should return $\binom{n}{k}$.
- `print_pt(self, n)` should print the Pascal's triangle with $n+1$ lines (from 0 to n). The triangle should be formatted so that the numbers in the first lines are in the center not on either edge; see the first two figures in the *Wikipedia* article. Print out three cases for n=2, n=5 and n=12.

Problem 2
With this problem, we will begin diving into the visualization of data. Visit the following webpage: `https://ourworldindata.org/coronavirus` and download the data. Write Python scripts to accomplish the two following tasks:

- Plot the chart of new confirmed COVID cases per country. Pick 6 countries of your choice. (First tab from the left)
- Plot the world map with current cases (pick a date from Sep 2022), and another plot with cases from a date in 2020, for each country. (Second tab from the left)