FINAL PROJECT ENDG 233 BY VISHNU DHANDA AND HARSH CHITRODA L11 - 7.

PROGRAM SUMMARY

A terminal application which enables the user to:

- Information on population data of a country within a specified timeframe.
  - Change in population of a country within the timeframe specified by the user.
  - Average population of a country within timeframe specified by the user.
  - Current population density within country entered by the user.
  - Produces a line graph showing variation in population within the specified timeframe.
- Information on threatened species within a country.
  - Total number of threatened species within country entered.
  - Average number of threatened species within a country entered.
  - Most and least threatened species within a country.
  - A bar graph which graphs threatened species against the number of threatened species for a visual representation.

TASK MANAGEMENT AND TASK ALLOCATION

DATES FROM 24TH NOVEMBER

- Discussed what data we will be using, functions the program should execute, graphs we would like to display to the user and a user interface based on these decisions.
- Set up a Github repository containing the py file and the CSV files which we then cloned on to our VS Code workspaces. This enabled us to work on the py file at the same time and push any changes as commits to the repository.
- Discussed what we would like the PDF provided to include.
- Allocated tasks to Vishnu Dhanda included:
  - Design and execution of user interface.
  - Programming and importing any relevant data for the threatened species section of the program to display total no of threatened species, average no of threatened species and most and least threatened species.
  - Design and programming of a bar graph which shows threatened species and the number of each species respectively.
  - Commenting code and adding docstrings (Shared task)
  - The program summary section of the PDF.
  - The Task management and Task allocation section of the PDF (Shared task)
  - Execution screenshot section of the PDF.
- Allocated tasks to Harsh Chitroda included:
  - Programming and importing any relevant data for the Population data of a country within a timeframe specified by user to display, change in population, average population and current population density.
  - Design and programming of line graph to display variation of population within timeframe specified.
  - Commenting code and adding docstrings (Shared task)
  - Flowchart section of the PDF.
  - The Task management and Task allocation section of the PDF (Shared task)
  - Data section of the PDF

DATES FROM 29TH NOVEMBER

- Edits were made to the data sets. (Edits made have been listed in the data section of the PDF)
- Harsh completes programming of population data section of the program, including all relevant functions and the plotting of the required graph.
- Vishnu completed programming the Threatened species data section of the program, including all relevant functions and plotting of the required graph.
- A meeting is organized so that we can comment and add necessary docstrings to the code together.

- Execution screenshots are taken to be later added within the PDF

DATES FROM 4TH DECEMBER

- We focus on completion of the PDF.
- Vishnu completes the program summary section of the PDF.
- Harsh completes the data and flowchart section of the PDF.
- We organize a meeting to complete the Task management section of the PDF together.
- Vishnu creates PDF to include the execution screenshots.

DATA

Data used: ENDG 233: Programming with Data. (2021). Population Data. Course provided dataset. Schulich School of Engineering, University of Calgary.

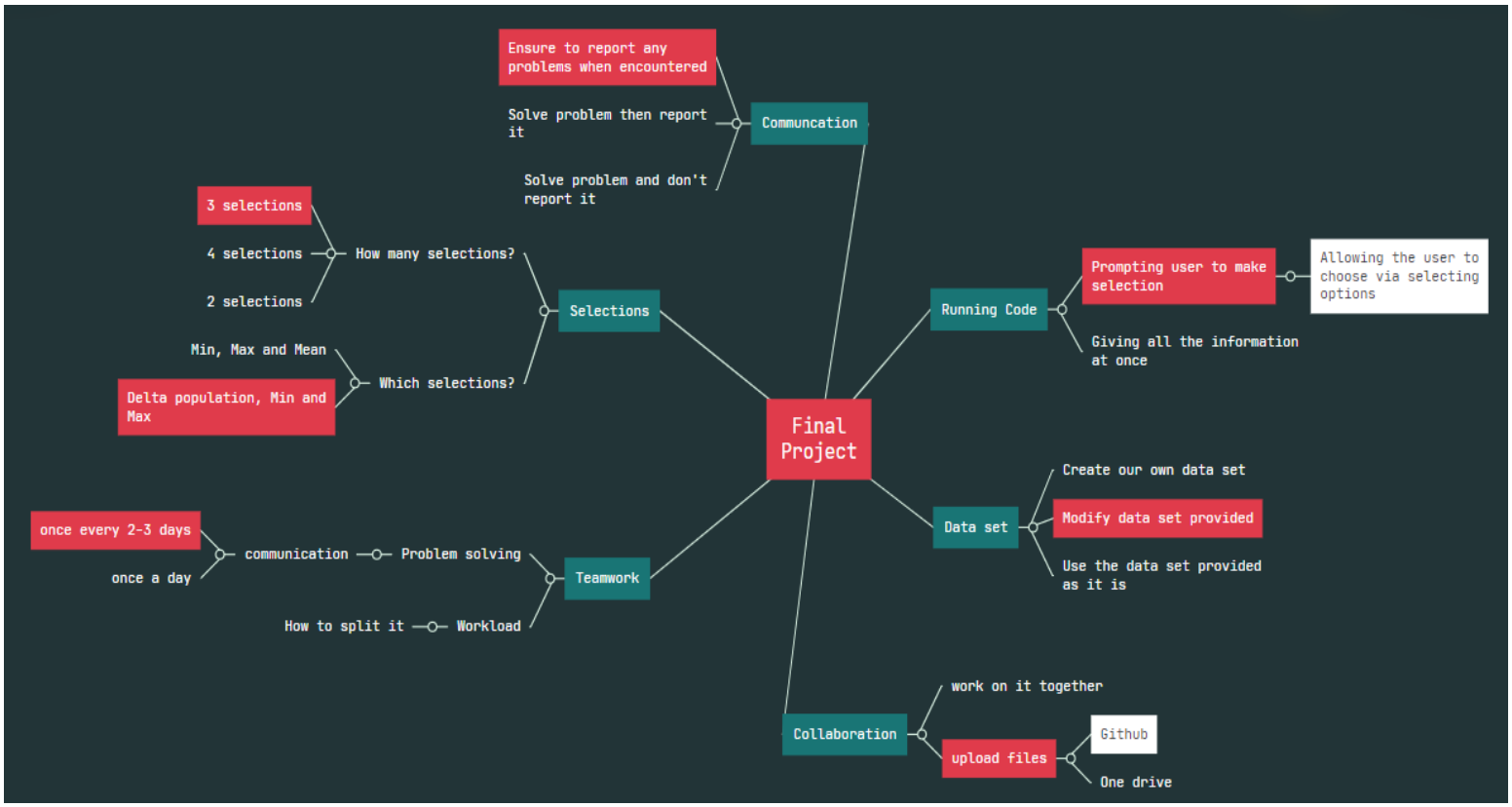
The following alterations were made to the Data used:

- Removal of country column from Threatened_Species.csv.
- Removal of country column from Population_Data.csv.
- Change of first row in Population_Data.csv to display year only.

IMPORTANT NOTE ON USAGE.

- When using the population information functionality within the program the user will be asked to specify a starting year and ending year. An example: If finding population **between year 2000 and 2005** the **starting year should be year 2000** and **ending year should be 2005.**
- **When asked for country it must be entered with a capital first letter e.g Algeria, Kenya.**
- The program also corrects for user input to ensure the program is not terminated with incorrect input.

FLOWCHART



EXECUTION SCREENSHOTS

```
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C:\Users\dhand\Desktop\ENDG233>c:/Users/dhand/Desktop/ENDG233/venv/Scripts/activate.bat

(venv) C:\Users\dhand\Desktop\ENDG233>py finalproject.py
ENDG 233 FINAL PROJECT BY HARSH CHITRODA AND VISHNU DHANDA
Select 1 for information on population data of a country within a specified timeframe
Select 2 for information on threatened species within a country.
Select 0 to exit.
Enter a option: 1
Enter a country: Algeria
Enter a starting year from 2000 to 2019: 2003
Enter a ending year from 2004 to 2020: 2019

Change in population for Algeria between 2003 to 2019 is 10800000
The average population from 2003 to 2019 is: 36681250
The current population density is: 18.445378151260503 people per sq km

Would you to display a graph (y/n)? y

Select 1 for information on population data of a country within a specified timeframe
Select 2 for information on threatened species within a country.
Select 0 to exit.
Enter a option: 2
Enter a country: Tonga
```
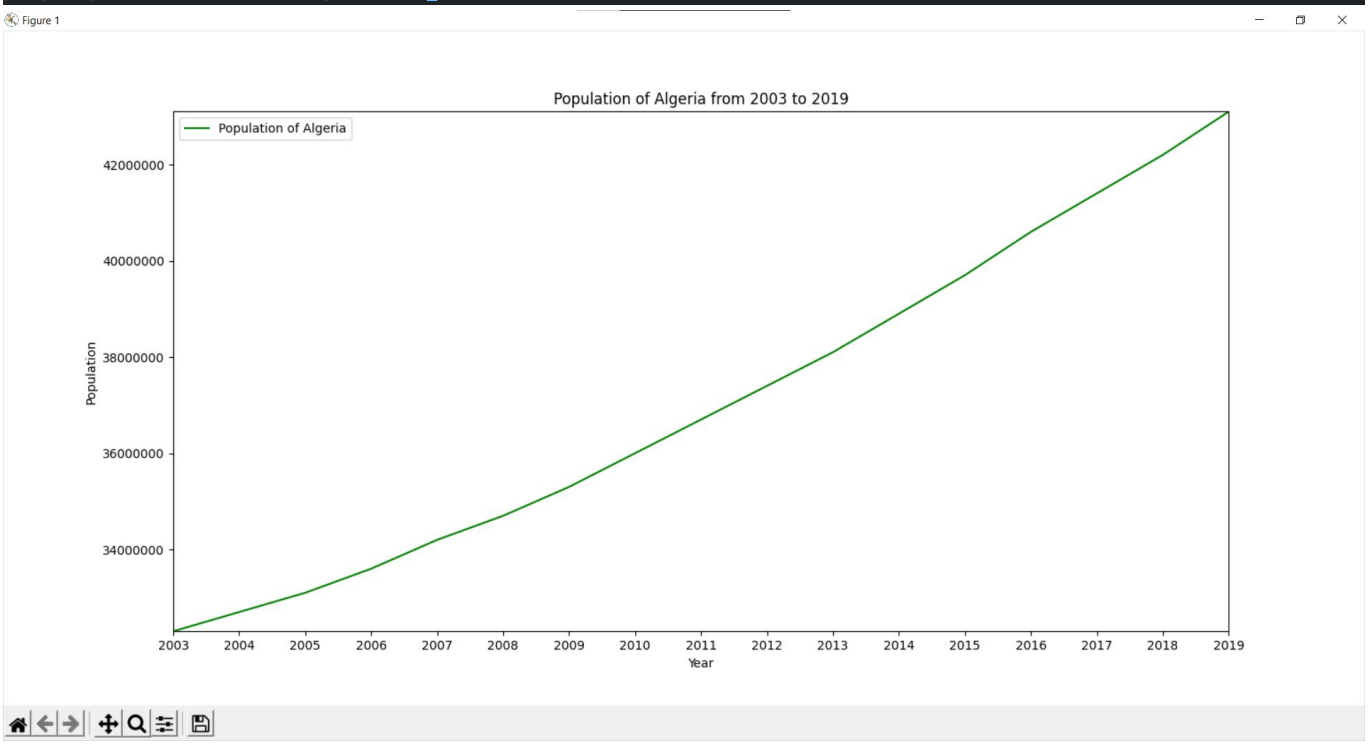
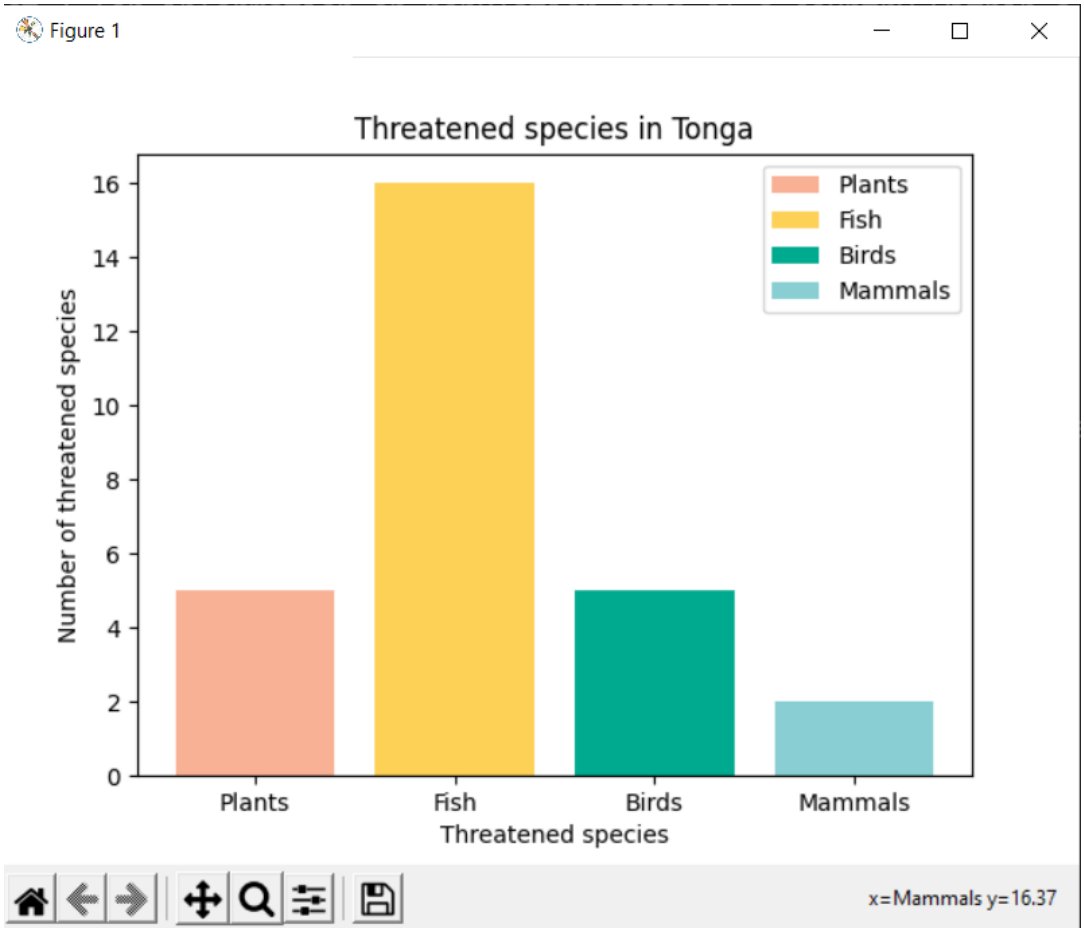

```
Total number of threatened species: 28
Average number of threatened species: 7.0
Most threatened species: Fish
Least threatened species: Mammals

Would you to display a graph (y/n)? y

Select 1 for information on population data of a country within a specified timeframe
Select 2 for information on threatened species within a country.
Select 0 to exit.
Enter a option: 0
Thank you for using the data analysis program.

(venv) C:\Users\dhand\Desktop\ENDG233>
```






```
Microsoft Windows [Version 10.0.19042.1348]
(c) Microsoft Corporation. All rights reserved.

C:\Users\dhand\Desktop\ENDG233>c:/Users/dhand/Desktop/ENDG233/venv/Scripts/activate.bat

(venv) C:\Users\dhand\Desktop\ENDG233>py finalproject.py
ENDG 233 FINAL PROJECT BY HARSH CHITRODA AND VISHNU DHANDA
Select 1 for information on population data of a country within a specified timeframe
Select 2 for information on threatened species within a country.
Select 0 to exit.
Enter a option: 1
Enter a country: Tonga
Enter a starting year from 2000 to 2019: 200
Please enter a valid year.
Enter a starting year from 2000 to 2019: 2000
Enter a ending year from 2001 to 2020: 2020

Change in population for Tonga between 2000 to 2020 is 8000
The average population from 2000 to 2020 is: 101655
The current population density is: 141.33333333333334 people per sq km

Would you to display a graph (y/n)? y
```

```
 Select 1 for information on population data of a country within a specified timeframe
 Select 2 for information on threatened species within a country.
 Select 0 to exit.
 Enter a option: 2
 Enter a country: Kenya

 Total number of threatened species: 391
 Average number of threatened species: 97.8
 Most threatened species: Plants
 Least threatened species: Mammals

 Would you to display a graph (y/n)? y

 Select 1 for information on population data of a country within a specified timeframe
 Select 2 for information on threatened species within a country.
 Select 0 to exit.
 Enter a option: 0
 Thank you for using the data analysis program.

 (venv) C:\Users\dhand\Desktop\ENDG233>
```

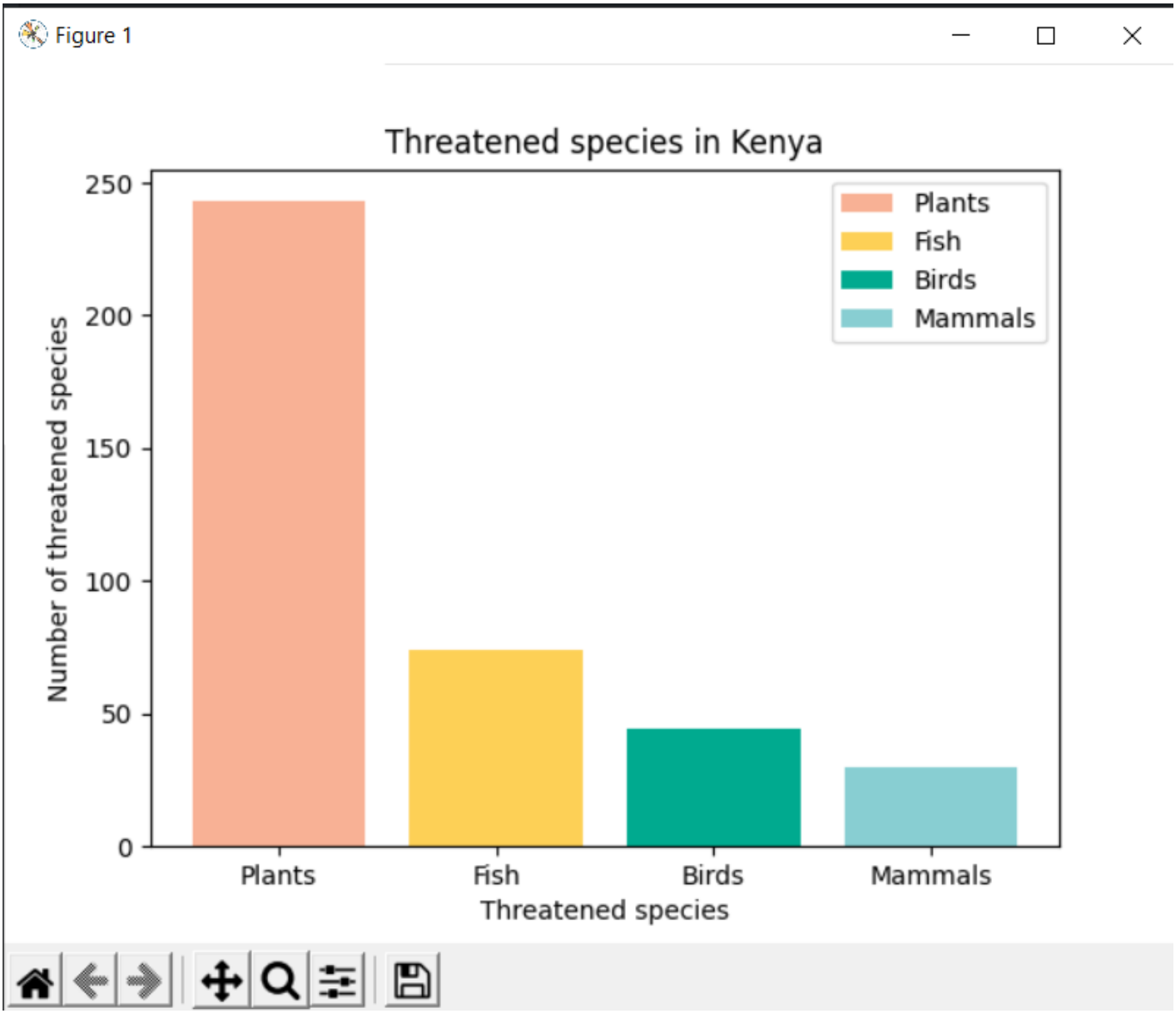


Figure 1
Threatened species in Kenya
Number of threatened species
250
200
150
100
50
0
Plants
Fish
Birds
Mammals
Plants
Fish
Birds
Mammals
Threatened species

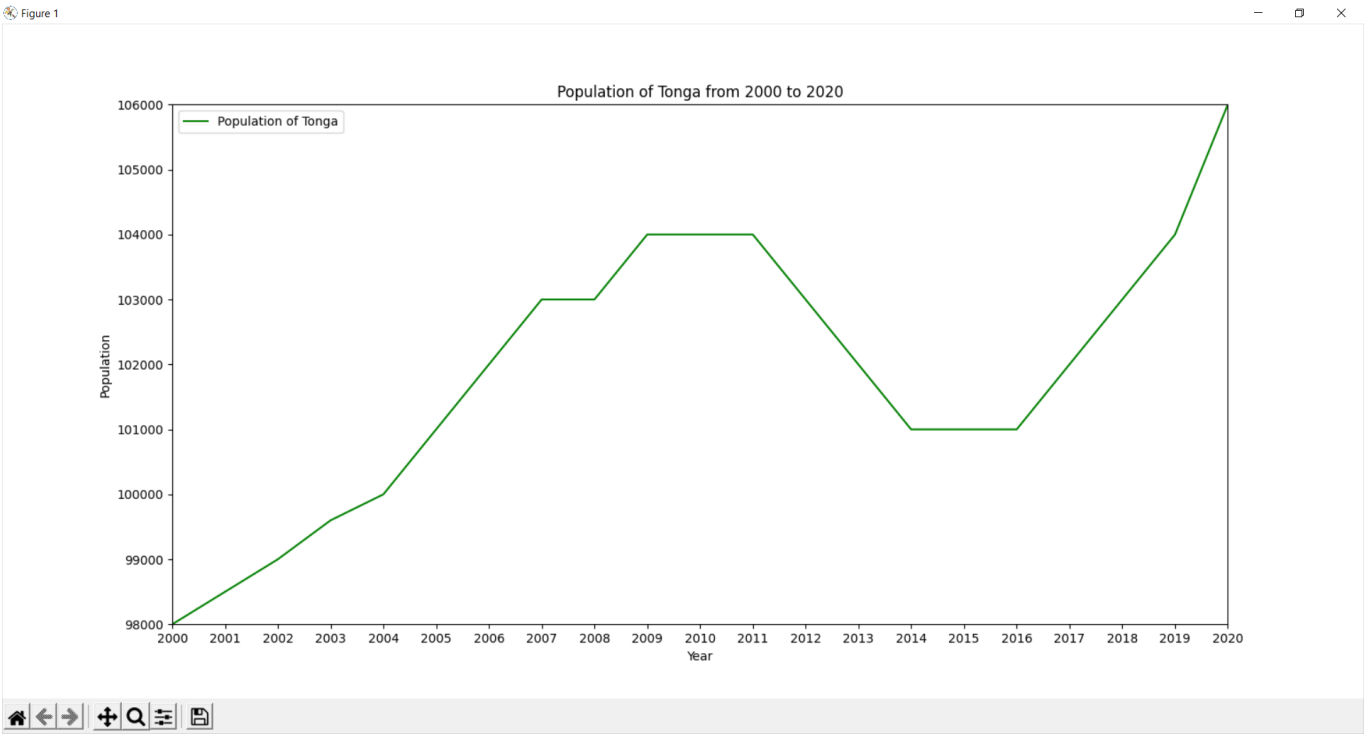


Figure 1
Population of Tonga from 2000 to 2020
Population of Tonga
Population
106000
105000
104000
103000
102000
101000
100000
99000
98000
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year