COMP 4304 / 6934 – ASSIGNMENT 2 (6%)

MEMORIAL
UNIVERSITY

Due: 11:59pm, Jan. 27, 2023

Learning Objectives

You will gain experience using Pandas aggregation functions and Matplotlib in this assignment.

Instructions

Download the following data set from Brightspace for this assignment:
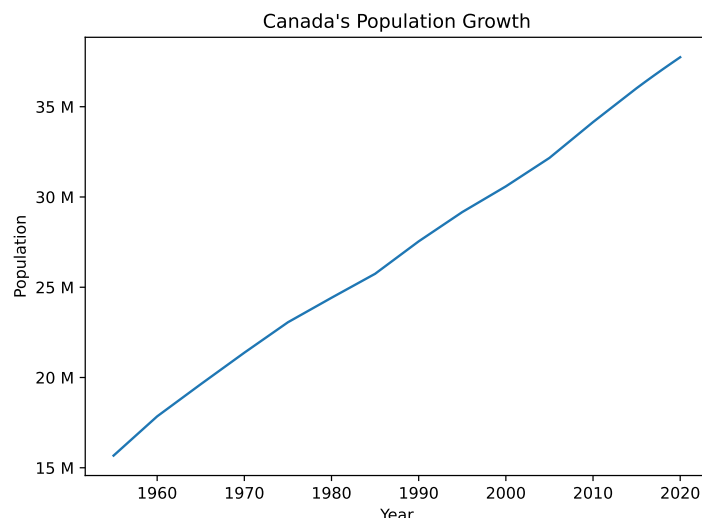
- `population.csv`

This data set contains information about the populations of all countries in the world from the period between 1955 to 2020. It contains the population of the country, the population living in urban areas, the median age within the country, and absolute and percentage change of population from the previous year.

Using the provided data set, create a Jupyter notebook that answers the following questions. You may only import the Pandas and Matplotlib libraries.
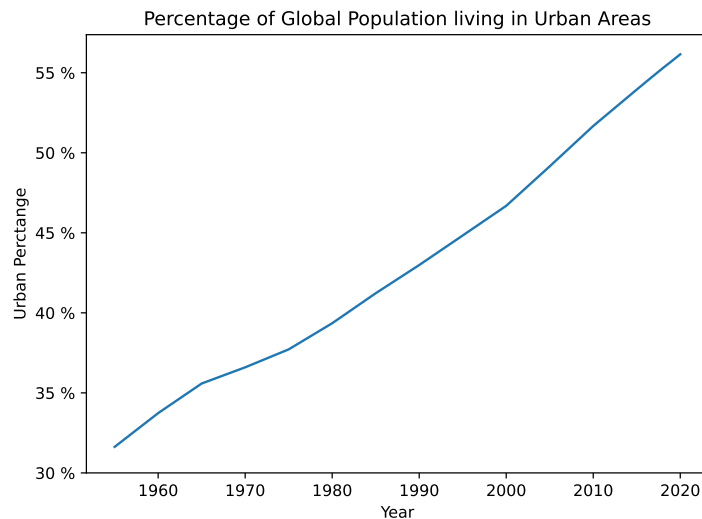
Question 1: (15 pts)

Recreate the following plot using Matplotlib's functional API. This line plot shows the population of Canada between the years 1955 and 2020. Make sure to include the axes labels, title, and that the tick marks on the y-axis match the figure below.

Question 2: (15 pts)

Recreate the following plot using Matplotlib's functional API. This line plot shows the percentage of the world's population that are living in urban areas. This has increased from low 30% to mid 50% over the past 60 years.

You will need to use Pandas to compute the required data. Specifically, you will need to obtain the percentage of the global population that live in urban areas on a per year basis. Make sure to include the axes labels, title, and that the tick marks on the y-axis match the figure below.


Question 3: (20 pts)

Recreate the following plot using Matplotlib's object-oriented API. This line plot shows the yearly population change (absolute number) per continent over the past 60 years. You will need to compute this data on a per continent basis using the country values. Make sure to include the axes labels and plot title, and that the colours of each line match the figure. The legend should be in the centre of the plot without a border (hint: framealpha), and the continents in alphabetical order.
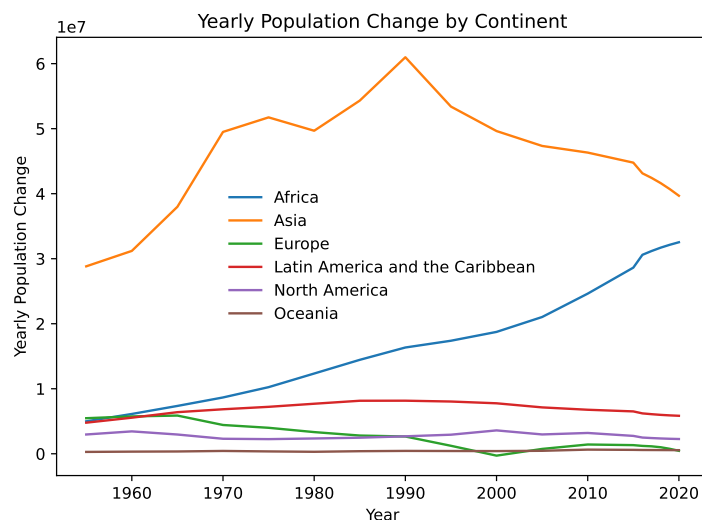
Question 4: (25 pts)

Recreate the following plot using Matplotlib's object-oriented API. This scatter plot shows the median age and percentage population growth (Yearly%Change) from the year 2019 to 2020 for all the countries of the world. Each country is colour coded according to its continent. Notice how countries with younger median ages have larger population growth rates.

Make sure to include the axes labels and plot title, and that the colours match the figure. (The colours are consistent with the plot from question 3 – this reinforces their interpretation.) Exclude countries that are missing median age information. The legend should be in the lower left corner, without a border, and the continents in alphabetical order.
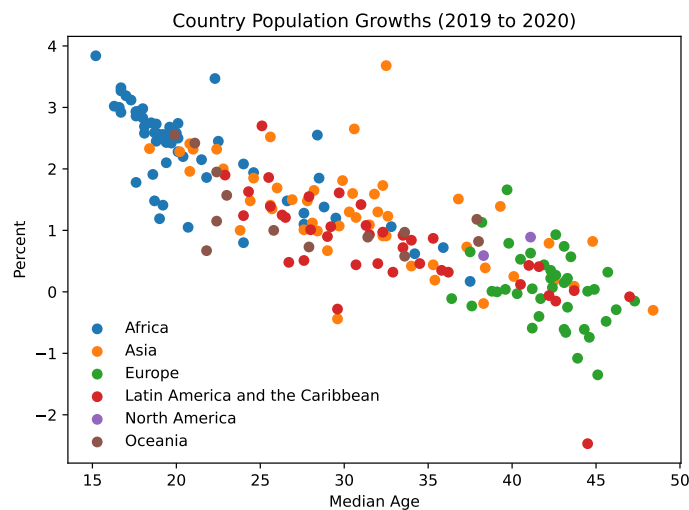
Question 5: (25 pts)

Recreate the following plot using Matplotlib's object-oriented API. This bar plot shows the population of the top 10 most populous countries in 2020.

Make sure to include the axes labels and title, and that the colours and x-axis ticks match the figure. The countries should be in descending order in according to their population.
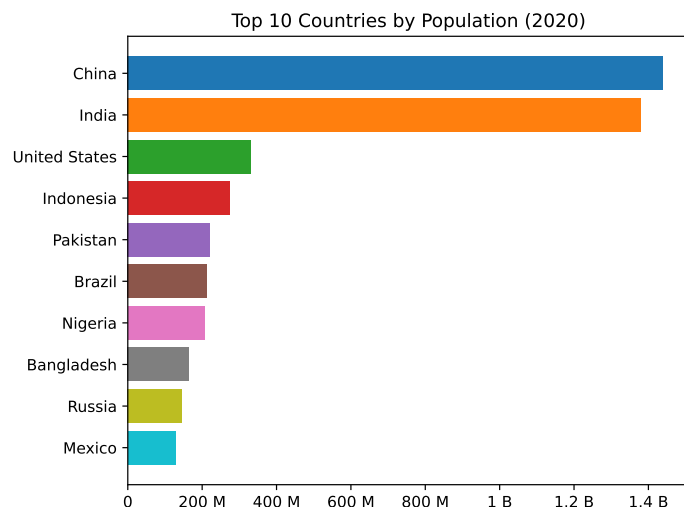
Submission

Submit your Jupyter notebook (`.ipynb`) through Brightspace.

Late submissions will be subject to a 10% penalty for each hour past the deadline.

Attribution

Submissions should include an attribution section indicating any sources of material, ideas or contribution of others to the submission.

Submissions must represent your independent work.

You are encouraged to use any resources to help with your solution, but your solution must represent independent work. If your submitted work includes unacknowledged collaboration, code materials, ideas or other elements that are not your original work, it may be considered plagiarism or some other form of cheating under MUN general regulations 6.12.4.2 (4.12.4.2 for graduate students) and academic penalties will be applied accordingly.

Avoid academic penalties by properly attributing any contribution to your submission by others, including internet sources and classmates. This will also help distinguish what elements of the submission are original. You may not receive full credit if your original elements are insufficient, but you can avoid penalties for plagiarism or copying if you acknowledge your sources.

Github

I encourage you to store and version your work on GitHub. It is good practice to do so as everyone uses git in the real world.

However, **it is a requirement that git repositories containing assignment material be private.** University regulations (undergraduate 6.12.4.2 and graduate 4.12.4.2) consider it cheating if you allow your work to be copied. There will be zero tolerance for this.