**Overview of the analysis:**

The purpose of this analysis is to aid the nonprofit organization, Alphabet Soup, in selecting applicants for funding with the highest likelihood of success. The goal was to develop a deep learning model that can analyze extensive historical data—more than 34,000 funded organizations—to identify patterns and characteristics associated with successful funding outcomes. Using machine learning techniques, specifically a binary classification neural network, this model aims to help Alphabet Soup make data-driven decisions when evaluating future applicants.

**Results:**

* What variable(s) are the target(s) for your model?
  + IS\_SUCCESSFUL: This column indicates whether the applicant received funding (1) or not (0).
* What variable(s) are the features for your model?
  + Feature variables include all other relevant (not dropped) variables.
    - AFFILIATION
    - CLASSIFICATION
    - USE\_CASE
    - ORGANIZATION
    - STATUS
    - INCOME\_AMT
    - SPECIAL\_CONSIDERATIONS
    - ASK\_AMT
* What variable(s) should be removed from the input data because they are neither targets nor features?
  + EIN (Employer Identification Number)
  + NAME (Specific organization names)
    - These variables have no predictive value
* How many neurons, layers, and activation functions did you select for your neural network model, and why?
  + 3 hidden layers:
    - Layer 1 – 100 neurons, ReLU activation
    - Layer 2 – 30 neurons, Sigmoid activation
    - Layer 3 – 10 neurons, Sigmoid activation
  + Output layer - 1 neuron, Sigmoid activation
  + I chose 3 hidden layers to give the model enough chances to learn patterns in the data. The first layer contained 100 neurons in order to catch a lot of detail, and utilized ReLU to only pass on positive signals. The second and third layer contained fewer neurons and used Sigmoid to narrow things down and only return values between 0 and 1, helping the model make “yes” or “no" predictions.
* Were you able to achieve the target model performance?
  + Target performance (>=75%) was not achieved in the original model but was reached after optimization.
* What steps did you take in your attempts to increase model performance?
  + The original model only contained 2 hidden layers and an output layer. Both hidden layers used ReLU. This wasn’t sufficient to achieve the desired accuracy. I made the changes detailed above in order to achieve the resulting 78.8% accuracy.