CIS 41B Spring 2023
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Final Project Proposal (Revised)

Overview: This project uses the REST Countries API from Alejandro Matos to create a database of countries. A screenshot of the JSON data associated with one country (Andorra) is shown in Figure 1 on the next page. There are 250 rows in the dataset as it includes not just independent countries but also such entities as Palestine and Guam. Information for each country includes:

- Common name, e.g., Andorra
- Official name, e.g., Principality of Andorra
- Capital
- Population
- Currency
- Continent, etc.

The database is linked to a GUI front end that allows users to choose what data they want to view. For example, the user can choose to display countries in a given region by population or by area. Or the user can choose specific countries to view general information about them. Figure 2 on page 3 has a diagrammatic overview of the program flow. A further description accompanies the figure.

Skills used:

- API call, JSON
- SQLite
- numpy
- matplotlib
- Tkinter

New skills for the project:

- Many-to-many relationships among database tables, e.g., Turkey and Russia straddle continents
- Writing out database table to CSV file
- Box plots for matplotlib, e.g., show the population distribution of all the countries by continent using box plots

Task responsibilities:

- James Kang: Front end (TKinter, matplotlib)
- Surajit Bose: Back end (web access, database, numpy or pandas)

Figure 1. Sample JSON data about a single country, Andorra

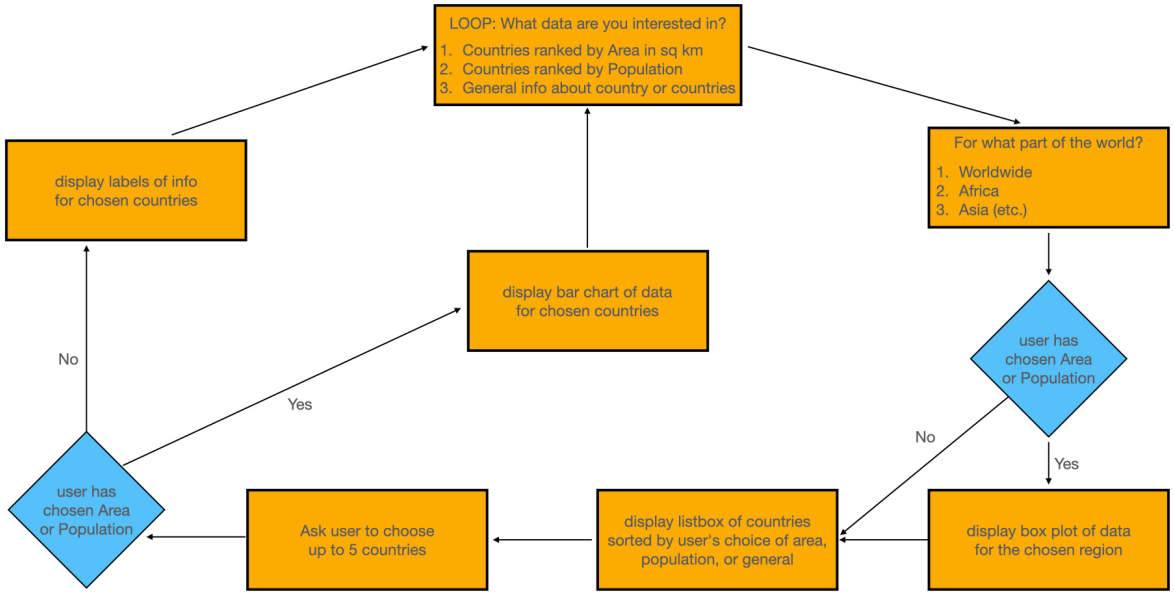

Figure 2. Program flow with TKinter main loop

Program Flow: As shown in Figure 2, on startup the user is presented with a choice of whether to view countries by ranked by area or population, or simply to view general information about countries. On making the choice, the user is asked to pick a specific continent or to view in worldwide scope. Then the display is customized based on the user's choices, e.g.:

- If the user chooses "Asia" and "Population", then the user will see a box plot of the population of Asian countries, and a listbox of Asian countries sorted by population.
- If the user chooses "World" and "Population", then the user will see a box plot of the population of all the countries in the world, and a listbox of all the countries sorted by population.
- If the user chooses "Africa" and "Area", then the user will see a box plot of the population of African countries, and a listbox of African countries sorted by area.
- If the user chooses "General Information" and "Europe", then the user will not see a box plot, but just a listbox of all the countries in Europe, sorted alphabetically.

The user can then pick up to five countries out of the listbox. If the user has chosen Area or Population, the user will see a bar chart of those countries' area or population. Otherwise, the user will see one card per country with general information about the country such as its currency, capital, official name, population, area, bordering countries, Gini coefficient, and continent, along with a clickable link to a map of the country.