DATA_301_Assignment_02A_Ishaan_Sathaye_and_Sreshta_Talluri

October 23, 2023

This assignment is in two parts. This is Part A; make sure to also complete Part B. Read the notebook from the beginning and answer the questions as you go. You can add as many cells as you want. Submission instructions are at the end. See Canvas for general rules about Assignments and collaboration.

1 Shark Tank

Shark Tank is a reality TV show. Contestants present their idea for a company to a panel of investors (a.k.a. "sharks"), who then decide whether or not to invest in that company. The investors give a certain amount of money in exchange for a percentage stake in the company ("equity"). If you are not familiar with the show, you may want to watch part of an episode here to get a sense of how it works.

The data that you will examine in this lab contains data about all contestants from the first 6 seasons of the show, including: - the name and industry of the proposed company - whether or not it was funded (i.e., the "Deal" column) - which sharks chose to invest in the venture (N.B. There are 7 regular sharks, not including "Guest". Each shark has a column in the data set, labeled by their last name.) - if funded, the amount of money the sharks put in and the percentage equity they got in return

To earn full credit on this lab, you should: - use built-in `pandas` methods (like `.sum()` and `.max()`) instead of writing a for loop over a `DataFrame` or `Series` - use the split-apply-combine pattern wherever possible

Of course, if you can't think of a vectorized solution, a `for` loop is still better than no solution at all!

```
[18]: import pandas as pd
```

1.1 Question 0. Getting and Cleaning the Data

The data is stored in the CSV file `https://dlsun.github.io/pods/data/sharktank.csv`. Read in the data into a Pandas `DataFrame`.

```
[19]: # YOUR CODE HERE
      df_shark = pd.read_csv("https://dlsun.github.io/pods/data/sharktank.csv")
      df_shark
```

```
[19]:       Season  No. in series                      Company Deal
      0       1.0            1.0              Ava the Elephant  Yes  \
      1       1.0            1.0         Mr. Tod's Pie Factory  Yes
      2       1.0            1.0                       Wispots   No
      3       1.0            1.0   College Foxes Packing Boxes   No
      4       1.0            1.0                     Ionic Ear   No
      ..      ...            ...                           ...  ...
      490     6.0           28.0                  You Kick Ass  Yes
      491     6.0           29.0                   Shark Wheel  Yes
      492     6.0           29.0                     Gato Cafe   No
      493     6.0           29.0               Sway Motorsports  Yes
      494     6.0           29.0                     Spikeball  Yes

                       Industry Entrepreneur Gender   Amount Equity  Corcoran
      0              Healthcare              Female  $50,000    55%       1.0  \
      1       Food and Beverage                Male $460,000    50%       1.0
      2       Business Services                Male      NaN    NaN       NaN
      3         Lifestyle / Home               Male      NaN    NaN       NaN
      4         Uncertain / Other              Male      NaN    NaN       NaN
      ..                    ...                 ...     ...    ...       ...
      490     Children / Education           Female $100,000    10%       NaN
      491        Fitness / Sports             Male  $225,000     8%       NaN
      492        Uncertain / Other           Female      NaN    NaN       NaN
      493           Green/CleanTech            Male $300,000    20%       NaN
      494        Fitness / Sports             Male  $500,000    20%       NaN

           Cuban  Greiner  Herjavec  John  O'Leary  Harrington  Guest
      0      NaN      NaN       NaN   NaN      NaN         NaN    NaN  \
      1      NaN      NaN       NaN   1.0      NaN         NaN    NaN
      2      NaN      NaN       NaN   NaN      NaN         NaN    NaN
      3      NaN      NaN       NaN   NaN      NaN         NaN    NaN
      4      NaN      NaN       NaN   NaN      NaN         NaN    NaN
      ..     ...      ...       ...   ...      ...         ...    ...
      490    1.0      NaN       NaN   NaN      NaN         NaN    NaN
      491    1.0      NaN       1.0   NaN      NaN         NaN    1.0
      492    NaN      NaN       NaN   NaN      NaN         NaN    NaN
      493    1.0      NaN       NaN   NaN      NaN         NaN    NaN
      494    NaN      NaN       NaN   1.0      NaN         NaN    NaN

                                    Details / Notes
      0                                         NaN
      1                                         NaN
      2                                         NaN
      3                                         NaN
      4                                         NaN
      ..                                        ...
      490                                       NaN
```

```
491  10% royalty until $500K; then converts to 5% e…
492                                              NaN
493                                              NaN
494                                              NaN
```

```
[495 rows x 17 columns]
```

There is one column for each of the sharks. A 1 indicates that they chose to invest in that company, while a missing value indicates that they did not choose to invest in that company. Notice that these missing values show up as NaNs when we read in the data. Fill in these missing values with zeros. Other columns may also contain NaNs; be careful not to fill those columns with zeros, or you may end up with strange results down the line.

```python
[20]:  # YOUR CODE HERE
       df_shark[["Corcoran", "Cuban", "Greiner", "Herjavec", "John", "O'Leary",
         "Harrington", "Guest"]] = df_shark[["Corcoran", "Cuban", "Greiner",
         "Herjavec", "John", "O'Leary", "Harrington", "Guest"]].fillna(0)
       df_shark
```

```
[20]:      Season  No. in series                       Company Deal
       0      1.0            1.0            Ava the Elephant  Yes  \
       1      1.0            1.0         Mr. Tod's Pie Factory  Yes
       2      1.0            1.0                      Wispots   No
       3      1.0            1.0  College Foxes Packing Boxes   No
       4      1.0            1.0                    Ionic Ear   No
       ..     …              …                          …    …
       490    6.0           28.0                You Kick Ass  Yes
       491    6.0           29.0                 Shark Wheel  Yes
       492    6.0           29.0                   Gato Cafe   No
       493    6.0           29.0             Sway Motorsports  Yes
       494    6.0           29.0                   Spikeball  Yes

                         Industry Entrepreneur Gender     Amount Equity  Corcoran
       0                Healthcare              Female   $50,000    55%       1.0  \
       1           Food and Beverage             Male  $460,000    50%       1.0
       2           Business Services             Male       NaN    NaN       0.0
       3             Lifestyle / Home            Male       NaN    NaN       0.0
       4           Uncertain / Other            Male       NaN    NaN       0.0
       ..                      …                 …        …      …         …
       490      Children / Education           Female  $100,000    10%       0.0
       491          Fitness / Sports            Male  $225,000     8%       0.0
       492         Uncertain / Other           Female       NaN    NaN       0.0
       493             Green/CleanTech           Male  $300,000    20%       0.0
       494          Fitness / Sports            Male  $500,000    20%       0.0

            Cuban  Greiner  Herjavec  John  O'Leary  Harrington  Guest
       0      0.0      0.0       0.0   0.0      0.0         0.0    0.0  \
```

```
1      0.0      0.0        0.0   1.0      0.0          0.0      0.0
2      0.0      0.0        0.0   0.0      0.0          0.0      0.0
3      0.0      0.0        0.0   0.0      0.0          0.0      0.0
4      0.0      0.0        0.0   0.0      0.0          0.0      0.0
..     ...      ...        ...   ...      ...          ...      ...
490    1.0      0.0        0.0   0.0      0.0          0.0      0.0
491    1.0      0.0        1.0   0.0      0.0          0.0      1.0
492    0.0      0.0        0.0   0.0      0.0          0.0      0.0
493    1.0      0.0        0.0   0.0      0.0          0.0      0.0
494    0.0      0.0        0.0   1.0      0.0          0.0      0.0

                                          Details / Notes
0                                                     NaN
1                                                     NaN
2                                                     NaN
3                                                     NaN
4                                                     NaN
..                                                    ...
490                                                   NaN
491   10% royalty until $500K; then converts to 5% e…
492                                                   NaN
493                                                   NaN
494                                                   NaN

[495 rows x 17 columns]
```

Notice that Amount and Equity are currently being treated as categorical variables (`dtype: object`). Can you figure out why this is? Clean up these columns and cast them to numeric types (i.e., a `dtype` of `int` or `float`) because we'll need to perform mathematical operations on these columns.

```python
# YOUR CODE HERE
df_shark["Amount"] = df_shark["Amount"].str.replace("$", "")
df_shark["Amount"] = df_shark["Amount"].str.replace(",", "")
df_shark["Amount"] = df_shark["Amount"].astype(float)
df_shark["Equity"] = df_shark["Equity"].str.replace("%", "")
df_shark["Equity"] = df_shark["Equity"].astype(float)
df_shark
```

```
[21]:     Season  No. in series                      Company Deal
      0      1.0           1.0            Ava the Elephant  Yes  \
      1      1.0           1.0         Mr. Tod's Pie Factory  Yes
      2      1.0           1.0                       Wispots   No
      3      1.0           1.0   College Foxes Packing Boxes   No
      4      1.0           1.0                     Ionic Ear   No
      ..     ...           ...                           ...  ...
      490    6.0          28.0                 You Kick Ass  Yes
```

```
491      6.0          29.0             Shark Wheel  Yes
492      6.0          29.0               Gato Cafe   No
493      6.0          29.0         Sway Motorsports  Yes
494      6.0          29.0                Spikeball  Yes

                Industry Entrepreneur Gender     Amount  Equity  Corcoran
0             Healthcare               Female    50000.0    55.0       1.0  \
1        Food and Beverage              Male   460000.0    50.0       1.0
2        Business Services              Male        NaN     NaN       0.0
3          Lifestyle / Home             Male        NaN     NaN       0.0
4          Uncertain / Other            Male        NaN     NaN       0.0
..                     …               …          …       …         …
490     Children / Education          Female   100000.0    10.0       0.0
491         Fitness / Sports            Male   225000.0     8.0       0.0
492        Uncertain / Other          Female        NaN     NaN       0.0
493          Green/CleanTech            Male   300000.0    20.0       0.0
494         Fitness / Sports            Male   500000.0    20.0       0.0

     Cuban  Greiner  Herjavec  John  O'Leary  Harrington  Guest
0      0.0      0.0       0.0   0.0      0.0         0.0    0.0  \
1      0.0      0.0       0.0   1.0      0.0         0.0    0.0
2      0.0      0.0       0.0   0.0      0.0         0.0    0.0
3      0.0      0.0       0.0   0.0      0.0         0.0    0.0
4      0.0      0.0       0.0   0.0      0.0         0.0    0.0
..     …        …         …     …        …           …      …
490    1.0      0.0       0.0   0.0      0.0         0.0    0.0
491    1.0      0.0       1.0   0.0      0.0         0.0    1.0
492    0.0      0.0       0.0   0.0      0.0         0.0    0.0
493    1.0      0.0       0.0   0.0      0.0         0.0    0.0
494    0.0      0.0       0.0   1.0      0.0         0.0    0.0

                               Details / Notes
0                                          NaN
1                                          NaN
2                                          NaN
3                                          NaN
4                                          NaN
..                                         …
490                                        NaN
491  10% royalty until $500K; then converts to 5% e…
492                                        NaN
493                                        NaN
494                                        NaN

[495 rows x 17 columns]
```

1.2 Question 1. Which Company was Worth the Most?

The valuation of a company is how much it is worth. If someone invests $10,000 for a 40% equity stake in the company, then this means the company must be valued at $25,000, since 40% of $25,000 is $10,000.

Calculate the valuation of each company that was funded. Which company was most valuable? Is it the same as the company that received the largest total investment from the sharks?

```python
[22]:  # YOUR CODE HERE
       df_shark_q1 = df_shark[df_shark["Equity"] != 0]
       df_shark_q1["Valuation"] = df_shark_q1["Amount"] / (df_shark_q1["Equity"] / 100)
       df_shark_q1
```

```
/var/folders/q8/mqm68gfx7pjfpqftf7y_v6140000gn/T/ipykernel_99181/2936311911.py:3
: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  df_shark_q1["Valuation"] = df_shark_q1["Amount"] / (df_shark_q1["Equity"] /
100)
```

```
[22]:      Season  No. in series                      Company Deal
       0       1.0            1.0             Ava the Elephant  Yes  \
       1       1.0            1.0          Mr. Tod's Pie Factory  Yes
       2       1.0            1.0                       Wispots   No
       3       1.0            1.0   College Foxes Packing Boxes   No
       4       1.0            1.0                     Ionic Ear   No
       ..       ...            ...                         ...  ..
       490     6.0           28.0                 You Kick Ass  Yes
       491     6.0           29.0                  Shark Wheel  Yes
       492     6.0           29.0                    Gato Cafe   No
       493     6.0           29.0              Sway Motorsports  Yes
       494     6.0           29.0                    Spikeball  Yes

                      Industry Entrepreneur Gender    Amount  Equity  Corcoran
       0            Healthcare              Female   50000.0    55.0       1.0  \
       1     Food and Beverage                Male  460000.0    50.0       1.0
       2     Business Services                Male       NaN     NaN       0.0
       3        Lifestyle / Home             Male       NaN     NaN       0.0
       4        Uncertain / Other            Male       NaN     NaN       0.0
       ..                    ...                ...       ...     ...       ...
       490  Children / Education           Female  100000.0    10.0       0.0
       491      Fitness / Sports            Male  225000.0     8.0       0.0
       492     Uncertain / Other          Female       NaN     NaN       0.0
       493        Green/CleanTech           Male  300000.0    20.0       0.0
       494      Fitness / Sports            Male  500000.0    20.0       0.0
```

```
     Cuban  Greiner  Herjavec  John  O'Leary  Harrington  Guest
0      0.0      0.0       0.0   0.0      0.0         0.0    0.0  \
1      0.0      0.0       0.0   1.0      0.0         0.0    0.0
2      0.0      0.0       0.0   0.0      0.0         0.0    0.0
3      0.0      0.0       0.0   0.0      0.0         0.0    0.0
4      0.0      0.0       0.0   0.0      0.0         0.0    0.0
..     ...      ...       ...   ...      ...         ...    ...
490    1.0      0.0       0.0   0.0      0.0         0.0    0.0
491    1.0      0.0       1.0   0.0      0.0         0.0    1.0
492    0.0      0.0       0.0   0.0      0.0         0.0    0.0
493    1.0      0.0       0.0   0.0      0.0         0.0    0.0
494    0.0      0.0       0.0   1.0      0.0         0.0    0.0

                                    Details / Notes     Valuation
0                                              NaN   9.090909e+04
1                                              NaN   9.200000e+05
2                                              NaN            NaN
3                                              NaN            NaN
4                                              NaN            NaN
..                                             ...            ...
490                                            NaN   1.000000e+06
491  10% royalty until $500K; then converts to 5% e…   2.812500e+06
492                                            NaN            NaN
493                                            NaN   1.500000e+06
494                                            NaN   2.500000e+06

[494 rows x 18 columns]
```

```python
[23]: max_valuation = df_shark_q1["Valuation"].max()
      df_shark_q1.loc[df_shark_q1["Valuation"] == max_valuation]
```

```
[23]:      Season  No. in series Company Deal          Industry
      421     6.0           11.0    Zipz  Yes  Food and Beverage  \

           Entrepreneur Gender     Amount  Equity  Corcoran  Cuban  Greiner
      421          Male  2500000.0    10.0       0.0    0.0      0.0  \

           Herjavec  John  O'Leary  Harrington  Guest
      421       0.0   0.0      1.0         0.0    0.0  \

                                    Details / Notes   Valuation
      421  with an option for another $2.5 Million for an…  25000000.0
```

```python
[24]: df_shark_q1[df_shark_q1["Amount"] == df_shark_q1["Amount"].max()]
```

```
[24]:       Season  No. in series Company Deal        Industry Entrepreneur Gender
     483     6.0           27.0  AirCar  Yes  Green/CleanTech                  Male  \

            Amount  Equity  Corcoran  Cuban  Greiner  Herjavec  John  O'Leary
     483  5000000.0    50.0       0.0    0.0      0.0       1.0   0.0      0.0  \

            Harrington  Guest                               Details / Notes
     483          0.0    0.0  Contingent on getting deal to bring to contine…  \

            Valuation
     483  10000000.0
```

YOUR EXPLANATION HERE

There is one row/company that has an equity of 0% (The Wall DoctorRX). This would mean that their valuation is infinite which seems like a special case. For that reason, we will ignore that observation and consider the other ones. The company that was the most valuable was Zipz and it is not the same as the one that received the largest total in investment.

1.3 Question 2. Which Shark Invested the Most?

Calculate the total amount of money that each shark invested over the 6 seasons. Which shark invested the most total money over the 6 seasons?

Hint: If n sharks funded a given venture, then the amount that each shark invested is the total amount divided by n.

```python
[25]: # ENTER CODE HERE.
      df_shark["Num_Investors"] = df_shark["Corcoran"] + df_shark["Cuban"] +
        ↪df_shark["Greiner"] + df_shark["Herjavec"] + df_shark["John"] +
        ↪df_shark["O'Leary"] + df_shark["Harrington"] + df_shark["Guest"]
      df_shark
```

```
[25]:       Season  No. in series                        Company Deal
     0        1.0            1.0              Ava the Elephant  Yes  \
     1        1.0            1.0          Mr. Tod's Pie Factory  Yes
     2        1.0            1.0                        Wispots   No
     3        1.0            1.0  College Foxes Packing Boxes   No
     4        1.0            1.0                      Ionic Ear   No
     ..       …              …                            …     …
     490      6.0           28.0                  You Kick Ass  Yes
     491      6.0           29.0                   Shark Wheel  Yes
     492      6.0           29.0                     Gato Cafe   No
     493      6.0           29.0               Sway Motorsports  Yes
     494      6.0           29.0                     Spikeball  Yes

               Industry Entrepreneur Gender    Amount  Equity  Corcoran
     0         Healthcare                Female   50000.0    55.0       1.0  \
     1  Food and Beverage                  Male  460000.0    50.0       1.0
```

```
2          Business Services          Male      NaN     NaN      0.0
3          Lifestyle / Home           Male      NaN     NaN      0.0
4          Uncertain / Other          Male      NaN     NaN      0.0
..                      …              …        …       …        …
490  Children / Education           Female  100000.0   10.0     0.0
491        Fitness / Sports           Male  225000.0    8.0     0.0
492        Uncertain / Other        Female      NaN     NaN      0.0
493          Green/CleanTech          Male  300000.0   20.0     0.0
494        Fitness / Sports           Male  500000.0   20.0     0.0

     Cuban  Greiner  Herjavec  John  O'Leary  Harrington  Guest
0      0.0      0.0       0.0   0.0      0.0         0.0    0.0  \
1      0.0      0.0       0.0   1.0      0.0         0.0    0.0
2      0.0      0.0       0.0   0.0      0.0         0.0    0.0
3      0.0      0.0       0.0   0.0      0.0         0.0    0.0
4      0.0      0.0       0.0   0.0      0.0         0.0    0.0
..     …        …         …     …        …           …      …
490    1.0      0.0       0.0   0.0      0.0         0.0    0.0
491    1.0      0.0       1.0   0.0      0.0         0.0    1.0
492    0.0      0.0       0.0   0.0      0.0         0.0    0.0
493    1.0      0.0       0.0   0.0      0.0         0.0    0.0
494    0.0      0.0       0.0   1.0      0.0         0.0    0.0

                               Details / Notes  Num_Investors
0                                          NaN            1.0
1                                          NaN            2.0
2                                          NaN            0.0
3                                          NaN            0.0
4                                          NaN            0.0
..                                          …              …
490                                        NaN            1.0
491  10% royalty until $500K; then converts to 5% e…            3.0
492                                        NaN            0.0
493                                        NaN            1.0
494                                        NaN            1.0

[495 rows x 18 columns]
```

```python
[26]: df_shark["Amount_Per_Investor"] = df_shark["Amount"] / df_shark["Num_Investors"]
```

```python
[27]: names = ["Corcoran", "Cuban", "Greiner", "Herjavec", "John", "O'Leary",
       "Harrington", "Guest"]
total_amounts = []
for x in names:
    total_amounts.append((df_shark[df_shark[x] == 1.0]["Amount_Per_Investor"].
    sum(), x))
```

```
[28]: total_amounts
```

```
[28]: [(4912500.0, 'Corcoran'),
       (17817500.0, 'Cuban'),
       (8170000.0, 'Greiner'),
       (16297500.0, 'Herjavec'),
       (8154000.0, 'John'),
       (7952500.0, "O'Leary"),
       (800000.0, 'Harrington'),
       (400000.0, 'Guest')]
```

```
[29]: max(total_amounts)
```

```
[29]: (17817500.0, 'Cuban')
```

YOUR EXPLANATION HERE

Over the 6 seasons, Mark Cuban invested the most total money.

1.4 Question 3. Do the Sharks Prefer Certain Industries?

Calculate the funding rate (the proportion of companies that were funded) for each industry. Make a visualization showing this information.

```python
[30]: # ENTER CODE HERE.
      def bin_deal(a):
        if a == "Yes":
          return 1
        else:
          return 0
      df_shark['Bin_Deal'] = df_shark['Deal'].map(bin_deal)
      df_shark
```

```
[30]:      Season  No. in series                      Company Deal
      0       1.0            1.0              Ava the Elephant  Yes  \
      1       1.0            1.0         Mr. Tod's Pie Factory  Yes
      2       1.0            1.0                       Wispots   No
      3       1.0            1.0  College Foxes Packing Boxes   No
      4       1.0            1.0                     Ionic Ear   No
      ..       …              …                           … …
      490     6.0           28.0                  You Kick Ass  Yes
      491     6.0           29.0                   Shark Wheel  Yes
      492     6.0           29.0                     Gato Cafe   No
      493     6.0           29.0               Sway Motorsports  Yes
      494     6.0           29.0                     Spikeball  Yes

               Industry Entrepreneur Gender    Amount  Equity  Corcoran
      0      Healthcare                Female  50000.0    55.0       1.0  \
```

1	Food and Beverage	Male	460000.0	50.0	1.0
2	Business Services	Male	NaN	NaN	0.0
3	Lifestyle / Home	Male	NaN	NaN	0.0
4	Uncertain / Other	Male	NaN	NaN	0.0
..	…	…	…	…	…
490	Children / Education	Female	100000.0	10.0	0.0
491	Fitness / Sports	Male	225000.0	8.0	0.0
492	Uncertain / Other	Female	NaN	NaN	0.0
493	Green/CleanTech	Male	300000.0	20.0	0.0
494	Fitness / Sports	Male	500000.0	20.0	0.0

	Cuban	Greiner	Herjavec	John	O'Leary	Harrington	Guest	
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	\
1	0.0	0.0	0.0	1.0	0.0	0.0	0.0	
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
..	…	…	…	…	…	…	…	
490	1.0	0.0	0.0	0.0	0.0	0.0	0.0	
491	1.0	0.0	1.0	0.0	0.0	0.0	1.0	
492	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
493	1.0	0.0	0.0	0.0	0.0	0.0	0.0	
494	0.0	0.0	0.0	1.0	0.0	0.0	0.0	

|	Details / Notes	Num_Investors	
0	NaN	1.0	\
1	NaN	2.0	
2	NaN	0.0	
3	NaN	0.0	
4	NaN	0.0	
..	…	…	
490	NaN	1.0	
491	10% royalty until $500K; then converts to 5% e…	3.0	
492	NaN	0.0	
493	NaN	1.0	
494	NaN	1.0	

	Amount_Per_Investor	Bin_Deal
0	50000.0	1
1	230000.0	1
2	NaN	0
3	NaN	0
4	NaN	0
..	…	…
490	100000.0	1
491	75000.0	1
492	NaN	0

```
493              300000.0              1
494              500000.0              1

[495 rows x 20 columns]
```

[31]: `df_shark.groupby("Industry")["Bin_Deal"].mean().plot.bar(ylabel="Funding Rate",␣↪title="Funding Rate for Industries on Shark Tank")`

[31]: `<Axes: title={'center': 'Funding Rate for Industries on Shark Tank'}, xlabel='Industry', ylabel='Funding Rate'>`
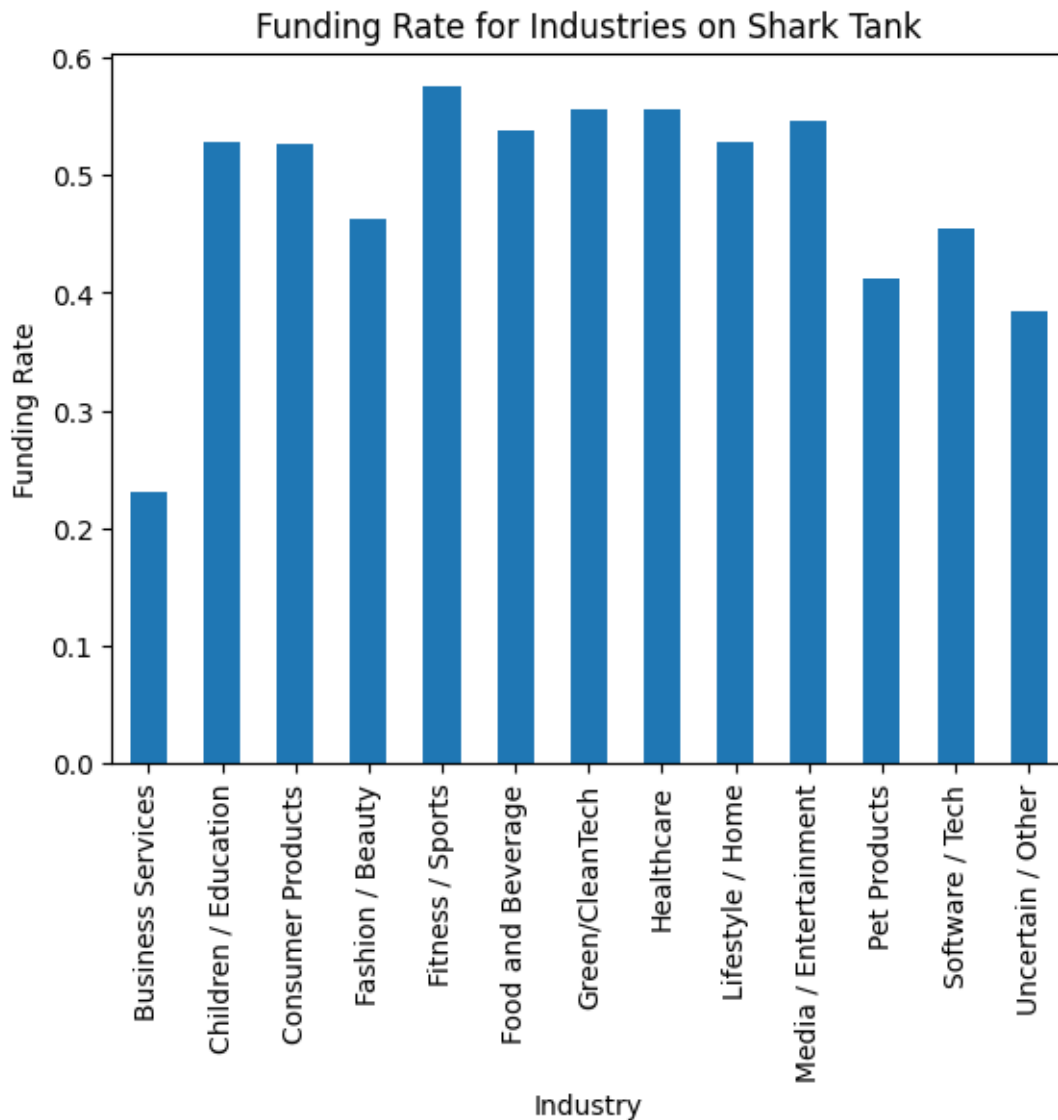
YOUR EXPLANATION HERE

From the bar plot, it can be seen that Business Services were in general least likely to be funded in Shark Tank. On the other hand, Fitness / Sports is the most likely to be funded in Shark Tank.

1.5 Submission Instructions

- After you have completed the notebook, select **Runtime > Run all**
- After the notebook finishes rerunning check to make sure that you have no errors and everything runs properly. Fix any problems and redo this step until it works.
- Rename this notebook by clicking on "DATA 301 Lab 2A - YOUR NAMES HERE" at the very top of this page. Replace "YOUR NAMES HERE" with the first and last names of you and your partner (if you worked with one).
- Expand all cells with View > Expand Sections
- Save a PDF version: File > Print > Save as PDF
    - Under "More Settings" make sure "Background graphics" is checked
    - Printing Colab to PDF doesn't always work so well and some of your output might get cutoff. That's ok.
    - It's not necessary, but if you want a more nicely formatted PDF you can uncomment and run the code in the following cell. (Here's a video with other options.)
- Download the notebook: File > Download .ipynb
- Submit the notebook and PDF in Canvas. If you worked in a pair, only one person should submit in Canvas.

```
[32]:  # !wget -nc https://raw.githubusercontent.com/brpy/colab-pdf/master/colab_pdf.py
       # from colab_pdf import colab_pdf
       # colab_pdf('DATA 301 Lab1A - YOUR NAMES HERE.ipynb')
```