Exam #1 Review

IP Licensing Problem

Background Information

In recent decades, the United States economy has increasingly shifted from a basis in manufacturing to one based on services and research. This is especially noticeable in the technology industry, where many companies get their money not from making products but from licensing their patents and other intellectual patents to other companies.

Revenue from the licensing of intellectual property such as patents and copyrights has exploded since 1970. In 1970, about $220 million (in 2016 dollars) was charged for licensing in the United States. By 2015, this number climbed to almost $40 billion.

Problem Statement

In this project, students will explore the change in licensing charges based on different growth rates. The generated values will be compared with data from the World Bank.

Instructions

IMPORTANT: This is not the actual Exam 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.

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1. Download and extract the provided Data Files ZIP file. It contains the following files for use in this assignment:

   a. **licensing.csv** – World Bank estimate of intellectual property licensing charges for the years 1970 through 2015 [1].

Column Name	Type	Description
Year	Number	Year of the data.
Charges	Currency	Amount charged to license intellectual property in the United States in 2016-valued dollars.
11.5% Rate	Currency	Licensing charges with 11.5% annual growth.
12.0% Rate	Currency	Licensing charges with 12.0% annual growth.
12.5% Rate	Currency	Licensing charges with 12.5% annual growth.
13.0% Rate	Currency	Licensing charges with 13.0% annual growth.
13.5% Rate	Currency	Licensing charges with 13.5% annual growth.
Average	Currency	Empty column.
Maximum	Currency	Empty column.
Minimum	Currency	Empty column.
Class	Text	Empty column.

2. Begin by creating a new Microsoft Excel workbook named **lastname_firstname_er1_iplp.xlsx**.

3. We must adjust the sheets in our workbook.

   a. Rename *Sheet1* to *Licensing Charges*.

   b. Add a new sheet named *Analysis Questions*.

4. Import the following item into the workbook:

   a. **licensing.csv** file – Import starting in cell **A4** of the *Licensing Charges* sheet. The file is comma-delimited and has headers.

5. We wish to apply formatting to the *Licensing Charges* sheet.

   a. Create a table based on cells **A4** through **K50** using a style of your choice. The table has headers.

      The table will overlap external data ranges. Convert the selection to a table and remove all external connections.

   b. For the table, turn on the **Total Row** option.

   c. Enter text in the cells as indicated below:

      i. **A1**: IP Licensing Charges

      ii. **A3**: Annual Growth Rate:
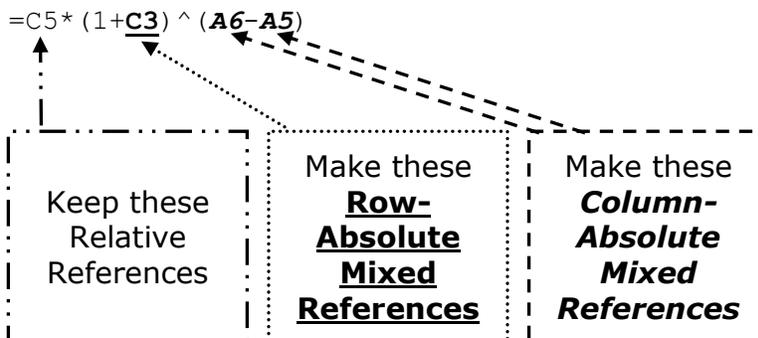
      iii. **C3**: 11.5%

      iv. **D3**: 12.0%

     v.   **E3**: `12.5%`

     vi.   **F3**: `13.0%`

     vii.   **G3**: `13.5%`

     viii.   **A51**: `Average`

  d.   Merge-and-center cells **A1** through **K1**.

  e.   Merge (but not center) cells **A3** through **B3**.

  f.   Apply the *Title* cell style to cell **A1**.

6.   We need to perform calculations to analyze the *Licensing Charges* sheet data.

  a.   We would like to summarize the charges and projections.

     i.   In the total row, individually average columns **B** through **G**.

     ii.   In the total row, do not display any statistics in columns **H** through **K**.

7.   On the *Licensing Charges* sheet, we wish to calculate licensing estimates with different assumptions about the carrying capacity and growth rate.

  a.   We want to estimate future licensing charges values.

     i.   Enter the formula into the cell as indicated below.

        HINT: To avoid errors, copy-and-paste the provided formula.

        (1) **C6**: `=C5*(1+C3)^(A6-A5)`

     ii.   We must adjust the future values formula so its cell references are correct when the formula is copied.

        In cell **C6**, modify the cell references so they are column-absolute mixed, row-absolute mixed, or relative references as indicated:

`=C5*(1+`**`C3`**`)^(`***`A6`***`-`***`A5`***`)`

Keep these Relative References	Make these **Row-Absolute Mixed References**	Make these ***Column-Absolute Mixed References***

     iii.   We will now AutoFill the modified formula. Enter the formula into the cells as indicated below:

        (1) **C6** through **G50**: AutoFill the formula from cell **C6**.

b. In column **H**, write a formula that, for each year, uses a function to find the average of the projected licensing charges. Compare each year's projections from columns **C** through **G**.

c. In column **I**, write a formula that, for each year, uses a function to find the highest of the projected licensing charges. Compare each year's projections from columns **C** through **G**.

d. In column **J**, write a formula that, for each year, uses a function to find the lowest of the projected licensing charges. Compare each year's projections from columns **C** through **G**.

e. In column **K**, calculate the licensing charges class by nesting `IF()` functions to display a class according to the following rules:

   i. Class of `A` if the average of projected licensing charges was more than $30,000,000,000.

   ii. Class of `B` if the average of projected licensing charges was between $10,000,000,000 and $30,000,000,000.

   iii. Class of `C` if the average of projected licensing charges was less than $10,000,000,000.

8. We must apply additional formatting to the *Licensing Charges* sheet.

   a. Format the cells as indicated below:

      i. **B5** through **J51**: currency with no decimal places

   b. AutoFit the widths of columns **A** through **K**.

   c. Apply the *Green-Yellow-Red* color scale conditional formatting option to cells **B5** through **G50**.

9. We would like to create a chart to plot the licensing charges over time.

   a. Create a 2-D line chart based on cells **A4** through **B50** of the *Licensing Charges* sheet. Move the chart to a new sheet named *Licensing Charges Chart*.

      Ensure that 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 licensing charges. Use the trendline type that best fits the data and project the values forward 20 periods (through the year 2035). Display the **R-squared** value on the chart.

      NOTE: You cannot use the *Moving Average* type for your trendline.

10. To better understand our data, we wish to create a PivotTable.

    a. Create a new PivotTable based on the data in cells **A4** through **K50** of the *Licensing Charges* sheet. Place the PivotTable on a new sheet named *Licensing Charges PivotTable*.

    b. On the PivotTable, do the following:

        i. Add the year as a ***Rows*** field.

        ii. Add the charges as a ***Values*** field.

    c. We need to perform formatting on our PivotTable.

        i. Group the years into sets of 10 starting at 1970.

        ii. Summarize the charges by averaging them.

        iii. Format the cells as indicated below:

            (1) **Average of Charges** field: currency with no decimal places

11. 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 the text is displayed at the top of each row.

    f. Turn on text wrapping for column **B**.

12. Starting in row **2** of the *Analysis Questions* sheet, answer four of the five analysis questions below. Respond to one question per row.

    a. Which trendline type did you use on *Licensing Charges Chart*? Why did you choose this type of trendline?

    b. Why might a company choose to license its intellectual property to others rather than keep it just for itself?

    c. Historically, patents have been for physical inventions like machines. In recent years, procedures and processes have become increasingly patented. For example, Amazon.com received a patent for its one-click buying process [2]. Do you think patents like this should be allowed? Why or why not?

d. Many technology standards, such as those used for cell phones and computer networks, incorporate patented technology for which would-be users must acquire licenses. Do you think it is a good idea to allow patented technology to be incorporated into standards like this? Explain your rationale.

e. Do you think companies be required to license their intellectual property to others? Should there be any limit on the price they can charge? Explain your rationale.

Grading Rubric

This is a practice assignment and is worth no points. A comparable Exam would be is worth 100 points and graded using this rubric, with partial credit awarded as appropriate:

Steps 3a-b	3 points total	Steps 8a-c	6 points total
Step 4	5 points	Step 9a	6 points
Steps 5a-f	8 points total	Step 9b	4.5 points
Step 6a	5 points	Steps 10a-c	7.5 points total
Step 7a	15 points	Steps 11a-f	5 points total
Steps 7b-e	15 points total	Steps 12a-e (pick 4 of 5)	5 points each

The analysis questions in Steps 12a-e will be evaluated using this rubric:

Standard	Meets Requirements (2.5 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.

Acknowledgments

The image in the introduction appears courtesy of the United States Patent and Trademark Office [3].

References

[1] "Charges for the use of intellectual property, payments (BoP, current US$)," *World Bank*, Oct. 14, 2016. Available: *http://data.worldbank.org/indicator/BM.GSR.ROYL.CD?locations=US*.

[2] P. Hartman, J. P. Bezos, S. Kaphan, and J. Spiegel, "Method and system for placing a purchase order via a communications network," US5960411 A, Sep. 28, 1999.

[3] *Seal of the United States Patent and Trademark Office*. 2003. Available: *https://commons.wikimedia.org/wiki/File:US-PatentTrademarkOffice-Seal.svg*.