# Stat 541 Final Portfolio

## Table of contents

# Independent Learning (IL):

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

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### [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: 1**

**Justification:**

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### [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: 1**

**Justification:**

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## 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: 1**

**Justification:**

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### [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:**

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### [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: 1**

**Justification**

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## 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.*

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### [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:**

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### [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:**

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## Data Manipulation (DM):

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

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### [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: 1**

**Justification:**

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### [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: 1**

**Justification:**

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### [DM-3] Data formats

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

**Level: 0**

**Justification**

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### [DM-4] Data collection

- I can webscrape simple tables and information

**Level: 1**

**Justification**

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## Professional Visualization (PV):

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### [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: 1**

**Justification:**

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### [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: 1**

**Justification:**

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### [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: 1**

**Justification:**

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### [PV-4] Shiny

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

**Level: 1**

**Justification:**

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## Software Development (SD):

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

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### [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:**

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### [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**

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## 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.*

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### [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:**

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### [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:**

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## Algorithms and Iteration (AI):

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

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### [AI-1] Creating an algorithm:

- I can invent and implement my own iterative algorithm.

**Level: 1**

**Justification:**

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### [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:**

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## 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.*

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### [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:**

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### [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:**

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### [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:**

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### [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:**

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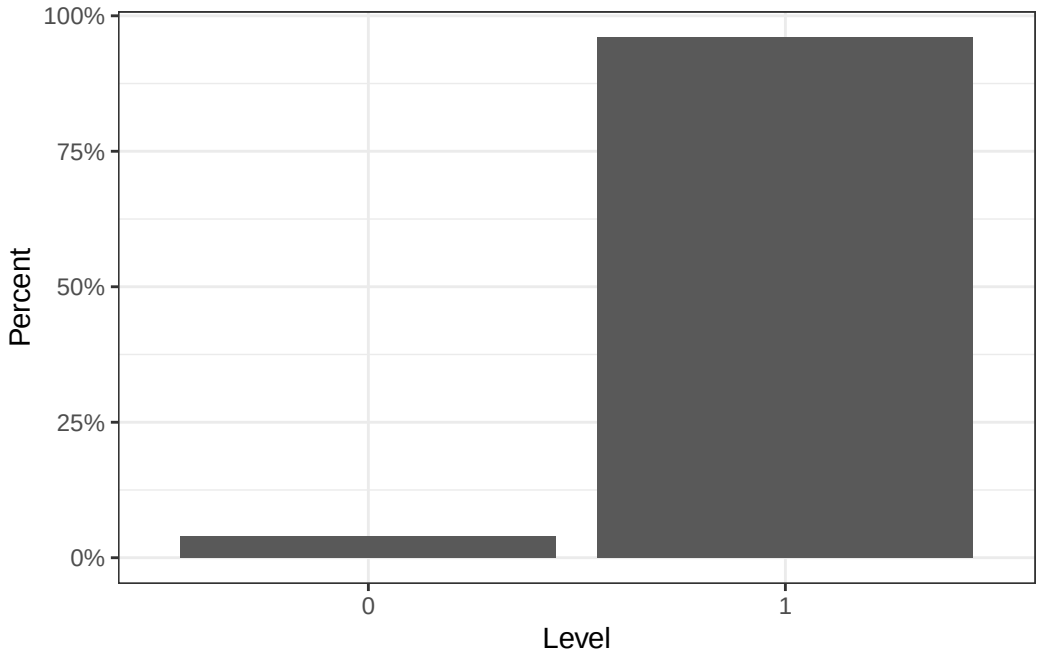
## Summary

```
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 a ____ in STAT 541.

**Justification**