BOM1 — BOM1 TASK 1: ESTIMATING POPULATION SIZE

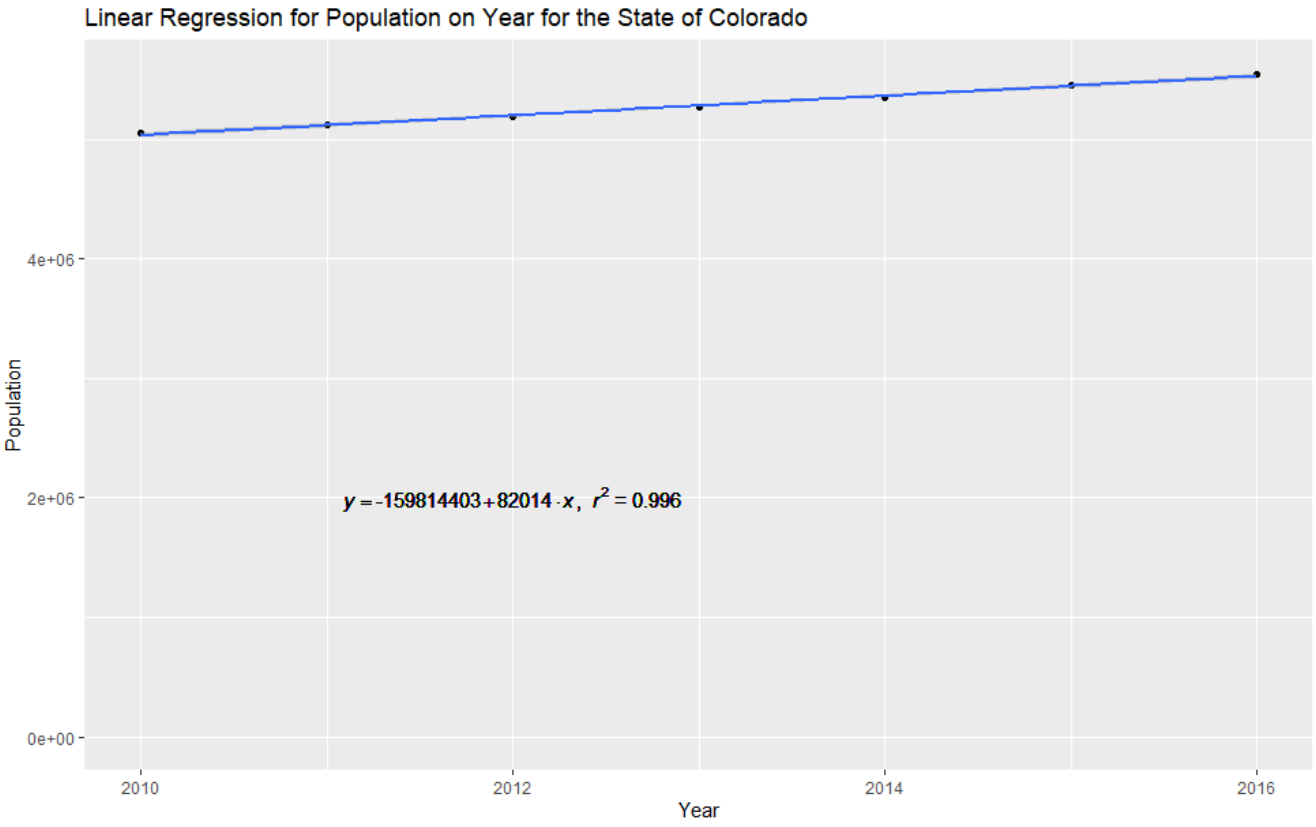
Nanako Ohashi

Western Governors University

N.B.: I live in the state of Colorado.

A.

Figure 1: Linear Regression for Population on Year for the State of Colorado



With the help of Ramnath's (2011) post on Stack Overflow, I was able to add a regression line equation and r-squared value on the graph.

B.

1. Using the file I obtained from U.S. Census Bureau, Population Division (2016), I opened the file using LibreOffice Calc, removed some rows, and saved the file as a .csv file.

Rows removed:

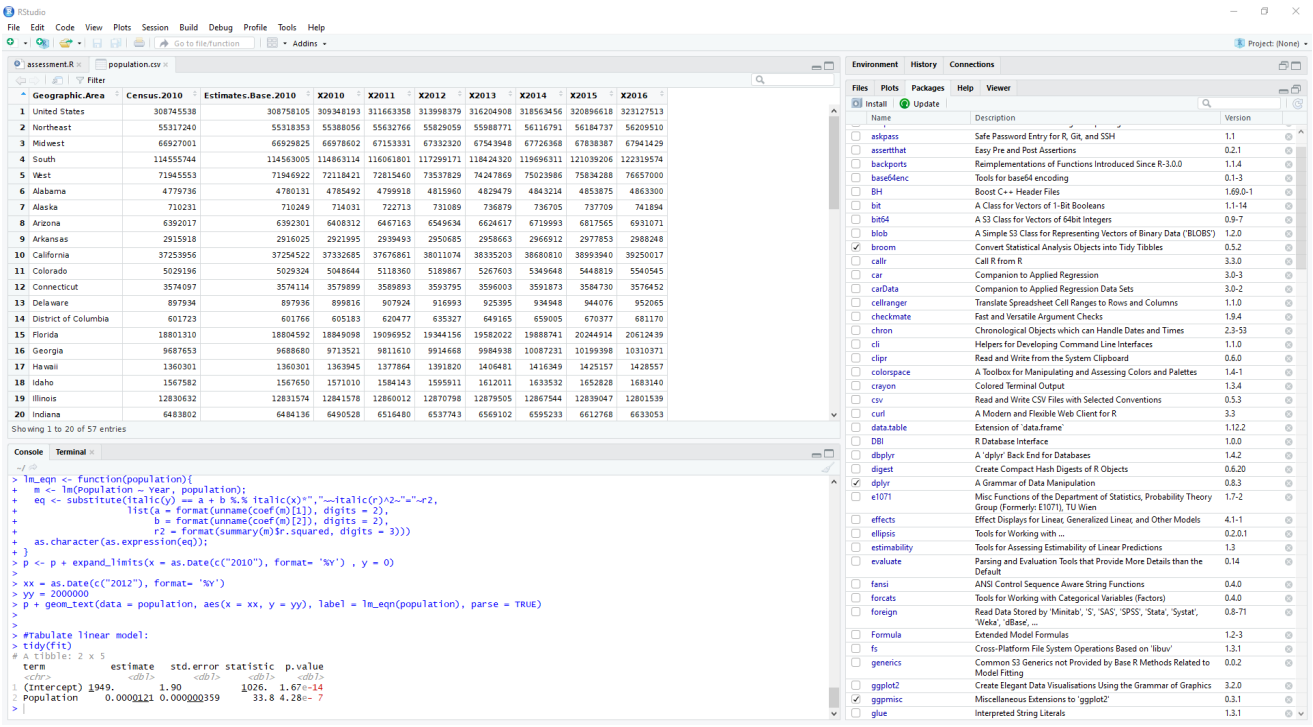
- First two rows (Title and first column heading row) to get a cleaner dataset.
- The empty row above the Puerto Rico entry to make the dataset cleaner.
- All rows after the Puerto Rico entry to get a cleaner dataset.

2. I imported the .csv file to RStudio using the `read.csv()` command.

3. I assigned .csv to a variable.

4. I created a data frame using the `tbl_df()` and `as.data.frame()` functions (Rdocumentation, n.d.).

Figure 2: Screenshot of results of imported data set in R Studio



C.

Figure 3: Screenshot of results of tabulating R's summary() function.

```
> #Tabulate linear model:
> summary(fit)

Call:
lm(formula = Population ~ Year, data = population)

Residuals:
     1      2      3      4      5      6      7
 14189   1891  -8617 -12895 -12864   4292  14004

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -159814403    4887957  -32.70 5.03e-07 ***
Year             82014       2428   33.78 4.28e-07 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 12850 on 5 degrees of freedom
Multiple R-squared:  0.9956,    Adjusted R-squared:  0.9948
F-statistic:  1141 on 1 and 5 DF,  p-value: 4.278e-07
```

D.

Population size of Colorado in 5 years

Present year = 2019.

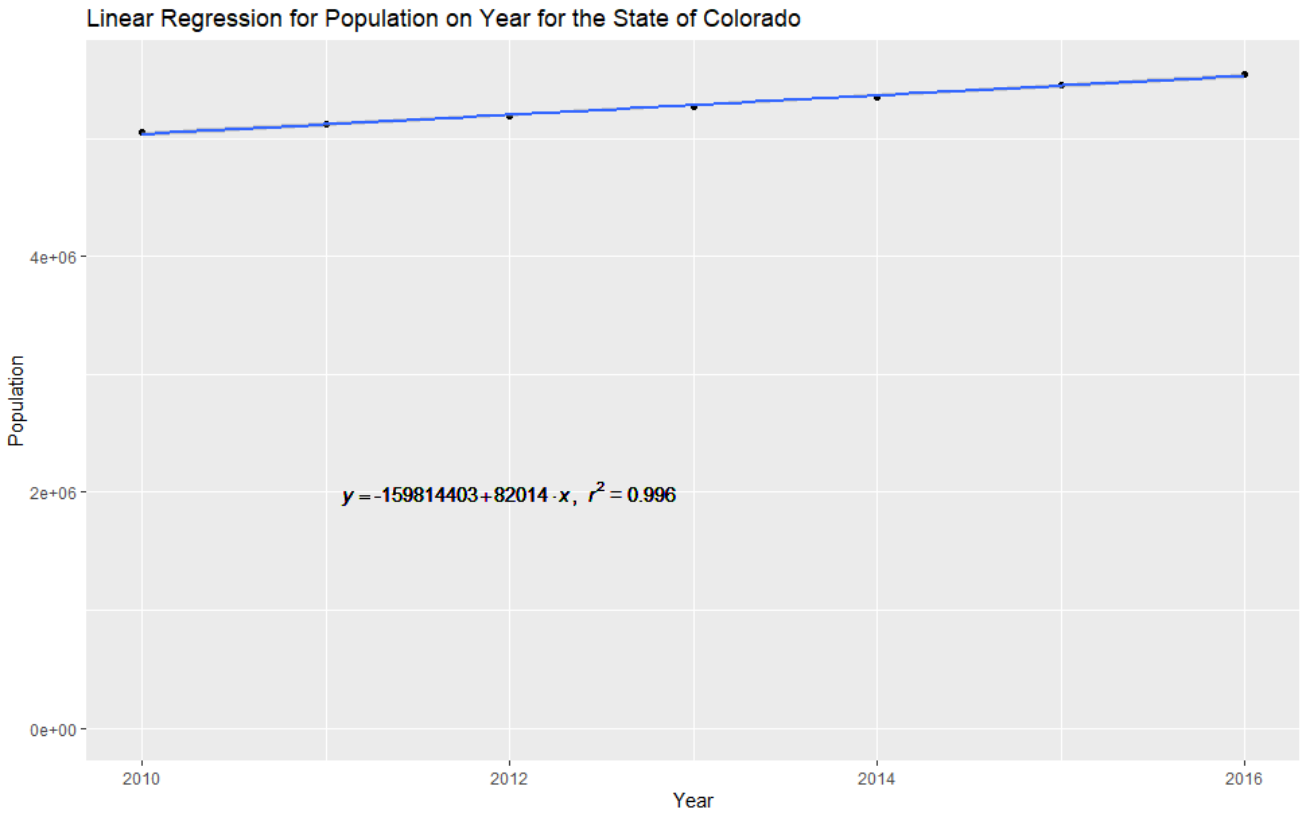
Year in 5 years (x) = 2024

y = -159,814,403 + 82,014x

y = 6,181,933

The estimated population of Colorado in the year 2024 is 6,181,933.

Figure 4: Screenshot of linear regression equation used to calculate Colorado's population in 2024



E.

References:

- RDocumentation (n.d.). *Excel Regression Analysis Output Explained.* Retrieved from https://www.rdocumentation.org/packages/dplyr/versions/0.5.0/topics/tbl_df
- Ramnath (2011, September 26). Adding Regression Line Equation and R2 on graph [Online Forum Comment]. Retrieved from https://stackoverflow.com/questions/7549694/adding-regression-line-equation-and-r2-on-graph
- U.S. Census Bureau, Population Division (2016). *Table 1. Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2016 (NST-EST2016-01)*