Design Document

### **Goals**

**Overall Long-term Goal:**

This project’s goal is to use Fibonacci’s sequence in a recurrent neural network to find and predict the following number in a sequence of numbers.

**Intermediate Goals:**

1. To create a model that produces an accuracy score above 80%.
2. To minimize and avoid possible group attribution bias.
3. To complete the model by July 22, 2022

### **Data Acquisition and Preparation**

#### **Part 1**

1. Download data set
2. Turn dataset into data frame.
3. Exploratory data analysis (repair data, find missing values, etc.)
4. Define target column(s) as the next Fibonacci’s sequence output (what we want the model to predict).
5. Define feature column(s) based on the remaining columns.
6. Find non-numerical columns, determine whether to one-hot encode or remove.
7. Train/test split (80% train, 20% test)
8. Create a recurring neural network model.
9. Fit the model to the training data.
10. Get predictions for test set target values.
11. Get accuracy using predictions for testing data.

#### **Part 2**

1. Start with state of data frame after part 1 step 3.
2. Remove features and/or change targets for other models.
3. Repeat steps: Part 1 - 6 through 11.

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### **Project Roles**

*Takiya*: Project Leader / Presentation Designer

Schedule to start: Throughout the capstone and once we have all of our findings from implementation of the model/code.

*Donald*: Lead Code Designer / Backup Auditor

Schedule to start: Throughout code development process.

*Deandre*: Lead writer / backup presentation designer

Schedule to start: Throughout the capstone.

*Xavier*: Lead Auditor / backup writer

Schedule to start: Once the code has been completed.

### **Problem Space**

The project goal is to use Fibonacci’s sequence in a recurrent neural network to find the approximation of the following numbers in the sequence. We are using Fibonacci’s sequence in a recurrent neural network to find the most accurate representation of the data. The sequence is used as a mathematical metaphor to see the bias and fairness that is used today as well as how it impacts the day to day lives of humans. The tools that we use to accomplish this task is the golden rule. The golden rule is a quadratic formula that we’ve implemented to teach the network a pattern, in which it accomplishes a divider for fairness. We are also using linear regression as a tool that will give us an exact representation of where the data needs to be adjusted so that we have a clear understanding of where our recurrent neural network needs to be adjusted.

**Motivated Questions**

1. What numbers are given?
2. In what order are the numbers listed?
3. What existential factors will produce bias and how can we mitigate them?
4. What model best suits the data provided?
5. How can our findings improve future research?