

# CT-STEM

## Computational Thinking in Science, Technology, Engineering, and Mathematics

Data Analysis Skills: Part 2

Version 0.1



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# Student Information

First Name

Last Name

Email

Student ID

School Name

Grade

Date of Birth

Sex

Race / Ethnicity (check all that apply)

☐ Native American

☐ Mexican American or Chicano

☐ Pacific Islander

☐ Puerto Rican

☐ Asian American

☐ Other Latin American

☐ White (Caucasian)

☐ Black or African American

Other

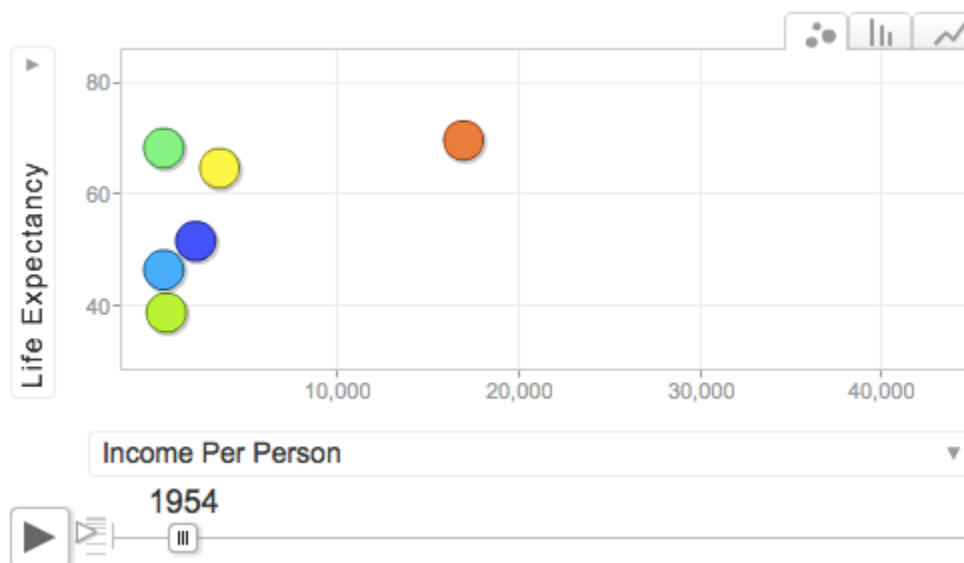
# The Human Development Index

There are 196 countries in the world, and the quality of life for people in these countries can vary dramatically. Every year the United Nations ranks countries according to health, education, and living standards. These rankings are combined into a single measure of societal well being called the Human Development Index (HDI).



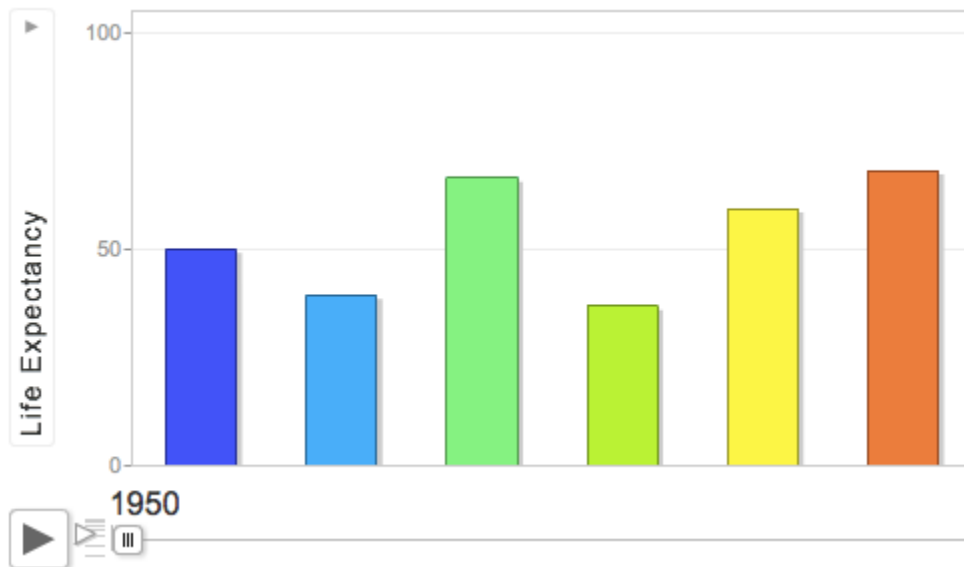
## HDI Visualization

Two important factors that contribute to a country's Human Development Index are life expectancy (how long a person is expected to live) and income per person (how much money a person earns in a year). The graph below allows you to explore these measures for six different countries over a period of 60 years from 1950 to 2010.



This chart is interactive. Try changing the values on the x- or y-axis and then pressing the play button. Take a minute to experiment with the graph, and then press the next button at the top of the page.

- The play button at the bottom of this graph will animate the data over time.
- Click on the y-axis label to change the values that are graphed.
- Click on any of the bars to see the country that it represents.



**Item 1a:** Based on the graph, which of these countries had a population over 1 billion people in 1950? Check all that apply.

- |                                    |                                    |                                   |
|------------------------------------|------------------------------------|-----------------------------------|
| A. <input type="checkbox"/> Brazil | C. <input type="checkbox"/> France | E. <input type="checkbox"/> Japan |
| B. <input type="checkbox"/> China  | D. <input type="checkbox"/> India  | F. <input type="checkbox"/> USA   |

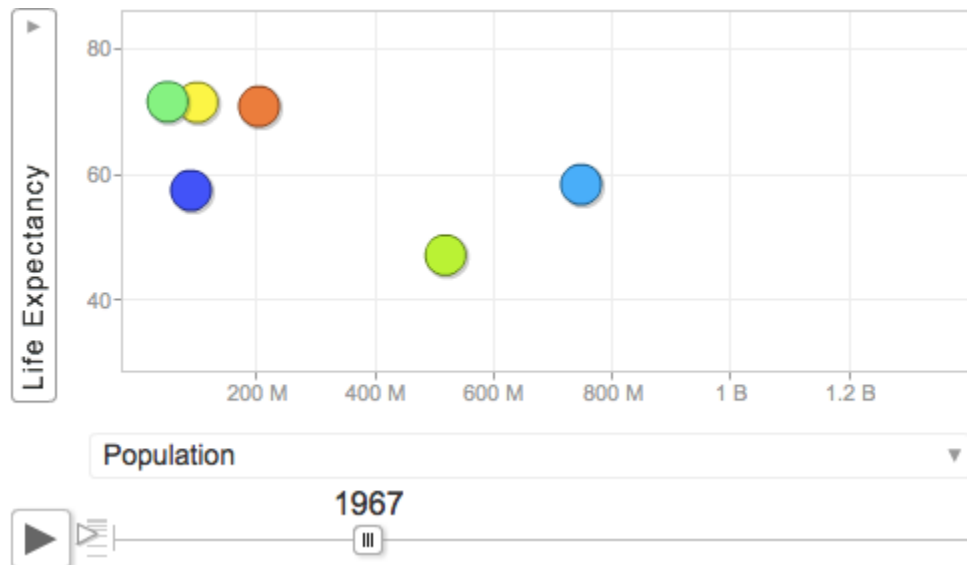
**Item 1b:** Which of these countries had a population over 1 billion people in 2010? Check all that apply.

- |                                    |                                    |                                   |
|------------------------------------|------------------------------------|-----------------------------------|
| A. <input type="checkbox"/> Brazil | C. <input type="checkbox"/> France | E. <input type="checkbox"/> Japan |
| B. <input type="checkbox"/> China  | D. <input type="checkbox"/> India  | F. <input type="checkbox"/> USA   |

**Item 1c:** In what year did income per person in the United States exceed \$20,000?

- |                               |                               |                               |
|-------------------------------|-------------------------------|-------------------------------|
| A. <input type="radio"/> 1954 | C. <input type="radio"/> 1974 | E. <input type="radio"/> 1994 |
| B. <input type="radio"/> 1964 | D. <input type="radio"/> 1984 | F. <input type="radio"/> 2004 |

Click on the x- or y-axis to change the values that the graph tracks over time. The values are: population, income per person, and life expectancy.



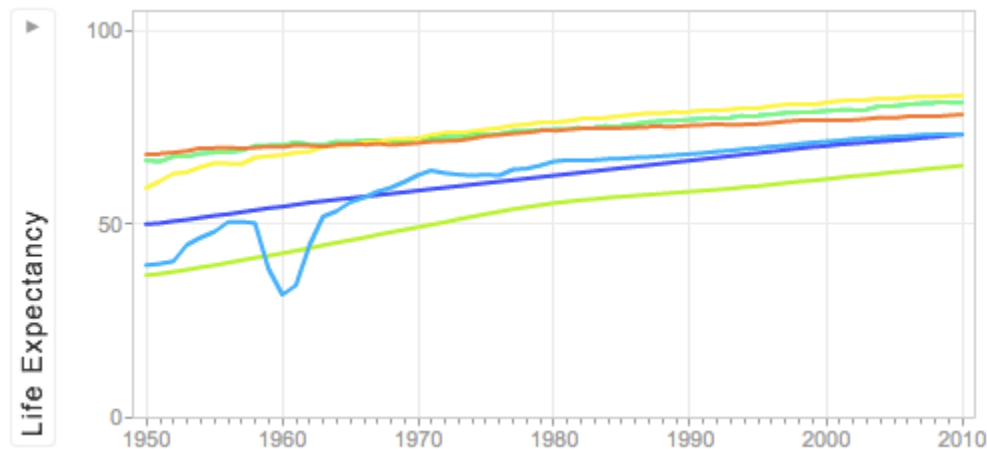
**Item 2a:** Based on the graph, which of the following assumptions could be true?

- A. ☐ As a country's income increases, it's population also increases.
- B. ☐ Life expectancy is generally increasing over time.
- C. ☐ As a country's life expectancy increases, it's population also increases.
- D. ☐ As a country's income increases, it's life expectancy also increases.

**Item 2b:** Based on the graph, which of the following assumptions could be true?

- A. ☐ In 1966, China and Brazil had roughly the same life expectancy.
- B. ☐ People in Japan are happier than people in Brazil.
- C. ☐ Having a large population is the biggest factor affecting life expectancy.
- D. ☐ All of the countries have experienced a steady increase in life expectancy.

Here is a different view of the same information for six countries from 1950 to 2010. Use the graph to answer the following questions.

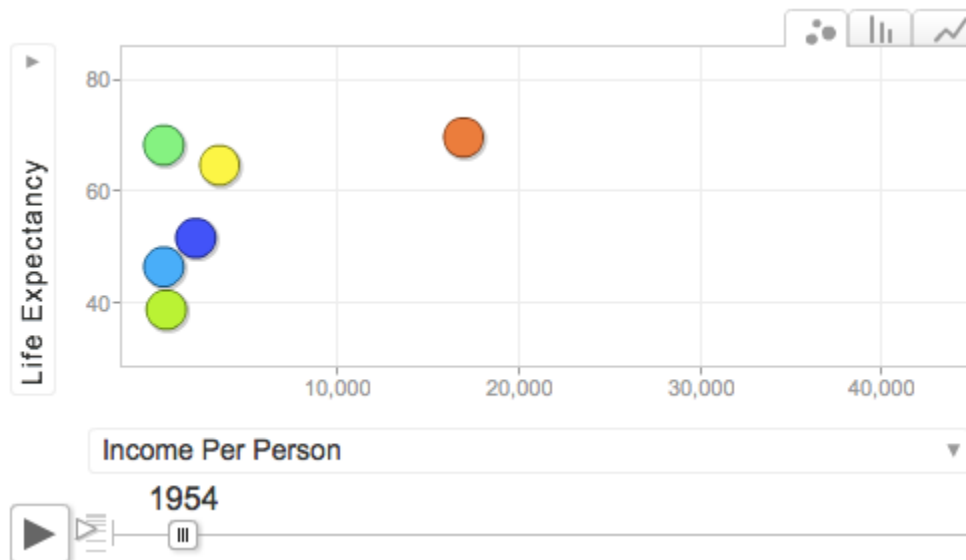


**Item 3a:** In the late 1950s and early 1960s China went through a "Cultural Revolution" that dramatically changed life in that country. Based on the graph, which factor was most affected by this event?

- A. ☐ Life expectancy      C. ☐ Worker productivity  
 B. ☐ Population      D. ☐ Income per person

**Item 3b:** In 2008 and 2009 there was a global economic crisis that caused people around the world to lose money. According to this graph, which two countries were affected the most?

- A. ☐ Brazil      C. ☐ France      E. ☐ Japan  
 B. ☐ China      D. ☐ India      F. ☐ USA



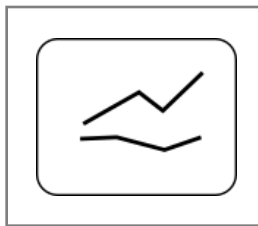
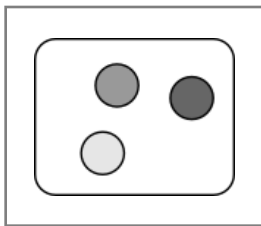
Consider the following two statements:

**Statement 1:** "The population of India will increase the most in the next 10 years."

**Statement 2:** "An increase in life expectancy does not necessarily mean there will be an increase in a country's population."

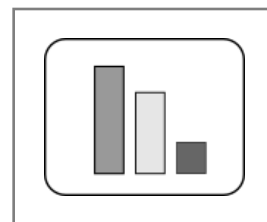
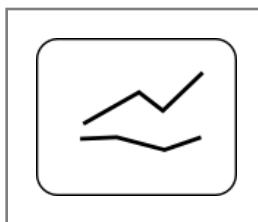
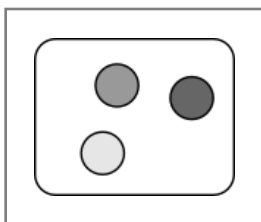
**Item 4a:** Which type of graph is best for supporting Statement 1?

- A. ☐ Animated bubble chart B. ☐ Line graph C. ☐ Animated bar chart



**Item 4a:** Which type of graph is best for supporting Statement 2?

- A. ☐ Animated bubble chart B. ☐ Line graph C. ☐ Animated bar chart



# **Congratulations!**

**You're finished. Use any remaining time to go back and check your answers.**



# CT-STEM Skills Taxonomy

## Data and Information Skills

1. Collecting Data
2. Creating Data
3. Manipulating Data
4. Analyzing Data
5. Visualizing Data