

Project #1 - Redesign of Decadal Survey Plot
Proposal Due 2/21 as Prelab (Instructions to follow)
Report, Notebook and Slide Due 3/1
Presentations in class on 3/1

Purpose: Utilize your developing python plotting skills to remake a visualization from the 2010 Decadal Survey.

Constraints/Requirements:

1. You must choose a traditional graphic and not an image (Simply because we have not yet learned how to visualize/manipulate images in Python. This is a primary focus of ASTR 337, but we will touch on it later in this class as well.).
2. Your redesign must be a different **type** of plot from the original

Products:

1. A 3-5 page written report that includes:

- a. Background Section
 - i. A description of the context of the plot within the decadal survey and an explanation of what you think its purpose is and why
 - ii. A graphic of the original plot and description in words of what it shows
 - iii. A description of the original source of the data
- b. Analysis Section
 - i. A discussion of the aspects of the plot that MEET Tufte's criteria for graphical excellence and integrity that compares specific aspects of the plot with specific criteria (consider making a graphic highlighting these in the original plot)
 - ii. A discussion of the aspects of the plot that VIOLATE Tufte's criteria for graphical excellence and integrity that compares specific aspects of the plot with specific criteria (consider making a graphic highlighting these in the original plot)
 - iii. A written description of your thought process in the course of redesigning the plot. What alternate forms did you consider or try?
- c. Procedure Section
 - i. A detailed description of how you "lifted" the data, including a description of any difficulties or uncertainties surrounding this process. Options include:
 1. By-eye estimation
 2. Finding the source of the original data (and/or additional complimentary data) and downloading it
 3. Using a tool such as DataThief (<https://www.datathief.org/>) to lift the data from the graphic itself
 - ii. A qualitative description of the code that you wrote to manipulate the data and plot. Do not include the code itself. Instead, describe in words what you did and connect it to general techniques (conditionals, loops,

functions, return statements, lists, strings, arrays, type conversion, packages, etc.)

- d. Discussion Section
 - i. A description of each of the differences between the original and final plots and how/why your redesign constitutes an improvement, with specific connections to Tufte's criteria
 - ii. A description of the flaws and potential pitfalls of your redesigned graphic. What else would you improve if you were able? In what ways might your graphic be inaccurate or misleading?
2. **A jupyter notebook** containing the code needed to create or read in the data and create your plot. The notebook must:
 - a. Be zipped together with any supplemental files (e.g. data) that are necessary
 - b. Execute linearly and without errors
 - c. Include a comment describing what each line of code does
3. **A two slide presentation** showing the original and final plots and highlighting flaws of the original and benefits of your redesign. It should:
 - a. Be submitted as a .pdf
 - b. Include minimal text and no complete sentences

A rubric for evaluation of the project is below. ***Please carefully study the criteria against which you will be evaluated before beginning the project.***

	4 points	7 points	10 points
Background/ Motivation	Student explanation of plot and background had many and/or severe deficiencies in describing the nature and origin of the data and/or plot	Student explanation of plot and background fell a little short in describing the nature and origin of the data and/or plot	Student clearly and thoroughly explained the origin and nature of the data and plot
Analysis	Student's analysis of the original graphic had many and/or severe deficiencies in the areas of clarity, specificity, or accuracy	Student analysis of the original graphic had some deficiencies in clarity, specificity, or accuracy	Student clearly and thoroughly explained their analysis of the original graphic and made sound, specific, and logical data-driven arguments
Procedure	There were many and/or severe deficiencies in the clarity or thoroughness of the procedure explanation or the nature of that procedure	There were some deficiencies in the clarity or thoroughness of the procedure explanation or the nature of that procedure	The procedure used to manipulate the data and generate the plot was clearly and thoroughly explained and appropriate

	4 points	7 points	10 points
Final Graphic X 2	Graphic had several and/or severe deficiencies in design or appropriateness or was not an improvement over the original graphic	Graphic had minor deficiencies in design or appropriateness or was a minor improvement over the original graphic	Graphic was well-designed, clearly and legibly labeled, and was a significant improvement over the original graphic
Comparison	Student comparison of original and final graphics was unclear, unspecific, or inaccurate	Student comparison of original and final graphics fell somewhat short in clarity, specificity, or accuracy	Student clearly and objectively explained the differences between the original and final graphics and made clear, specific, and compelling comparisons
Code	Written code applies few or none of the coding and graphical design concepts from the course	Written code applies some of the coding and graphical design concepts from the course	Written code represents a clear and ambitious attempt by the student to apply both coding and graphical design concepts from the course
Notebook	Code was poorly commented or did not meet several of the requirements	Code comments could have been improved or one of the requirements for submission was not met	Code is appropriately commented, runs linearly, and was packaged and submitted appropriately
Slide Design	Slides were unreadable, extremely text heavy, or submitted in the wrong format	Slides were somewhat deficient in readability or were somewhat text heavy	Slides were well designed and submitted with an appropriately clear and readable format with minimal text
Presentation Skills	The presentation as a whole had many and/or severe deficiencies in clarity, volume, appropriateness, pace, thoroughness, etc.	The presentation as a whole had some deficiencies in clarity, volume, appropriateness, pace, thoroughness, etc.	The presentation as a whole was clear, informative, appropriate, and thorough and given at an appropriate pace and volume.

Total: _____/100