

Stat 541 Final Portfolio

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Independent Learning (IL):

These objectives show your ability to seek out new information and adapt to new tools to solve data analysis problems.

[IL-1] Adding new skills:

- I can find and adopt new packages to accomplish tasks.
- I can adapt to different syntax styles (tidy, base, formula style, data.table).
- I can use tutorials, etc. to enhance my understanding of new concepts

Level: 2**Justification:**

Lab4: I read in the data when it was a txt file. <https://github.com/Cal-Poly-Advanced-R/lab-3-using-apis-joshblank73/pull/1/files>

[IL-2] Online resources:

- I can use online resources (Google, ChatGPT, StackOverflow) to solve problems, debug, or find new tools.
- I can find source code for similar projects to use as starting points for my own
- I can read the documentation of an API to figure out how to access data.

Level: 3**Justification:**

Github: I used online resources to learn how to use git commands. Additionally, I learned about best practices for Github during collaboration.

Project1:

We used ChatGPT to set up the RShiny app <https://github.com/lana1218/STAT-541-Project1/pull/1/files>

I watched a Youtube video titled “How to bring modern UI to your Shiny apps” in order to make our app look prettier. <https://github.com/lana1218/STAT-541-Project1/pull/4/files>

Reproducible Workflow (RW):

These objectives show your ability to produce artifacts and deliverables that are organized, documented, version tracked, and responsibly designed. _____

[RW-1] File, code, and data management:

- I can use Git and GitHub to track my progress and collaborate (creating repos, cloning, forking, pull requesting).
- I always use R Projects and the {here} package to organize my scripts, notebooks, data, and applications.

Level: 4

Justification:

Github: Before this class, I never really used Git and Github. I'm glad that one of the goals since the beginning of the class was to learn about it, and I have been taking that very seriously. I learned git commands, so that I can use Github features outside of R. My partner, Eva, was not very well versed in data management, so I helped her answer questions about Github related stuff. I ran into merge conflicts, and I was able to help solve that.

Project1: I set up this Github repository, and organized the files in its correct directory such as "Data" and "Scripts". I used the "here" package when reading in my data.

<https://github.com/lana1218/STAT-541-Project1/pull/2/files>

Lab4: Another example of organizing files in appropriate directories and using the "here" package. <https://github.com/Cal-Poly-Advanced-R/lab-3-using-apis-joshblank73/pull/1/files>

[RW-2] Notebooks:

- I can use Quarto and/or R Markdown to produce a reproducible notebook and polished rendered document.
- I can use appropriate chunk options (echo, error, cache, etc.) to render my qmd/Rmd quickly and cleanly.

Level: 1

Justification:

[RW-3] Code style

- My code is clear, readable, well-organized, and well-commented.
- I can use a package-based workflow to organize my analyses

Level: 2

Justification

Lab2: I used Quarto formatting styles to organize all of the bullet points presented in this analysis <https://github.com/Cal-Poly-Advanced-R/lab-2-visualization-evadykaar/pull/7/files>

Lab4: I added labels to my code chunks. <https://github.com/Cal-Poly-Advanced-R/lab-3-using-apis-joshblank73/pull/1/files>

Technical Communication (TC):

These objectives show your ability to communicate the processes you have implemented in your code, as well as the data conclusions and results.

[TC-1] Project summaries:

- I can clearly and succinctly summarize the contributions of my project.
- I accurately interpret statistical or modeling results.
- I consider the appropriate scope and impact of my project results.

Level: 1

Justification:

[TC-2] Documentation:

- I provide ample documentation and tutorials for my custom functions.
- I provide user-friendly guides for my tools and software

Level: 1

Justification:

Data Manipulation (DM):

These objectives relate to the collection, cleaning, processing, and preparing of datasets for analysis.

[DM-1] Data preparation:

- I can read in datasets to R, including untidy ones.
- I can clean datasets to deal with missing data, typos, poor formatting, etc.

Level: 2

Justification:

Project1: The “911 calls” dataset from the Seattle website consisted of almost 2 million rows. I took a sample of that dataset and saved it to a new csv file. I cleaned our dataset by making sure our variables are in Datetime format. Even though our sampled file was significantly smaller than before, I still needed to filter it by the year 2023 so that the app does not lag as much. <https://github.com/lana1218/STAT-541-Project1/pull/2/files>

[DM-2] Data wrangling

- I can cleverly use pivoting, grouping, and joining to wrangle data.
- I can use mapping (`{purrr}`), applying (`tapply`, `lapply`, ...), and/or iteration (for loops) to perform repeated tasks.

Level: 2

Justification:

Lab1: I used a lot of of tidyverse's data wrangling functions to find the answer to Part 2's questions. This includes functions such as `group_by`, `summarize`, `slice_max`, `mutate`, etc. Additionally, we received an expert level grade for this portion of the lab. <https://github.com/Cal-Poly-Advanced-R/lab-1-review-evadykaar/pull/6/files>

[DM-3] Data formats

- I can use API urls to access JSON data and convert it to a data frame

Level: 0

Justification

[DM-4] Data collection

- I can webscrape simple tables and information

Level: 1

Justification

Professional Visualization (PV):

[PV-1] ggplot: grammar of graphics

- I can use less common geometries, including those from ggplot extension packages.
- I can use the correct aesthetics to map variables
- I understand how geometries inherit aesthetics I can add annotations to my plot

Level: 2

Justification:

Lab3: When recreating the “ugly” plot from this lab, I had to make a new dataframe in order to manipulate the variables for plotting. I ordered the categorical variables by using the factor function. <https://github.com/Cal-Poly-Advanced-R/lab-2-visualization-evadykaar/pull/7/files>

[PV-2] ggplot: theme

- I can edit the titles, subtitles, captions, axis labels, etc. to create a clearly labelled plot
- I can choose colors (“scales”) and themes to make a visually pleasing and accessible plot

Level: 3

Justification:

Lab3: To recreate the “ugly” plot from the original report, I utilized a variety of theme functions to make the plot look as nice as possible. For this plot in particular, I used “theme_pubr” so that it is ready for publication. Additionally, I made sure the texts were the correct size so that it is readable. I gave the plot a title to the plot to indicated what the variables are, and I made a subtitle to indicate what trend the reader should be seeing. <https://github.com/Cal-Poly-Advanced-R/lab-2-visualization-evadykaar/pull/7/files>

[PV-3] Dynamic visualizations

- I can use a package like {gganimate} to create self-contained gifs
- I can use a package like {plotly}, {ggplotly}, {leaflet}, {ggirafe}, etc. to make interactive html widgets

Level: 2

Justification:

Project1: I made a leaflet plot. <https://github.com/lana1218/STAT-541-Project1/pull/2/files>

Lab4: We didn't use gganimate, but we still made a dynamic visualization to animate the route of the ISS. <https://github.com/Cal-Poly-Advanced-R/lab-3-using-apis-joshblank73/pull/7/files>

[PV-4] Shiny

- I can create a functional Shiny app.
- I understand the principle of reactivity, and how to use it.

Level: 4

Justification:

Project1: I created a Shiny App that displays a map of 911 accidents in Seattle, a time-series plot, and the average number of accidents per day. The filters that the user can toggle with include the type of accident and the month of accident. Not only can I implement these features and explain them thoroughly, but I can make a beautiful user-interface. I made a toggle for the filters, so that the user can close them if they wanted full-screen the output. Additionally, I intentionally chose appealing themes, fonts, and colors. <https://github.com/lana1218/STAT-541-Project1/pull/4/files> <https://github.com/lana1218/STAT-541-Project1/pull/2/files>

Lab4: We created a Shiny app to display the route of the ISS. I made the app look prettier using the UI skills that I learned from the previous project. <https://github.com/Cal-Poly-Advanced-R/lab-3-using-apis-joshblank73/pull/7/files>

Software Development (SD):

These objectives relate to your ability to develop correct, usable, well-designed, and sophisticated software in the R language.

[SD-1] R programming language details

- I understand non-standard evaluation (aka “Tidy Eval” or “unquoted objects”), and I can use tunneling in my functions.
- I understand functional programming, and I can use functions as objects in my code design
- I understand object-oriented programming, and I can define my own classes and methods.

Level: 1

Justification:

[SD-2] Package creation:

- I can create a folder that is installable as an R package, possibly using {usethis} helper functions
- I can document my functions using {roxygen2} style commenting
- I can write and run unit tests using {testthat}
- I can design a package that is user-friendly and has well-designed functions.

Level: 1

Justification

Matrix Operations (MO):

These objectives show your ability to manipulate data-related information in the form of vectors and matrices, rather than in high-level data structures.

[MO-1] Theory:

- I understand the difference between ordinary multiplication and matrix multiplication, and how to implement each in R
- I can implement and briefly explain the matrix equations for multiple linear regression

Level: 1

Justification:

[MO-2] Object structures:

- I can convert data objects into the necessary matrix structures to perform operations on them.
- I can convert results of matrix operations to convenient data analysis formats

Level: 1

Justification:

Algorithms and Iteration (AI):

These objectives ask you to design code-based approaches to statistical computing problems, usually involving iteration to a stopping condition.

[AI-1] Creating an algorithm:

- I can invent and implement my own iterative algorithm.

Level: 1

Justification:

[AI-2] Generative art:

- I can apply a variety of generative art functions to make a visually pleasing piece.
- I can explain why particular changes to the code result in particular differences in the visualization.

Level: 1

Justification:

Code Design (CD):

These objectives relate to making wise or clever choices in how you implement a procedure in code; including creating functions and objects, or thinking about the clarity and efficiency of processes.

[CD-1] Speed and Efficiency:

- I can recognize moments of possible slowdown in my code, and use built-in functions or parallelizing to speed them up.
- I always use and design vectorized functions whenever possible.

Level: 1

Justification:

[CD-2] Object handling:

- I can make reasonable choices in my code design about when to save intermediate objects.
- I can convert objects between types and structures as needed.

Level: 1

Justification:

[CD-3] Supporting functions:

- I write helper/shortcut functions to streamline repeated tasks and make my code easier to read.
- I use intermediate functions to streamline repeated or looping processes.

Level: 1

Justification:

[CD-4] Algorithmic process:

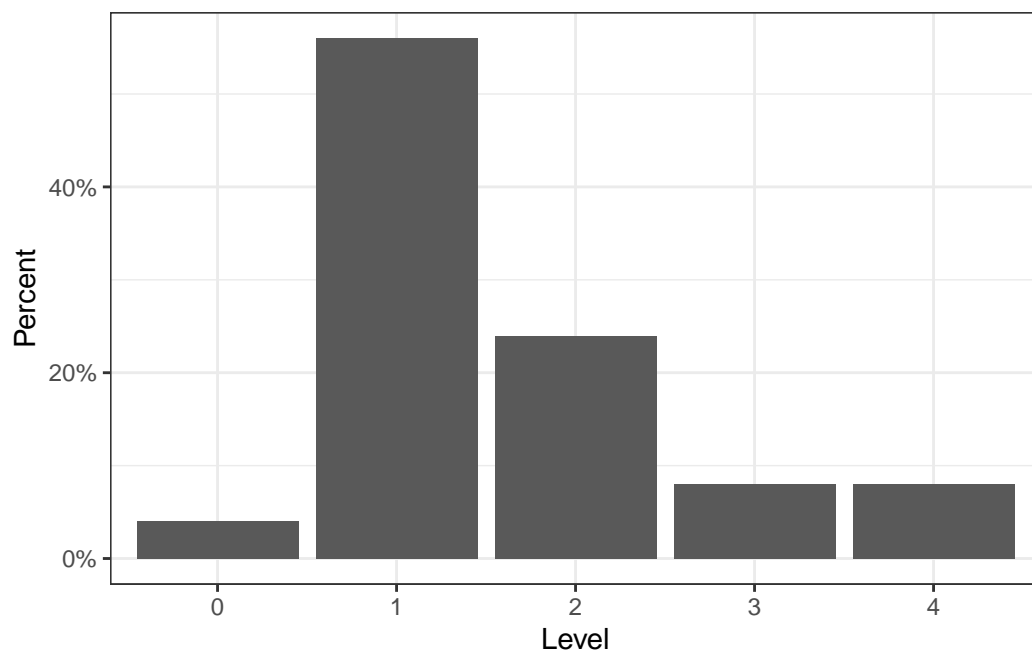
- My loops are clean and efficient
- Proper values are calculated to update objects and/or determine stopping conditions
- I have built in checks for possible problems or extreme cases in the algorithm

Level: 1

Justification:

Summary

Warning: The dot-dot notation (`..count..`) was deprecated in ggplot2 3.4.0.
i Please use `after_stat(count)` instead.



Grade

Based on the summary plot above, I believe I have earned an A in STAT 541.

Justification

Based on the content of this course, I think I have put a lot of effort into learning and mastering the learning objectives for each week. Although I still have a lot of 1s and 2s at this time, I will continue to build upon my portfolio in the coming weeks to show that I fully mastered the material.