Homework #1

Voter Registration Problem

Background Information

The right to vote has often been called the most important right Americans have. Since 1964, the U.S. Census Bureau has collected data on voter registration and participation rates every two years as part of the Current Population Survey. This data allows researchers to review trends in voter participation over an extended period of time and across different types of election cycles.

Problem Statement

In this assignment, students will analyze voter registration and participation statistics for elections from 1966 through 2022.

Instructions

IMPORTANT: Complete the steps below in the order they are given. Completing the steps out of order may complicate the assignment or result in an incorrect result.

1. Download and extract the provided Data Files ZIP file. It contains the following file for use in this assignment:
   a. **voting.csv** – Information on the number of people who were registered to vote and who voted in elections during the years 1966 through 2022 [1].

Column Name	Type	Description
Year	Number	Year of the election.
18-24 Voted	Number	Number of people ages 18 to 24 who voted.
18-24 Registered	Number	Number of people ages 18 to 24 registered to vote.
25-44 Voted	Number	Number of people ages 25 to 44 who voted.
25-44 Registered	Number	Number of people ages 25 to 44 registered to vote.
45-64 Voted	Number	Number of people ages 45 to 64 who voted.
45-64 Registered	Number	Number of people ages 45 to 64 registered to vote.
65+ Voted	Number	Number of people ages 65 and over who voted.
65+ Registered	Number	Number of people ages 65 and over registered to vote.
Total Voted	Number	Total number of people who voted.
Total Registered	Number	Total number of people registered to vote.

2. Create a new Microsoft Excel workbook named **hw1_vrp_*lastname_firstname*.xlsx**.

3. We must adjust the sheets in our workbook.
   a. Rename *Sheet1* to *Voting and Registration*.
   b. Add a new sheet named *Analysis Questions*.
4. Import the following item into the workbook:
   a. **voting.csv** file – Import starting in cell **A3** of the *Voting and Registration* sheet. The file is comma-delimited. Its first row contains headers.
5. We wish to apply formatting to the *Voting and Registration* sheet.
   a. We must set up a table to store data on voters.
      i. If a table does not already exist in cells **A3** through **K32**, create one using a style of your choice. The table has headers and will overlap external data ranges. If prompted, convert the selection to a table and remove all external connections.
      ii. If a table already exists in cells **A3** through **K32**, format the table using a style of your choice other than the default table style.
   b. We need to add additional columns to store rank and percentage data.
      i. Insert two new table columns to the right of existing column **K**.
   c. For the table, turn on the ***Total Row*** option.
   d. Enter text in the cells as indicated below.
      i. **A1**: `Voting and Registration – Firstname Lastname`
      ii. **L3**: `Total Registered Rank`
      iii. **M3**: `Voter Turnout`
   e. Merge-and-center cells **A1** through **M1**.
   f. Set the font size to 16-point for cell **A1**.
6. We need to perform calculations to analyze the *Voting and Registration* sheet data.
   a. In column **M**, calculate the voter turnout (percentage of registered people that voted) using the formula:

$$\frac{[Total\ Voted]}{[Total\ Registered]}$$

   b. In column **L**, use the `RANK.EQ()` function to rank each year by the total number of people registered to vote.
   c. We would like to summarize our voting and registration data.
      i. In the total row, individually average columns **B** through **K**.
      ii. In the total row, do not display any statistics in columns **L** and **M**.

7. We must apply additional formatting to the *Voting and Registration* sheet.
   a. Format the cells as indicated below:
      i. **B4** through **K33**: number with no decimal places, use 1000 separator
      ii. **M4** through **M32**: percentage with 1 decimal place
   b. AutoFit the widths of columns **A** through **M**.
   c. Apply conditional formatting to the percentages of registered people who voted in cells **M4** through **M32**.
      i. If the percentage was less than 75% (< 0.75), change the cell fill color to red and the text color to white.
      ii. If the percentage was at least 85% (≥ 0.85), change the fill color to green and the text color to white.
8. We wish to create a chart to plot voting and registration data for each election.
   a. Create a 2-D line chart based on cells **A3** through **K32** of the *Voting and Registration* sheet. Move the chart to a new sheet named *Voting and Registration Chart*.

      Ensure the years are shown as labels for the horizontal (category) axis, not plotted as chart data. Specify appropriate chart and axis titles.
   b. Add a trendline based on the total number of registered voters. Use the trendline type that best fits the data and forecast the values forward 10 periods (through the 2042 election). Display the ***R-squared*** value on the chart.

      NOTE: You cannot use the *Moving Average* type for your trendline.
9. We need to set up the *Analysis Questions* sheet so that it can store responses to the analysis questions.
   a. Enter text in the cells as indicated below:
      i. **A1**: `Question Number`
      ii. **B1**: `Response`
   b. Bold the contents of row **1**.
   c. AutoFit the width of column **A**. Set the width of column **B** to 100.
   d. Set the height for rows **2** through **4** to 110.
   e. Change the vertical alignment setting for columns **A** and **B** so that the text is displayed at the top of each row.
   f. Turn on text wrapping for column **B**.

10. Starting in row **2** of the *Analysis Questions* sheet, answer three of the five analysis questions below. Respond to one question per row.
    a. Which trendline type did you use on *Voting and Registration Chart*? Why did you choose this type of trendline?
    b. Voter turnout is higher in presidential election years (e.g., 2012, 2016, 2020) than in other years. Why might this be the case?
    c. Voter participation tends to be much higher among voters aged 65 and above compared to those aged 18-24. How might this impact political policy?
    d. Voter participation rates tend to drop among those aged 75 and above. Why might this be the case?
    e. Name at least one thing that could be done to increase voter participation rates.

Grading Rubric

This assignment is worth 60 points. It will be graded by your instructor using this rubric, with partial credit awarded as appropriate:

Steps 3a-b	2 points total	Steps 7a-b	3 points total
Step 4	3 points	Steps 7c(i)-(ii)	4 points total
Steps 5a-f	6 points total	Step 8a	10 points
Step 6a	5 points total	Step 8b	6 points
Step 6b	5 points total	Steps 9a-f	4 points total
Steps 6c(i)-(ii)	3 points total	Steps 10a-e (pick 3 of 5)	3 points each

The analysis questions in Steps 10a-e will be evaluated using this rubric:

Standard	Meets Requirements (1.5 points)	Does Not Meet Requirements (0 points)
Answer is reasonable.	Answer addresses the question prompt and is factually correct or a reasonable interpretation of available data.	Answer does not address the question prompt, is factually incorrect, or is an unreasonable interpretation of available data.
Answer is supported.	Logical rationale is provided to support the given answer.	Logical rationale is not provided to support the given answer.

References

[1] "Historical Reported Voting Rates: Table A-1," Apr. 19, 2023. Available: *https://www2.census.gov/programs-surveys/cps/tables/time-series/voting-historical-time-series/hst_vote01.xlsx*.