**Lab #2 - NumPy**

The notebook should be well organized. Each section should be **clearly labeled with the exercise (and part) that it addresses** (e.g., Exercise #1a, #1b, #2) in a Markdown cell block. Use (clear and concise) comments as needed to help describe each step of your process. All notebook cells that contain essential steps should be executed and the output should be visible, so as to demonstrate your successful completion of the exercise. If you cannot complete an exercise in its entirety, you should make an effort to demonstrate your intermediate progress in order to maximize partial credit, and move forward as best as possible. You may submit any written answers to the exercises in the notebook as text cells.

**Background**

Kickstarter ([www.kickstarter.com (Links to an external site.)](http://www.kickstarter.com)) has established itself as the leading platform for funding creative ventures. Aspiring entrepreneurs in the arts can initiate fundraising campaigns on Kickstarter to support their projects. Some projects have been hugely successful, whereas many others have fallen well short of their fundraising objectives. The [attached data filePreview the document](https://umd.instructure.com/courses/1266059/files/53843934/download?wrap=1) contains sample data on over 4000 Kickstarter fundraising campaigns. Each row contains a summary of each campaign, including the goal and amount pledged, the state of the project (e.g., successful, failed), the category of the project (i.e., type of art), and whether the project was featured via a staff pick or spotlight (i.e., on the Kickstarter home page). Complete the following exercises using the data.

**Exercise #1 (1 point)**

Load the amount pledged (in U.S. dollars) from the data file into an array of floating point values. Hint: look at the help for np.loadtxt - fill in the question marks below to load the column we need.

np.loadtxt(?, dtype=?, delimiter='?', skiprows=?, usecols=?)

Then, produce the following descriptive statistics:

1. Total number of projects
2. Amount pledged: minimum, mean, standard deviation, and maximum
3. Proportion (or percentage) of projects that earned total pledges of at least $1,000

**Exercise #2 (1 point)**

Load the project categories from the data file into an array of strings.

Count the frequency of each category, and then calculate the proportion of observations that fall into each category. Return both results (category and proportion of observations) in the form of a dictionary. Hint: Look at the help for np.unique.

Which project category is the most popular (in terms of the number of projects)? Least popular? Write your answer in a markdown cell.

**Exercise #3 (1 point)**

Import the project states from the data file into an array of strings.

For each project category, calculate the proportion (or percentage) of projects that were successful. Hint: Use np.where.

Which project category is the most successful (on average)? Least successful (on average)? Write your answer in a markdown cell.

**Exercise #4 (1 point)**

Load the staff pick and spotlight columns from the data file into (separate) arrays of strings.

Calculate the total number of projects in each featured category, and then calculate the associated success rates in each category (proportion of successful projects).

Which feature (staff pick or spotlight) is associated with a higher proportion of successful projects? Write your answer in a markdown cell.