

## Project 01 Written Work

● Graded

Group

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Total Points

33.5 / 35 pts

Question 1

1.3

5 / 5 pts

✓ + 2.5 pts Correct graph with dip

✓ + 2.5 pts Correct starting year (1970)

+ 0 pts Blank or Incorrect

Question 2

1.4

5 / 5 pts

✓ + 1.5 pts There was a cyclone in 1991 that caused a large dip in population size

✓ + 2.5 pts It does not explain the 30-year trend in population growth rate decline.

✓ + 1 pt Life expectancy increased again right after the dip.

+ 0 pts Blank or Incorrect

Question 3

1.6

5 / 5 pts

✓ + 2.5 pts Correct Answer: Yes.

✓ + 2.5 pts Correct explanation: Declining fertility rate implies fewer births which could help explain the declining population growth.

+ 0 pts Blank or Incorrect

Question 4

1.8

4.5 / 5 pts

✓ + 2.5 pts There is a strong positive association.

✓ + 2.5 pts No conclusions about causality can be drawn.

+ 0 pts Blank or Incorrect

- 0.5 pts Does not mention that the association is positive

✓ - 0.5 pts Does not mention that the association is strong

- 1 pt Incorrect reasoning for causation

### Question 5

1.10

5 / 5 pts

✓ + 2.5 pts Correct exponential shape

✓ + 2.5 pts Correct axes: x goes 1800-2020, y is in billions

+ 0 pts Blank or Incorrect

### Question 6

2.6

4 / 5 pts

✓ + 1 pt Described getting the country's geo code

✓ + 1 pt Discussed filtering both the poverty and population table to only have the specified geo code

✓ + 1 pt Mentioned joining the tables

+ 1 pt Described multiplying the population with the percent of the population living in poverty

✓ + 1 pt Discussed adding the column to the table in order to plot the data

+ 0 pts Blank or Incorrect

### Question 7

2.7

5 / 5 pts

✓ + 1 pt Graph for India is Correct

✓ + 1 pt Graph for Nigeria is Correct

✓ + 1 pt Graph for China is Correct

✓ + 1 pt Graph for Colombia is Correct

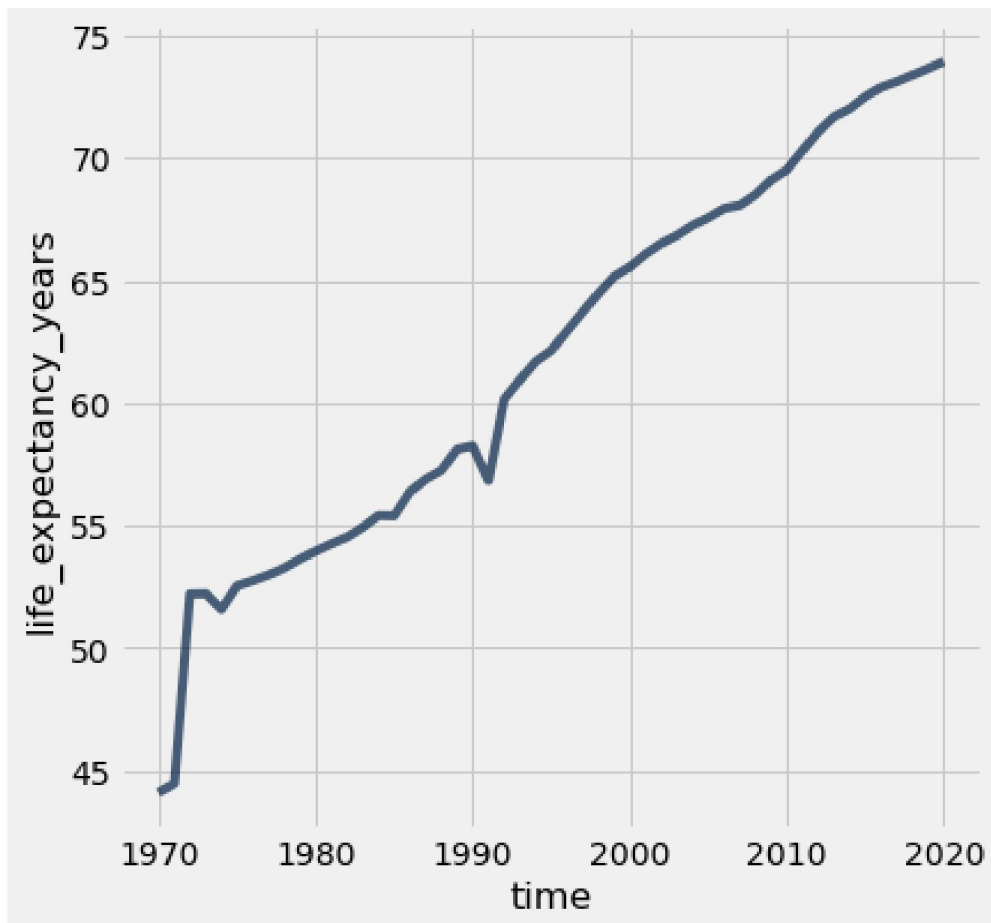
✓ + 1 pt Graph for United States is Correct

- 2.5 pts Incorrectly converted percent to proportion

+ 0 pts Blank or Incorrect

**Question 3.** Perhaps population is growing more slowly because people aren't living as long. Use the `life_expectancy` table to draw a line graph with the years 1970 and later on the horizontal axis that shows how the *life expectancy at birth* has changed in Bangladesh.

```
In [13]: #Fill in code here
life_expectancy.where('geo', are.equal_to('bgd')).where('time', are.above_or_equal_to(1970)).p.
```





**Question 4.** Assuming everything else stays the same, do the trends in life expectancy in the graph above directly explain why the population growth rate decreased from 1985 to 2015 in Bangladesh? Why or why not?

Hint: What happened in Bangladesh in 1991, and does that event explain the overall change in population growth rate? This [webpage](#) provides relevant context.

The trends in life expectancy does not directly explain why the population growth rate decreased from 1985 to 2015 in Bangladesh. Looking at the graph, life expectancy actually seems to increase over the years and people are living longer than before as the year goes by. This would increase the population size if everything else has stayed the same. The cyclone at 1991 in Bangladesh decreased the population size, but it does not explain the overall change in population growth rate cause it seems to increase even after that chatastrophic event.



**Question 6.** Assuming everything else is constant, do the trends in fertility in the graph above help directly explain why the population growth rate decreased from 1980 to 2020 in Bangladesh? Why or why not?

I think the trend in fertility in the graph above do explain directly why the population growth has decreased from 1980 to 2020. The graph is showing that there was a decline in the whole fertility rate, meaning that fewer babies were born every year, which affects the population growth by declining it eventually.





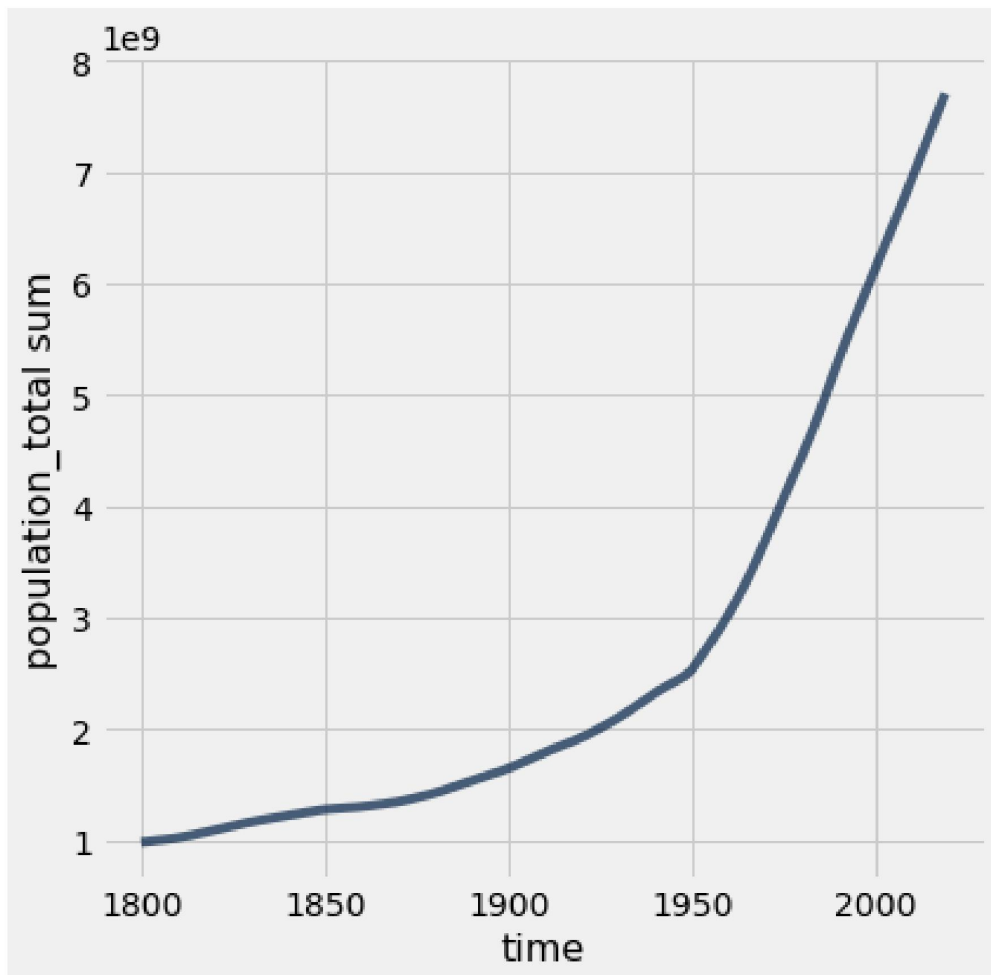
**Question 8.** In one or two sentences, describe the association (if any) that is illustrated by this scatter diagram. Does the diagram show that reduced child mortality *causes* parents to choose to have fewer children?

I can see that that there is positive association between child mortality and fertility rate with the linear association. But I don't think that means that diagram shows reduced child mortality causes parents to choose to have fewer children since association does not always mean that the change is caused by one another.



**Question 10.** Draw a line plot of the world population from 1800 through 2020 (inclusive of both endpoints). The world population is the sum of all of the countries' populations. You should use the `population` table defined earlier in the project.

```
In [23]: #Fill in code here
population.where('time', are.between (1800,2020)).drop('geo').group('time', sum).plot('time', ']
```





**Question 6.** It is important to study the absolute number of people living in poverty, not just the percent. The absolute number is an important factor in determining the amount of resources needed to support people living in poverty. In the next two questions you will explore this.

In Question 7, you will be asked to write a function called `poverty_timeline` that takes **the name of a country** as its argument (not the Alpha-3 country code). It should draw a line plot of the number of people living in poverty in that country with time on the horizontal axis. The line plot should have a point for each row in the `poverty` table for that country. To compute the population living in poverty from a poverty percentage, multiply by the population of the country **in that year**.

For this question, write out a generalized process for Question 7. What should this function output, and what steps will you take within the function?

The generalized process for this question is that it first defines `geo` as an array with countries. Then we have to filter the table by `geo`. Then we create a new table that includes the year and the number of people in poverty. This function should output an array of the year and number in poverty. In the function we use `country_poverty` and we also create another function to get the population for a country in a year from a row in the poverty table. We use this other function and `country_poverty` then to create the poverty timeline.



Finally, draw the line plots below to see how the world is changing. Pay attention to the axes! You can check your work by comparing your graphs to the ones on [gapminder.org](http://gapminder.org).

```
In [74]: poverty_timeline('India')
         poverty_timeline('Nigeria')
         poverty_timeline('China')
         poverty_timeline('Colombia')
         poverty_timeline('United States')
```



