Toronto Metropolitan University

Programming Competition 2022

Abstract

Background:

Throughout the past few years, society has been focused on solving problems centered around climate change, the pandemic, and the subsequent impacts of events on the economy. However, an issue on the rise that has been neglected in order to deal with short-term problems, is Urban Sprawl. Urban Sprawl is a geographically troublesome issue defined as an increased establishment of low density housing and single use developments that create unethical city layouts worldwide. Residential housing is produced rapidly to accommodate growing populations in many countries. To determine which countries are most affected by this issue, we must analyze its direct cause; population growth.

Your team's task will be to create a program that uses the provided information to determine population projections for the future, and in turn, determine which countries should be prioritized when addressing urban sprawl.

Challenge:

Build a recommendation engine that would sift through information provided to the user and create a list of the top 10 countries with the greatest projected populations for 2030. Teams must only use the following data set;

WPP2022_GEN_F01_DEMOGRAPHIC_INDICATORS_COMPACT_REV1.xlsx

The data set contains the following features;
- Index
- Variant
- Region, subregion, country or area*
- Notes
- Location code
- ISO3
- Alpha-code
- ISO2 Alpha-code
- SDMX code**
- Type
- Parent code
- Year
- Total Population, as of 1 January (thousands)
- Total Population, as of 1 July (thousands)
- Population Density, as of 1 July (persons per square km)

- Median Age, as of 1 July (years)
- Natural Change, Births minus Deaths (thousands)
- Rate of Natural Change (per 1,000 population)
- Population Change (thousands)
- Population Growth Rate (percentage)
- Population Annual Doubling Time (years)
- Births (thousands)
- Crude Birth Rate (births per 1,000 population)
- Total Fertility Rate (live births per woman)
- Net Reproduction Rate (surviving daughters per woman)
- Total Deaths (thousands)
- Crude Death Rate (deaths per 1,000 population)
- Life Expectancy at Birth, both sexes (years)
- Life Expectancy at Age 15, both sexes (years)
- Life Expectancy at Age 65, both sexes (years)
- Life Expectancy at Age 80, both sexes (years)
- Mortality between Age 15 and 60, both sexes (deaths under age 60 per 1,000 alive at age 15)
- Net Number of Migrants (thousands)
- Net Migration Rate (per 1,000 population)

Layout and Requirements:

You must use 5 categories from the list above to determine the Top 10 Countries with the Highest Population Growth Rate. However, ⅗ categories must be ***Population Growth Rate (percentage)*** and **Net** *Migration Rate (per 1,000 population)*

With respect to output, you have the freedom to choose how to present your solution. Use your creativity and technical skills to solve this problem. Take the program's CPU and memory usage into consideration and select the most appropriate algorithm to address the problem. All presentations must be presented in English and allow for the program to be adequately demonstrated.

Any Programming Language May Be Used

Programming Judging Matrix		
Strategy/Algorithm	Simplicity	/10
	Ingenuity	/10
	Ability to Achieve Desired Outcome	/15
		/35
Code	Structure	/10
	Consistency	/5
	Readability	/10
	Efficiency	/10
		/35
Resource Management	Memory Usage Efficiency	/5
	Program's CPU Usage	/5
		/10
Presentation	Design Process and Justification	/7
	Design Critique	/4
	Voice, Articulation and Timing	/4
	Visual Aids	/2
	Response to Questions	/3
		/20
Deduction Total		
Total		**/100**

Point Penalties	
Plagiarism	Elimination
Insufficient Citation	-50
Documents Received After Deadline	-50
Absent Team Member	-25
Entering presentation room before allotted time (after first offense)	-10
Total	