The Neural Network Model

1. **Overview** of the analysis:
   * The non-profit foundation Alphabet Soup wants a tool that helps it select the applicants for funding with the best chance of success in their ventures. With our knowledge of machine learning and neural networks, we will use the features in the provided dataset to create a binary classifier that can predict whether applicants will be successful if funded by Alphabet Soup.
2. **Results**:

* Data Preprocessing
  + What variable(s) are the target(s) for your model?
    - In this case we will use “**IS\_SUCCESSFUL**” variable as our target it is the main indicator to see if the money will be used effectively after applying our model
  + What variable(s) are the features of your model? The rest of the data, excluding “**EIN**” and “**NAME**” will be used as our features:
    - **APPLICATION\_TYPE**—Alphabet Soup application type
    - **AFFILIATION**—Affiliated sector of industry
    - **CLASSIFICATION**—Government organization classification
    - **USE\_CASE**—Use case for funding
    - **ORGANIZATION**—Organization type
    - **STATUS**—Active status
    - **INCOME\_AMT**—Income classification
    - **SPECIAL\_CONSIDERATIONS**—Special considerations for application
    - **ASK\_AMT**—Funding amount requested
  + What variable(s) should be removed from the input data because they are neither targets nor features?
    - “**EIN**” and “**NAME**” will be removed as it is an identification column.
* Compiling, Training, and Evaluating the Model
  + How many neurons, layers, and activation functions did you select for your neural network model, and why?
    - For the first model, I used 2 hidden layers with 80 and 30 neurons. I chose 80 and 30 as a rule of thumb, the number of neurons is normally 2 or 3 times the input features, which is 108 in this case.
  + Were you able to achieve the target model performance?
    - No, the first model only got around 73% accuracy which is close to the target result of 75%
  + What steps did you take in your attempts to increase model performance?
    - I will attempt to:
    - Adjust the input data to ensure that no variables or outliers are confusing the model, such as:
    - Dropping more or fewer columns.
    - Creating more bins for rare occurrences in columns.
    - Increasing or decreasing the number of values for each bin.
    - Add more neurons to a hidden layer.
    - Add more hidden layers.
    - Use different activation functions for the hidden layers.
    - Add or reduce the number of epochs to the training regimen.

1. **Summary**:
   * After attempting various steps, I still could achieve the targeted results (75%). The continuation of the steps will not allow “dropping more or fewer columns” because the model keeps crashing after compiling the result. If I bring back column “NAME” into the model, it can classify information and give better accuracy.