**Alphabet Soup Neural Network Deep Learning Analysis**

1. Overview of the analysis:
   1. This analysis was aimed at creating a machine learning model to assist the Alphabet Soup Foundation in determining the possible success of organizations that were recipients of their funding.
2. Results: Using bulleted lists and images to support your answers, address the following questions:

* Data Preprocessing
  + What variable(s) are the target(s) for your model?
    - The target variable was represented as “1” for “Is\_Successful”. This would be considered an organization with a successful venture that received funding. If they were not successful, they were represented with a “0”.
  + What variable(s) are the features for your model?
    - Application type, Affilication, Classification, Use case, Organizations, Status, Income Amount, Special Considerations, and Ask Amount
  + What variable(s) should be removed from the input data because they are neither targets nor features?
    - EIN and Name were removed as they are identifying information but not necessarily useful as a predictive mark.
* Compiling, Training, and Evaluating the Model
  + How many neurons, layers, and activation functions did you select for your neural network model, and why?
    - I ended up having 65 neurons (15, 20, 30), within 3 layers and used a combination of Relu and Sigmoid as my activation functions. I initially had more neurons and less layers but having less total neurons with an added layer seemed to increase the accuracy of my model.
  + Were you able to achieve the target model performance?
    - Yes. I achieved a 78.192% score.
  + What steps did you take in your attempts to increase model performance?
    - After a lot of trial and error, (stubbornly well after 3 attempts) I changed my neuron total from 140 to 65 and added a layer. I also changed binning from Application Type to Name. Although this was previously dropped in earlier attempts, this allowed me to achieve a very high score relative to my previous attempts which averaged between 71-73%

1. Summary: Summarize the overall results of the deep learning model. Include a recommendation for how a different model could solve this classification problem, and then explain your recommendation.
   1. The overall results exceeded the goal of 75% accuracy. I don’t think the number of neurons changing had a major impact from one attempt to another, but a third hidden layer, combination of activation functions and binning by Name were the key factors in the increased accuracy. Overall, this model as is would be of use to Alphabet Soup in determining what organizations to give funds to. However, another model that is commonly used is RainForest. These models combine a bunch of decision trees in order to make predictions.