Homework 2 Lab Report - Rust

Mary Kait Heeren

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1. **Problem Statement**

* In the context of this scenario, the purpose of the program is to analyze a diagnostic report that consists of a list of binary numbers of the same length. To start, the program loads the data from the specified file, calculates the O2 Generator, CO2 Scrubber, notifies the user when calculating, and returns the life support rate. I used a variety of sources for my code as Rust has a lot of documentation on how to use and understand the language. I utilized StackOverflow, Rust Programming Language articles, and Learning Rust Articles.

1. **Input and Output**

The **input** will be presented as a file in the format below. The length of the binary numbers may vary but all binary numbers will have the same length.



The **output** is formatted as below. The loading diagnostics message will appear as the data is loading from the input file. The O2 Generator message will appear once the O2 rate is calculated. The same will occur when the CO2 Scrubber rate is calculated. The life support rate will appear once it is calculated. All methods are called in main.

Loading diagnostics...

O2 Generator computed...

CO2 Scrubber rate computed...

Life Support rate: 230

1. **Usage**

To compile and run the program, open the terminal, navigate to the directory using the cd command, and run python script using the file as input by using the rustc command. Once the file has been compiled, you must enter ./ <filename> to run the code. The loadDiagnostics function reads in the binary numbers and stores the numbers in a vector. The filename is given by command line, allowing interaction with the operating system through command prompts. Therefore, we are able to complete compilation and run the program by typing specific commands rather than using GUI buttons.

1. **Theory**
2. Compare and contrast using Python from the previous homework with using Rust from this one. How are they different? What are the advantages of one over the other?

I prefer Python due to mostly my familiarity with the language. I believe I could grow to enjoy coding in Rust if I spent more time breaking it down and exploring the tasks it can complete. My preference with Python is also due to its application with dataframes, which is more of the coding I enjoy, while Rust seemed structured in a C-like format. It is interesting how most datatypes in Rust were mutable as it made the manipulation of vectors easier than working with arrays in Python. I also believe that Homework 2, if also coded in Python, would be easier to achieve in Rust. I also read that Rust has excellent memory management which helps with complex tasks, unlike Python. However, the syntax and structure of Python is preferred. I believe that both could be utilized well, given the proper scenario.