

ENDG-233 Final Project Summary

Project Overview

The purpose of the "ENDG 233 Country Statistics" program is to enable a user to retrieve and/or compare country statistics in terms of population and gross domestic product. More specifically, the program calculates and outputs significant statistics regarding the population and gross domestic product of a user-specified country within the years of 2011 - 2020 either on its own or compared to another country. These calculated statistics include average population and GDP, population and GDP growth rate, etc. The program also allows the user to visualize the data in two forms: the first being the average GDP per capita within each country in one or two of the user-specified sub-regions in the form of a bar graph, and the second being a line graph with either one or two countries' GDP and population between the years of 2011 - 2020.

The program first provides the user with an alphabetical list of UN Sub-Regions to which they must choose one and the program will print all the countries in alphabetical order, and their corresponding codes within the user-specified sub-region using the function `print_countries_sub_regions`. The user is then prompted to input either a country name or code, and will be re-prompted using a while loop if an invalid input is given or their country name or code is not within the sub-region previously specified. With this, the program has enough information to print the country's GDP and population related calculations using the classes `Population`, `GDP` (each containing functions for calculations such as growth rate and average using the data from the provided csv files), and `Table`. At this point, the user is given one of three options: they may input a second sub-region to further input a second country to compare to the first one, enter "SAME" for the previous sub-region so that the corresponding country codes and names do not print again, or enter "N/A" to indicate that they only want the information for one country and no comparison is desired. Regardless of choice, the country or countries' basic data such as name and region are printed using the class `Country`. From this point on, the data printed depends on whether or not a comparison was indicated.

A following table containing GDP and population calculated statistics prints using class `Table` which includes two important functions that are called depending on whether or not a comparison was indicated. If not, `print_all_data` is called to print the GDP and population data for only one country. If yes, `compare_data` is called and the data for both countries inputted is printed side-by-side.

With the user's input completed, the program can now plot the data for the specific countries. If comparison is indicated, the program outputs a subplot of two double-line graphs, (1) Years as a function of GDP, and (2) Years as a function of Population, with both the data for the first and second country, and a subplot of two bar graphs for the average GDP per capita in each country within the user's first and second specified sub-regions. In the case that two different countries are inputted within the same sub-region, one bar graph is printed for that sub-region and a line graph subplot plotted with both countries' data. If no comparison, then the same graphs are plotted except now with one bar graph for one sub-region and the same subplot for Years vs. GDP/Population but with the data for one country. Because of these different scenarios, plotting the bar graphs and line graphs were made into functions to be called in certain circumstances with different arguments.

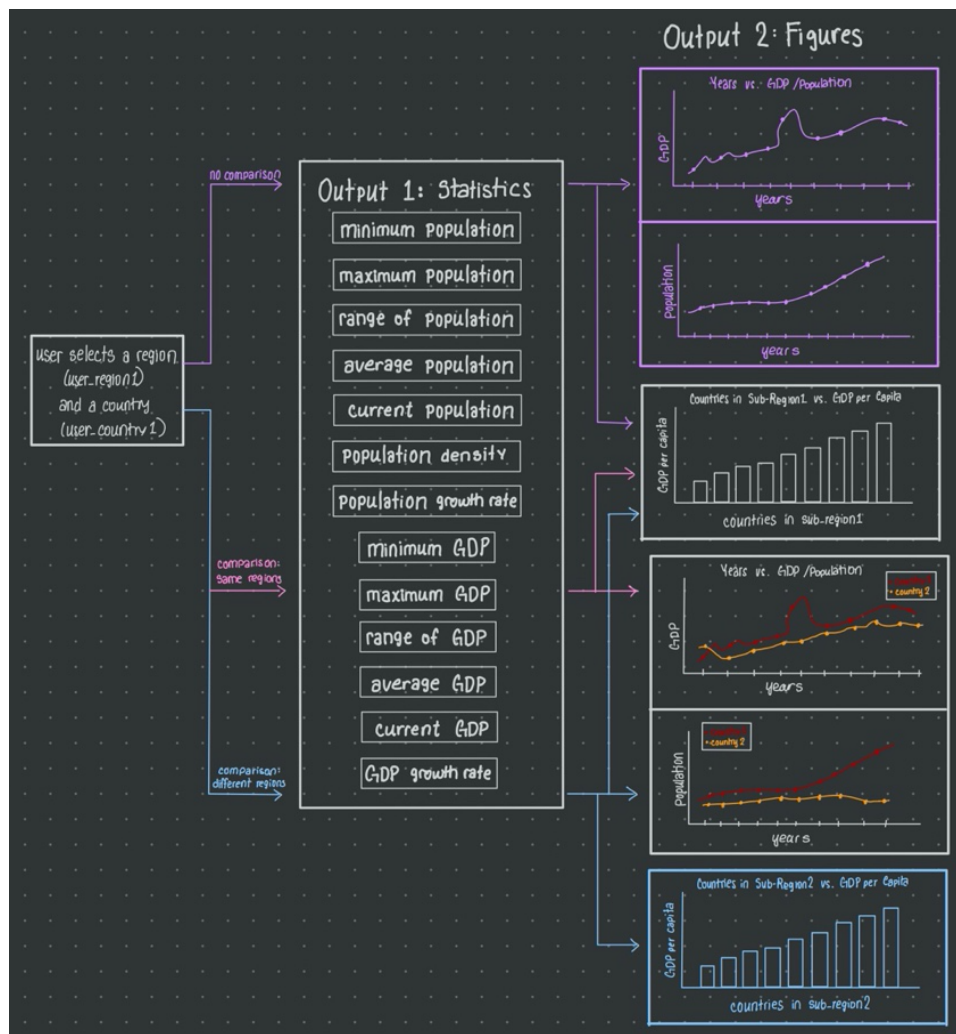
Citations

- The World Bank Group, "Land area (sq. km) - Sudan", 2021. [Online]. Available: <https://data.worldbank.org/indicator/AG.LND.TOTL.K2?locations=SD>. [Accessed: Nov. 30, 2021]
- IBAN, "Country Codes Alpha-2 & Alpha-3", 2021. [Online]. Available: <https://www.iban.com/country-codes>. [Accessed: Dec. 1, 2021]
- Knoema, "Historical GDP by Country | Statistics from the World Bank | 1960-2019", 2021. [Online]. Available: <https://public.knoema.com/mhrzolg/historical-gdp-by-country-statistics-from-the-world-bank-1960-2019?country=San%20Marino#>. [Accessed: Dec. 1, 2021]
- Country Data: ENDG 233: Programming with Data. (2021). *Country_Data*. Course provided dataset. Schulich School of Engineering, University of Calgary. [Accessed: Dec. 1, 2021]
- Population Data: ENDG 233: Programming with Data. (2021). *Population_Data*. Course provided dataset. Schulich School of Engineering, University of Calgary. [Accessed: Dec. 1, 2021]

Evidence of Task Management and Timeline of Milestones

Date	Tasks	Done by	Date	Tasks	Done by
Nov 29	Brainstormed ideas for data sets	Both	Dec 5	Coded for all country2 statistics	Zahwa
Nov 30	Concluded on data sets	Both	Dec 6	Coded plots	Zahwa
	Planned flow of code	Both		Added additional functions	Both (distributed)
Dec 1	Gathered all data required for code	Isha		Fixed recurring bugs	Both (distributed)
	Created csv files	Isha		Wrote project overview	Both (distributed)
Dec 2	Created outline/frame of code	Zahwa	Dec 7	Added docstrings	Isha
Dec 3	Coded for the classes	Both (distributed)		Added comments	Zahwa
Dec 4	Coded for all country1 statistics	Isha	Dec 8	Finalized write up and wrote headers	Both (distributed)

Evidence of Design Process



Successful Execution Screenshots

TERMINAL FOR COMPARISON OF COUNTRIES:

```
(venv) Zahwas-MacBook-Air:Portfolio Project zahwafatima$ python portfolio_project.py
ENDG 233 Country Statistics

UN Sub-Regions:
• Australia and New Zealand
• Central Asia
• Eastern Asia
• Eastern Europe
• Latin America and the Caribbean
• Melanesia
• Micronesia
• Northern Africa
• Northern America
• Northern Europe
• Polynesia
• South-eastern Asia
• Southern Asia
• Southern Europe
• Sub-Saharan Africa
• Western Africa
• Western Asia
• Western Europe

Please enter a UN sub-region from the above list: Invalid Sub-Region
You must enter a valid UN sub-region!
Please enter a UN sub-region: Northern Africa

Countries and their Corresponding Codes in Northern Africa:
• Algeria: DZA
• Egypt: EGY
• Libya: LBY
• Morocco: MAR
• Sudan: SDN
• Tunisia: TUN

Please enter a valid country name or country code within the specified sub-region: Invalid Country
You must enter a valid country name or country code:
Please enter a valid country name or country code: Egypt

Please enter another UN sub-region from the above list for comparison (enter SAME for previous sub-region, N/A for no comparison): Western Asia

Countries and their Corresponding Codes in Western Asia:
• Armenia: ARM
• Azerbaijan: AZE
• Bahrain: BHR
• Cyprus: CYP
• Georgia: GEO
• Iraq: IRQ
• Jordan: JOR
• Kuwait: KWT
• Lebanon: LBN
• Oman: OMN
• Qatar: QAT
• Saudi Arabia: SAU
• Turkey: TUR
• United Arab Emirates: ARE

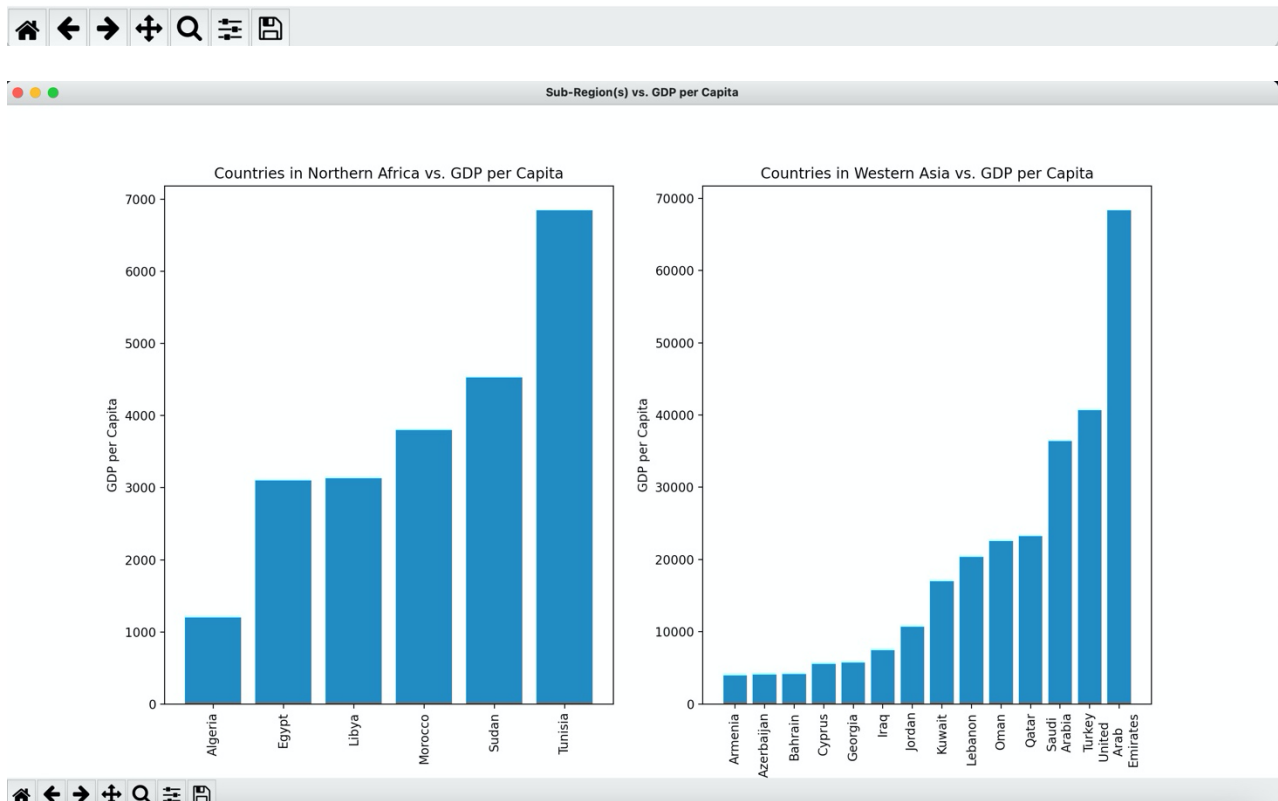
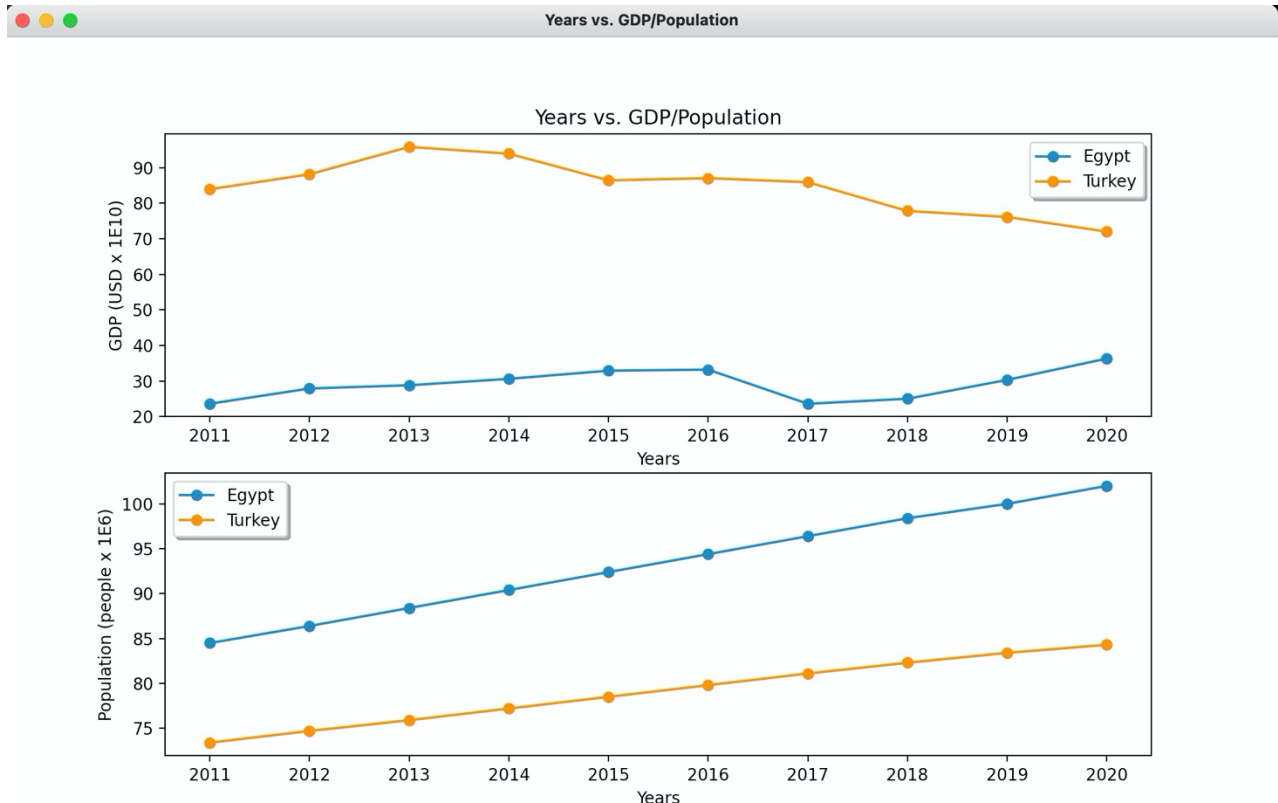
Please enter a valid country name or country code within the specified sub-region: INV
You must enter a valid country name or country code:
Please enter a valid country name or country code within the specified sub-region: TUR

***Requested Country Data***

COUNTRY 1                                COUNTRY 2
-----
Country Name: Egypt                      Country Name: Turkey
Country Code: EGY                        Country Code: TUR
UN Region: Africa                        UN Region: Asia
UN Sub-Region: Northern Africa            UN Sub-Region: Western Asia
Sq Km: 1000000                           Sq Km: 785000

Statistic                                Egypt                                Turkey                                Units
-----
POPULATION STATS
Minimum Population                        84500000                             73400000                             people
Maximum Population                       102000000                            84300000                             people
Range of Population                      17500000                             10900000                             people
Average Population                       93330000                             79060000                             people
Current Population as of 2020            102000000                            84300000                             people
Current Population Density as of 2020   102.00                               107.39                               people per square km
Population Growth Rate from 2011 to 2020 1.90                                 1.39                                 %
GROSS DOMESTIC PRODUCT STATS
Minimum GDP                             236000.00                            720000.00                            million USD
Maximum GDP                             363000.00                            958000.00                            million USD
Range of GDP                             127000.00                            238000.00                            million USD
Average GDP                             292200.00                            846900.00                            million USD
Current GDP as of 2020                   363000.00                            720000.00                            million USD
GDP Growth Rate from 2011 to 2020       4.40                                 -1.52                                 %
Average GDP per capita                   3130.83                             10712.12                             million USD

The figures will now display.
Thank you for using our program!
```

FIGURES FOR COMPARISON OF COUNTRIES:

TERMINAL FOR NO COMPARISON OF COUNTRIES:

```
(venv) Zahwas-MacBook-Air:Portfolio Project zahwafatima$ python portfolio_project.py
ENDG 233 Country Statistics
UN Sub-Regions:
• Australia and New Zealand
• Central Asia
• Eastern Asia
• Eastern Europe
• Latin America and the Caribbean
• Melanesia
• Micronesia
• Northern Africa
• Northern America
• Northern Europe
• Polynesia
• South-eastern Asia
• Southern Asia
• Southern Europe
• Sub-Saharan Africa
• Western Africa
• Western Asia
• Western Europe

Please enter a UN sub-region from the above list: Northern Africa

Countries and their Corresponding Codes in Northern Africa:
• Algeria: DZA
• Egypt: EGY
• Libya: LBY
• Morocco: MAR
• Sudan: SDN
• Tunisia: TUN

Please enter a valid country name or country code within the specified sub-region: EGY

Please enter another UN sub-region from the above list for comparison (enter SAME for previous sub-region, N/A for no comparison): N/A

***Requested Country Data***

Country Name: Egypt
Country Code: EGY
UN Region: Africa
UN Sub-Region: Northern Africa
Sq Km: 1000000
```

Statistic	Egypt	Units
POPULATION STATS		
Minimum Population	84500000	people
Maximum Population	102000000	people
Range of Population	17500000	people
Average Population	93330000	people
Current Population as of 2020	102000000	people
Current Population Density as of 2020	102.00	people per square km
Population Growth Rate from 2011 to 2020	1.90	%
GROSS DOMESTIC PRODUCT STATS		
Minimum GDP	236000.00	million USD
Maximum GDP	363000.00	million USD
Range of GDP	127000.00	million USD
Average GDP	292200.00	million USD
Current GDP as of 2020	363000.00	million USD
GDP Growth Rate from 2011 to 2020	4.40	%
Average GDP per capita	3130.83	million USD

The figures will now display.
Thank you for using our program!

FIGURES FOR NO COMPARISON OF COUNTRIES: