Background Information

As one might expect, it is generally in a city’s best financial interest to have more residents. A larger population generally yields a larger tax base and more income. There is also an additional financial benefit that comes with larger populations: additional federal grant money. In order to be eligible for many programs, a city has to be above a certain population threshold.

One such population threshold is 50,000 people. At the present time, the population of Charleston, West Virginia, is close to falling below this level. In 2014, its estimated population was 50,404. Further compounding the problem is that Charleston’s population is also somewhat older than average, with a median age of 41.7 versus 37.2 nationally. Charleston’s population has been dropping for years, so it appears that Charleston may fall below 50,000 by the 2020 census.

Problem Statement

In this assignment, students will explore the demographics of Charleston and its surrounding area and to understand how the city could be affected by the federal grant threshold.

Instructions

IMPORTANT: This is not the actual Homework for your section. You will not receive any credit for completing this project.

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. population.csv – Population and demographics information for the Charleston, West Virginia area [1]–[3].

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Text</td>
<td>Name of location.</td>
</tr>
<tr>
<td>Ages</td>
<td>Text</td>
<td>Age group for population figure.</td>
</tr>
<tr>
<td>Year</td>
<td>Number</td>
<td>Year of population figure.</td>
</tr>
<tr>
<td>Population</td>
<td>Number</td>
<td>Population for the specified location, year, and age group.</td>
</tr>
</tbody>
</table>

2. Begin by creating a new Microsoft Excel workbook named lastnameFirstname_hh3_cfgp.xlsx.
3. We must adjust the sheets in our workbook.
   a. Rename Sheet1 to Population.
   b. Add a new sheet named Scenarios.
   c. Add a new sheet named Analysis Questions.

4. Import the following item into the workbook:

5. We wish to apply formatting to the Population sheet.
   a. We must setup a table to store data on population.
      i. If a table does not already exist in cells A3 through D78, 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 D78, format the table using a style of your choice other than the default table style.
   b. For the table, turn on the First Column option.
   c. Enter text in the cells as indicated below:
      i. A1: Kanawha County Population
   d. Merge (but not center) cells A1 through D1.
   e. Apply the Heading 1 cell style to cell A1.
   f. Format the cells as indicated below:
      i. D4 through D78: number with no decimal places, use 1000 separator
   g. AutoFit the widths of columns A through D.

6. To better understand our data, we wish to create a PivotTable.
   a. Create a new PivotTable based on the data in cells A3 through D78 of the Population sheet. Place the PivotTable on a new sheet named Population PivotTable.
   b. On the PivotTable, do the following:
      i. Add the ages as a Filters field.
      ii. Add the year as a Rows field.
      iii. Add the location as a Columns field.
      iv. Add the population as a Values field.
c. We need to perform formatting on our PivotTable.
   i. Group the years into sets of 10 starting at 1985.
   ii. Summarize the population figures by summing them.
   iii. Format the cells as indicated below:

   (1) **Sum of Population** field: number with no decimal places, use 1000 separator

7. We also wish to apply formatting to the *Scenarios* sheet.
   a. Enter text in the cells as indicated below:
      i. **A1**: Population Scenarios
      ii. **A3**: Scenario
      iii. **B5**: Annual Growth Rate
      iv. **C5**: 2010
      v. **D5**: 2011
      vi. **E5**: 2012
      vii. **F5**: 2013
      viii. **G5**: 2014
      ix. **H5**: 2015
      x. **I5**: 2016
      xi. **J5**: 2017
      xii. **K5**: 2018
      xiii. **L5**: 2019
      xiv. **M5**: 2020
      xv. **A6**: Population Threshold
      xvi. **B6**: 0%
      xvii. **C6**: 50000
      xviii. **A7**: Charleston Population
      xix. **B7**: 0%
      xx. **C7**: 51400
      xxi. **A8**: Amount above Threshold
   b. Merge (but not center) cells **A1** through **M1**.
c. Apply the Heading 1 cell style to cell A1.
d. Apply background fill colors to the cells as indicated below:
   i. A5 through M5: Blue, Accent 1, Lighter 40%
   ii. A8 through M8: White, Background 1, 25% Darker
e. Format the cells as indicated below:
   i. B6 through B7: percentage with 2 decimal places
   ii. C6 through M8: currency with no decimal places
f. AutoFit the width of columns A through B. Set the width of columns C through M to 7 (0.64”).

8. On the Scenarios sheet, we wish to calculate information about possible population in the future.
   a. We wish to compute the gap between Charleston’s population and the population threshold. Enter the formulas in the cells as indicated below.
      i. C8: =C7-C6
      ii. C8 through M8: AutoFill the formula from cell C8.
   b. We want to estimate future salary scenarios.
      i. Enter the formula into the cell indicated below.
         **HINT:** To avoid errors, copy-and-paste the provided formula.
         \[ \text{(1)} \; D6: =C6 \times (1+B6) \]
      ii. We must adjust the future values formula so its cell references are correct when the formula is copied.
         In cell D6, modify the cell references so they are column-absolute mixed or relative references as indicated:
iii. We will now AutoFill the modified formula. Enter the formula into the cells as indicated below.

(1) **D6** through **M7**: AutoFill the formula from cell **D6**.

9. We will now evaluate two different scenarios for Charleston’s population.

a. The first scenario involves an -0.5% annual change, the same rate as from 1990 to 2010.

i. Enter text in the cells as indicated below:

(1) **A3**: Historic Growth Rate

(2) **B7**: -0.50%

ii. There is nothing to do for this step. Please proceed to the next step.

iii. Using Scenario Manager, create a new scenario named **Historic Growth Rate**. Have the scenario work by changing the values of cells **A3** and **B7** to the values they contain now.

b. The second scenario involves maintaining a population of 52,500 in 2020, which is 5% above the threshold.

i. Enter text in the cells as indicated below:

(1) **A3**: 5% Above Threshold

(2) **B7**: 0.00%

ii. Use Goal Seek to find an annual growth rate to achieve a population of 2,500 above the threshold in cell **M8**. Have Goal Seek change the value of cell **B7** until it locates the correct value.

iii. Using Scenario Manager, create a new scenario named **5% Above Threshold**. Have the scenario work by changing the values of **A3** and **B7** to the values they contain now.

10. 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 (8.39”).

d. Set the height for rows **2** through **5** to 110 (1.53”).

e. Change the vertical alignment setting for columns **A** and **B** so that text is displayed at the top of each row.
f. Turn on text wrapping for column B.

11. Starting in row 2 of the Analysis Questions sheet, answer four of the five analysis questions below. Respond to one question per row.
   a. Based on the age group populations shown on the PivotTable, do you think that Charleston could have enough new births to cause a net increase its population? Why or why not?
   b. How is Charleston’s population changing relative to that of the rest of Kanawha County?
   c. Do you think that the growth rate calculated by Goal Seek in the second scenario is attainable? Why or why not?
   d. Other than merging with other area cities and towns, what sort of things could Charleston do to help boost its population? List one or two ideas.
   e. On a national perspective, what sort of relationship exists between the country’s rising total population and the number of cities meeting the 50,000 threshold for federal grants? What would happen if the thresholds were adjusted to become a percentage of the country’s total population rather than a fixed number?

Grading Rubric

This is a practice assignment and is worth no points. A comparable Homework would be worth 50 points and graded using this rubric, with partial credit awarded as appropriate:

<table>
<thead>
<tr>
<th>Steps 3a-c</th>
<th>1 points total</th>
<th>Steps 8a-b</th>
<th>6 points total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 4</td>
<td>2 points</td>
<td>Step 9a-b</td>
<td>10 points total</td>
</tr>
<tr>
<td>Steps 5a-g</td>
<td>3 points total</td>
<td>Steps 10a-f</td>
<td>3 points total</td>
</tr>
<tr>
<td>Steps 6a-c</td>
<td>10 points total</td>
<td>Steps 11a-e (pick 4 of 5)</td>
<td>2.5 points each</td>
</tr>
<tr>
<td>Steps 7a-c</td>
<td>4 points total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The analysis questions in Steps 11a-e can be evaluated using this rubric:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Meets Requirements (1.25 points)</th>
<th>Does Not Meet Requirements (0 points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer is reasonable.</td>
<td>Answer addresses the question prompt and is factually correct or a reasonable interpretation of available data.</td>
<td>Answer does not address the question prompt, is factually incorrect, or is an unreasonable interpretation of available data.</td>
</tr>
<tr>
<td>Answer is supported.</td>
<td>Logical rationale is provided to support the given answer.</td>
<td>Logical rationale is not provided to support the given answer.</td>
</tr>
</tbody>
</table>
Acknowledgments
The image in the introduction appears courtesy of Analogue Kid [4].

References