# Star War Survey

May 24, 2018

## 1 Read the Datafile

In [3]:
```
import pandas as pd
import numpy as np
star_wars = pd.read_csv("./databank/StarWars.csv", encoding="ISO-8859-1")
star_wars.head(10)
```

Out[3]:

| | RespondentID | Have you seen any of the 6 films in the Star Wars franchise? | Do you consider yourself to be a fan of the Star Wars film franchise? | Which of the following Star Wars films have you seen? Please select all that apply. |
|---|---|---|---|---|
| 0 | NaN | Response | Response | |
| 1 | 3292879998 | Yes | Yes | Star Wars: Episode I  The Phantom Menace |
| 2 | 3292879538 | No | NaN | Star Wars: Episode I  The Phantom Menace |
| 3 | 3292765271 | Yes | No | NaN |
| 4 | 3292763116 | Yes | Yes | Star Wars: Episode I  The Phantom Menace |
| 5 | 3292731220 | Yes | Yes | Star Wars: Episode I  The Phantom Menace |
| 6 | 3292719380 | Yes | Yes | Star Wars: Episode I  The Phantom Menace |
| 7 | 3292684787 | Yes | Yes | Star Wars: Episode I  The Phantom Menace |
| 8 | 3292663732 | Yes | Yes | Star Wars: Episode I  The Phantom Menace |
| 9 | 3292654043 | Yes | Yes | Star Wars: Episode I  The Phantom Menace |

```
5           Star Wars: Episode I  The Phantom Menace
6           Star Wars: Episode I  The Phantom Menace
7           Star Wars: Episode I  The Phantom Menace
8           Star Wars: Episode I  The Phantom Menace
9           Star Wars: Episode I  The Phantom Menace

                                     Unnamed: 4  \
0  Star Wars: Episode II  Attack of the Clones
1  Star Wars: Episode II  Attack of the Clones
2                                           NaN
3  Star Wars: Episode II  Attack of the Clones
4  Star Wars: Episode II  Attack of the Clones
5  Star Wars: Episode II  Attack of the Clones
6  Star Wars: Episode II  Attack of the Clones
7  Star Wars: Episode II  Attack of the Clones
8  Star Wars: Episode II  Attack of the Clones
9  Star Wars: Episode II  Attack of the Clones

                                     Unnamed: 5  \
0  Star Wars: Episode III  Revenge of the Sith
1  Star Wars: Episode III  Revenge of the Sith
2                                           NaN
3  Star Wars: Episode III  Revenge of the Sith
4  Star Wars: Episode III  Revenge of the Sith
5  Star Wars: Episode III  Revenge of the Sith
6  Star Wars: Episode III  Revenge of the Sith
7  Star Wars: Episode III  Revenge of the Sith
8  Star Wars: Episode III  Revenge of the Sith
9  Star Wars: Episode III  Revenge of the Sith

                          Unnamed: 6  \
0  Star Wars: Episode IV  A New Hope
1  Star Wars: Episode IV  A New Hope
2                                NaN
3                                NaN
4  Star Wars: Episode IV  A New Hope
5  Star Wars: Episode IV  A New Hope
6  Star Wars: Episode IV  A New Hope
7  Star Wars: Episode IV  A New Hope
8  Star Wars: Episode IV  A New Hope
9  Star Wars: Episode IV  A New Hope

                                       Unnamed: 7  \
0  Star Wars: Episode V The Empire Strikes Back
1  Star Wars: Episode V The Empire Strikes Back
2                                             NaN
3                                             NaN
4  Star Wars: Episode V The Empire Strikes Back
```

```
5  Star Wars: Episode V The Empire Strikes Back
6  Star Wars: Episode V The Empire Strikes Back
7  Star Wars: Episode V The Empire Strikes Back
8  Star Wars: Episode V The Empire Strikes Back
9  Star Wars: Episode V The Empire Strikes Back

                                Unnamed: 8  \
0  Star Wars: Episode VI Return of the Jedi
1  Star Wars: Episode VI Return of the Jedi
2                                       NaN
3                                       NaN
4  Star Wars: Episode VI Return of the Jedi
5  Star Wars: Episode VI Return of the Jedi
6  Star Wars: Episode VI Return of the Jedi
7  Star Wars: Episode VI Return of the Jedi
8  Star Wars: Episode VI Return of the Jedi
9  Star Wars: Episode VI Return of the Jedi

  Please rank the Star Wars films in order of preference with 1 being your favorite fil
0           Star Wars: Episode I  The Phantom Menace
1                                                   3
2                                                 NaN
3                                                   1
4                                                   5
5                                                   5
6                                                   1
7                                                   6
8                                                   4
9                                                   5

            ...                    Unnamed: 28  \
0           ...                           Yoda
1           ...                 Very favorably
2           ...                            NaN
3           ...               Unfamiliar (N/A)
4           ...                 Very favorably
5           ...             Somewhat favorably
6           ...                 Very favorably
7           ...                 Very favorably
8           ...                 Very favorably
9           ...             Somewhat favorably

       Which character shot first?  \
0                          Response
1  I don't understand this question
2                               NaN
3  I don't understand this question
4  I don't understand this question
```

| | |
|---|---|
| 5 | Greedo |
| 6 | Han |
| 7 | Han |
| 8 | Han |
| 9 | Han |

| | Are you familiar with the Expanded Universe? \ |
|---|---|
| 0 | Response |
| 1 | Yes |
| 2 | NaN |
| 3 | No |
| 4 | No |
| 5 | Yes |
| 6 | Yes |
| 7 | Yes |
| 8 | No |
| 9 | No |

| | Do you consider yourself to be a fan of the Expanded Universe?Ñæ \ |
|---|---|
| 0 | Response |
| 1 | No |
| 2 | NaN |
| 3 | NaN |
| 4 | NaN |
| 5 | No |
| 6 | No |
| 7 | No |
| 8 | NaN |
| 9 | NaN |

| | Do you consider yourself to be a fan of the Star Trek franchise? | Gender \ |
|---|---|---|
| 0 | Response | Response |
| 1 | No | Male |
| 2 | Yes | Male |
| 3 | No | Male |
| 4 | Yes | Male |
| 5 | No | Male |
| 6 | Yes | Male |
| 7 | No | Male |
| 8 | Yes | Male |
| 9 | No | Male |

| | Age | Household Income | Education \ |
|---|---|---|---|
| 0 | Response | Response | Response |
| 1 | 18-29 | NaN | High school degree |
| 2 | 18-29 | $0 - $24,999 | Bachelor degree |
| 3 | 18-29 | $0 - $24,999 | High school degree |
| 4 | 18-29 | $100,000 - $149,999 | Some college or Associate degree |

```
5     18-29  $100,000 - $149,999  Some college or Associate degree
6     18-29    $25,000 - $49,999                  Bachelor degree
7     18-29                  NaN                High school degree
8     18-29                  NaN                High school degree
9     18-29         $0 - $24,999  Some college or Associate degree

  Location (Census Region)
0                 Response
1           South Atlantic
2       West South Central
3       West North Central
4       West North Central
5       West North Central
6          Middle Atlantic
7       East North Central
8           South Atlantic
9           South Atlantic

[10 rows x 38 columns]
```

## 2 Removing the RespondentID Irregularities

```
In [4]: star_wars = star_wars[pd.notnull(star_wars["RespondentID"])]
        star_wars.head()
```

```
Out[4]:   RespondentID Have you seen any of the 6 films in the Star Wars franchise?  \
        1   3292879998                                                Yes
        2   3292879538                                                 No
        3   3292765271                                                Yes
        4   3292763116                                                Yes
        5   3292731220                                                Yes

          Do you consider yourself to be a fan of the Star Wars film franchise?  \
        1                                              Yes
        2                                              NaN
        3                                               No
        4                                              Yes
        5                                              Yes

          Which of the following Star Wars films have you seen? Please select all that apply.
        1           Star Wars: Episode I  The Phantom Menace
        2                                                 NaN
        3           Star Wars: Episode I  The Phantom Menace
        4           Star Wars: Episode I  The Phantom Menace
        5           Star Wars: Episode I  The Phantom Menace

                                          Unnamed: 4  \
```

```
1  Star Wars: Episode II  Attack of the Clones
2                                          NaN
3  Star Wars: Episode II  Attack of the Clones
4  Star Wars: Episode II  Attack of the Clones
5  Star Wars: Episode II  Attack of the Clones

                                    Unnamed: 5  \
1  Star Wars: Episode III  Revenge of the Sith
2                                          NaN
3  Star Wars: Episode III  Revenge of the Sith
4  Star Wars: Episode III  Revenge of the Sith
5  Star Wars: Episode III  Revenge of the Sith

                           Unnamed: 6  \
1  Star Wars: Episode IV  A New Hope
2                                 NaN
3                                 NaN
4  Star Wars: Episode IV  A New Hope
5  Star Wars: Episode IV  A New Hope

                                      Unnamed: 7  \
1  Star Wars: Episode V The Empire Strikes Back
2                                           NaN
3                                           NaN
4  Star Wars: Episode V The Empire Strikes Back
5  Star Wars: Episode V The Empire Strikes Back

                                   Unnamed: 8  \
1  Star Wars: Episode VI Return of the Jedi
2                                       NaN
3                                       NaN
4  Star Wars: Episode VI Return of the Jedi
5  Star Wars: Episode VI Return of the Jedi

  Please rank the Star Wars films in order of preference with 1 being your favorite fil
1                                                  3
2                                                NaN
3                                                  1
4                                                  5
5                                                  5

           ...                    Unnamed: 28  \
1          ...                  Very favorably
2          ...                             NaN
3          ...                Unfamiliar (N/A)
4          ...                  Very favorably
5          ...              Somewhat favorably
```

```
       Which character shot first?  \
1  I don't understand this question
2                              NaN
3  I don't understand this question
4  I don't understand this question
5                           Greedo

  Are you familiar with the Expanded Universe?  \
1                                          Yes
2                                          NaN
3                                           No
4                                           No
5                                          Yes

  Do you consider yourself to be a fan of the Expanded Universe?Ñæ  \
1                                                 No
2                                                NaN
3                                                NaN
4                                                NaN
5                                                 No

  Do you consider yourself to be a fan of the Star Trek franchise? Gender  \
1                                                 No                 Male
2                                                Yes                 Male
3                                                 No                 Male
4                                                Yes                 Male
5                                                 No                 Male

     Age     Household Income                         Education  \
1  18-29                  NaN                High school degree
2  18-29         $0 - $24,999                    Bachelor degree
3  18-29         $0 - $24,999                High school degree
4  18-29  $100,000 - $149,999  Some college or Associate degree
5  18-29  $100,000 - $149,999  Some college or Associate degree

  Location (Census Region)
1           South Atlantic
2       West South Central
3       West North Central
4       West North Central
5       West North Central

[5 rows x 38 columns]
```

## 3 Converting to Boolean Data Type

```
In [5]: bool_dict = {"Yes": True, "No": False, np.nan: False}

        star_wars["Have you seen any of the 6 films in the Star Wars franchise?"].map(bool_dict
        star_wars["Do you consider yourself to be a fan of the Star Wars film franchise?"].map
        print(star_wars["Have you seen any of the 6 films in the Star Wars franchise?"].unique
        print(star_wars["Do you consider yourself to be a fan of the Star Wars film franchise?
```

```
['Yes' 'No' ' Inc.' nan]
['Yes' nan 'No']
```

## 4 Change Views Movies Column Names

```
In [6]: column_names = star_wars.columns.values
        for each in range(3,9):
            column_names[each] = "seen_" + str(each-2)
        star_wars.columns = column_names

        star_wars.columns
```

```
Out[6]: Index(['RespondentID',
               'Have you seen any of the 6 films in the Star Wars franchise?',
               'Do you consider yourself to be a fan of the Star Wars film franchise?',
               'seen_1', 'seen_2', 'seen_3', 'seen_4', 'seen_5', 'seen_6',
               'Please rank the Star Wars films in order of preference with 1 being your favor
               'Unnamed: 10', 'Unnamed: 11', 'Unnamed: 12', 'Unnamed: 13',
               'Unnamed: 14',
               'Please state whether you view the following characters favorably, unfavorably,
               'Unnamed: 16', 'Unnamed: 17', 'Unnamed: 18', 'Unnamed: 19',
               'Unnamed: 20', 'Unnamed: 21', 'Unnamed: 22', 'Unnamed: 23',
               'Unnamed: 24', 'Unnamed: 25', 'Unnamed: 26', 'Unnamed: 27',
               'Unnamed: 28', 'Which character shot first?',
               'Are you familiar with the Expanded Universe?',
               'Do you consider yourself to be a fan of the Expanded Universe?Ñæ',
               'Do you consider yourself to be a fan of the Star Trek franchise?',
               'Gender', 'Age', 'Household Income', 'Education',
               'Location (Census Region)'],
              dtype='object')
```

## 5 Converting Movie Response to Boolean Type

```
In [7]: movies = {
            "Star Wars: Episode I  The Phantom Menace": True,
            np.nan: False,
            "Star Wars: Episode II  Attack of the Clones": True,
```

```
    "Star Wars: Episode III  Revenge of the Sith": True,
    "Star Wars: Episode IV  A New Hope": True,
    "Star Wars: Episode V The Empire Strikes Back": True,
    "Star Wars: Episode VI Return of the Jedi": True
}

for cols in star_wars.columns[3:9]:
    star_wars[cols] = star_wars[cols].map(movies)

star_wars[3:9].head()
```

Out[7]:

| | RespondentID | Have you seen any of the 6 films in the Star Wars franchise? | Do you consider yourself to be a fan of the Star Wars film franchise? | seen_1 | seen_2 | seen_3 | seen_4 | seen_5 | seen_6 | Please rank the Star Wars films in order of preference with 1 being your favorite fi |
|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 3292763116 | Yes | Yes | True | True | True | True | True | True | 5 |
| 5 | 3292731220 | Yes | Yes | True | True | True | True | True | True | 5 |
| 6 | 3292719380 | Yes | Yes | True | True | True | True | True | True | 1 |
| 7 | 3292684787 | Yes | Yes | True | True | True | True | True | True | 6 |
| 8 | 3292663732 | Yes | Yes | True | True | True | True | True | True | 4 |

| | ... | Unnamed: 28 | Which character shot first? |
|---|---|---|---|
| 4 | ... | Very favorably | I don't understand this question |
| 5 | ... | Somewhat favorably | |
| 6 | ... | Very favorably | |
| 7 | ... | Very favorably | |
| 8 | ... | Very favorably | |

```
5                              Greedo
6                                 Han
7                                 Han
8                                 Han

  Are you familiar with the Expanded Universe?  \
4                                          No
5                                         Yes
6                                         Yes
7                                         Yes
8                                          No

  Do you consider yourself to be a fan of the Expanded Universe?Ñæ  \
4                                                 NaN
5                                                  No
6                                                  No
7                                                  No
8                                                 NaN

  Do you consider yourself to be a fan of the Star Trek franchise? Gender  \
4                                                 Yes                 Male
5                                                  No                 Male
6                                                 Yes                 Male
7                                                  No                 Male
8                                                 Yes                 Male

     Age     Household Income                          Education  \
4  18-29  $100,000 - $149,999  Some college or Associate degree
5  18-29  $100,000 - $149,999  Some college or Associate degree
6  18-29    $25,000 - $49,999                  Bachelor degree
7  18-29                  NaN               High school degree
8  18-29                  NaN               High school degree

  Location (Census Region)
4       West North Central
5       West North Central
6          Middle Atlantic
7       East North Central
8           South Atlantic

[5 rows x 38 columns]
```

## 6 Change Movie Ranking Columns Names

```
In [8]: column_names = star_wars.columns.values
        for i in range(9, 15):
            column_names[i] = "ranking_" + str(i-8)
```

```
        star_wars.columns = column_names

        print(star_wars.columns[9:15])
```

```
Index(['ranking_1', 'ranking_2', 'ranking_3', 'ranking_4', 'ranking_5',
       'ranking_6'],
      dtype='object')
```

## 7 Change Movie Ranking Columns Data Type

```
In [9]: star_wars[star_wars.columns[9:15]] = star_wars[star_wars.columns[9:15]].astype(float)
        print(star_wars["ranking_6"].dtype)
```

```
float64
```

## 8 Plot Average Ranking of Movies

```
In [10]: cols = star_wars.columns[9:15]
         bar_heights = star_wars[cols].mean()
         print("Average Movie Rankings\n", bar_heights)
```

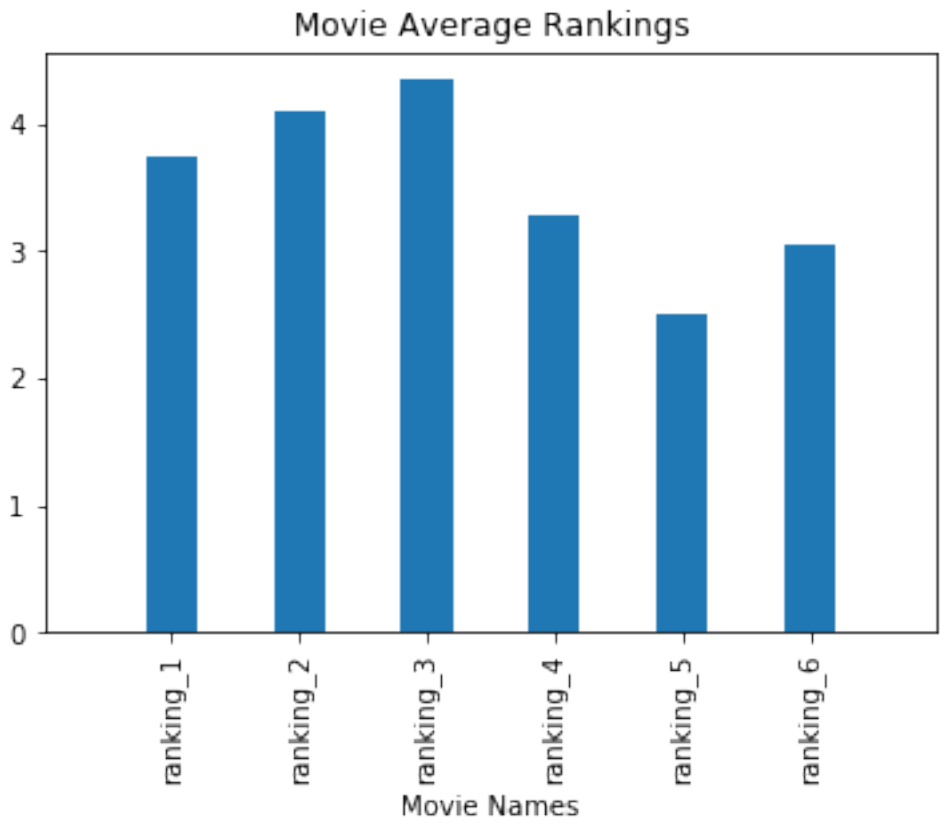
```
Average Movie Rankings
 ranking_1    3.732934
ranking_2    4.087321
ranking_3    4.341317
ranking_4    3.272727
ranking_5    2.513158
ranking_6    3.047847
dtype: float64
```

```
In [11]: import matplotlib.pyplot as plt
         %matplotlib inline

         fig, ax = plt.subplots()
         bar_positions = range(1,7)

         ax.set_xlim(0,7)
         ax.bar(bar_positions, bar_heights, 0.40, align="center")
         ax.set_xticks(range(1,7))
         ax.set_xticklabels(cols, rotation=90)
         ax.set_xlabel("Movie Names")
         ax.set_title("Movie Average Rankings")
```

```
Out[11]: Text(0.5,1,'Movie Average Rankings')
```




## 9 Report Number of Movies Seen

```
In [12]: col = star_wars.columns[3:9]
         print(star_wars[col].sum())

seen_1    673
seen_2    571
seen_3    550
seen_4    607
seen_5    758
seen_6    738
dtype: int64
```

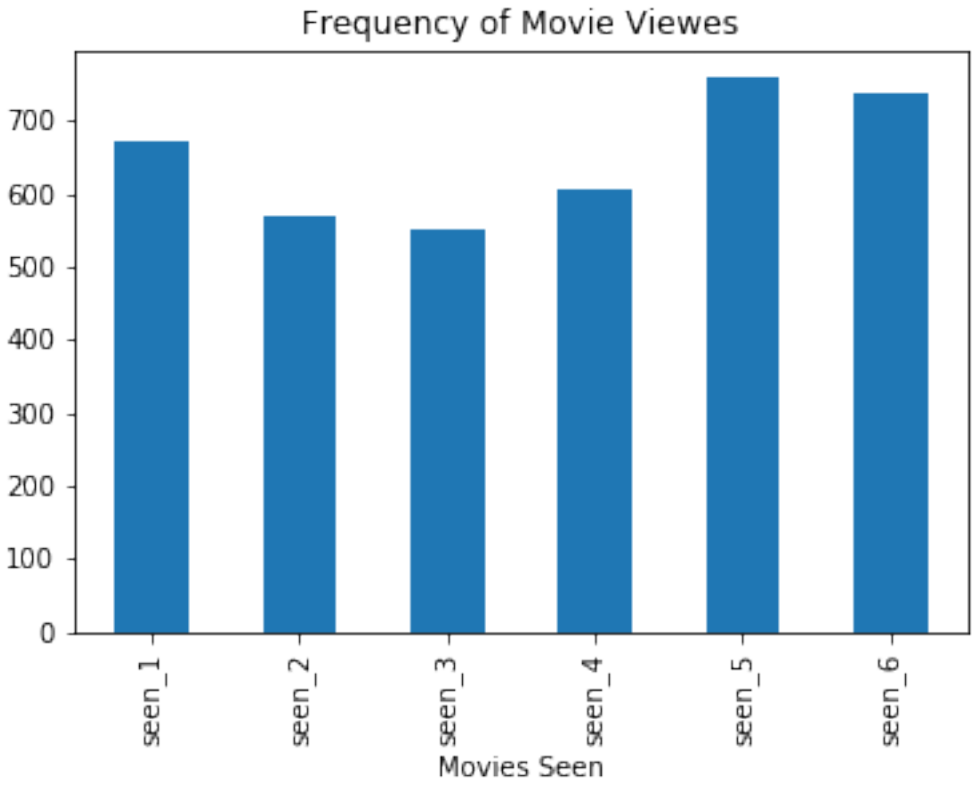
## 10 Plot Number of Movies Seen

```
In [13]: cols = star_wars.columns[3:9].values

         fig, ax = plt.subplots()
```

```
ax.bar(range(1,7), star_wars[cols].sum(), 0.5, align="center")
ax.set_xticks(range(1,7))
ax.set_xticklabels(cols, rotation=90)
ax.set_xlabel("Movies Seen")
ax.set_title("Frequency of Movie Viewes")
```

```
Out[13]: Text(0.5,1,'Frequency of Movie Viewes')
```




## 11 Split Database into Male & Female Groups

```
In [14]: males = star_wars[star_wars["Gender"] == "Male"]
         females = star_wars[star_wars["Gender"] == "Female"]
         print(males["Gender"].head())
         print(females["Gender"].head())
```

```
1    Male
2    Male
3    Male
4    Male
5    Male
Name: Gender, dtype: object
```

```
112    Female
113    Female
115    Female
117    Female
118    Female
Name: Gender, dtype: object
```

## 12 Report # of Movies Seen by Males

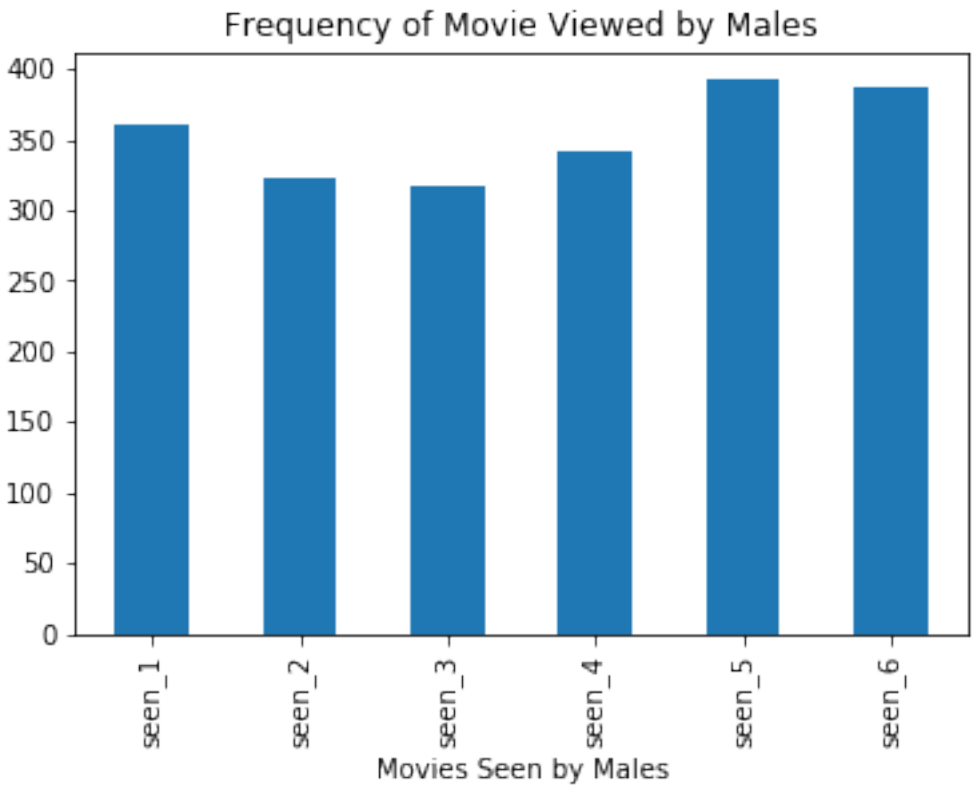
```
In [15]: print(males[cols].sum())
```

```
seen_1    361
seen_2    323
seen_3    317
seen_4    342
seen_5    392
seen_6    387
dtype: int64
```

## 13 Plot # of Movies Seen by Males

```
In [16]: fig, ax = plt.subplots()
         ax.bar(range(1,7), males[cols].sum(), 0.5, align="center")
         ax.set_xticks(range(1,7))
         ax.set_xticklabels(cols, rotation=90)
         ax.set_xlabel("Movies Seen by Males")
         ax.set_title("Frequency of Movie Viewed by Males")
```

```
Out[16]: Text(0.5,1,'Frequency of Movie Viewed by Males')
```




## 14 Report # of Movies Seen by Females

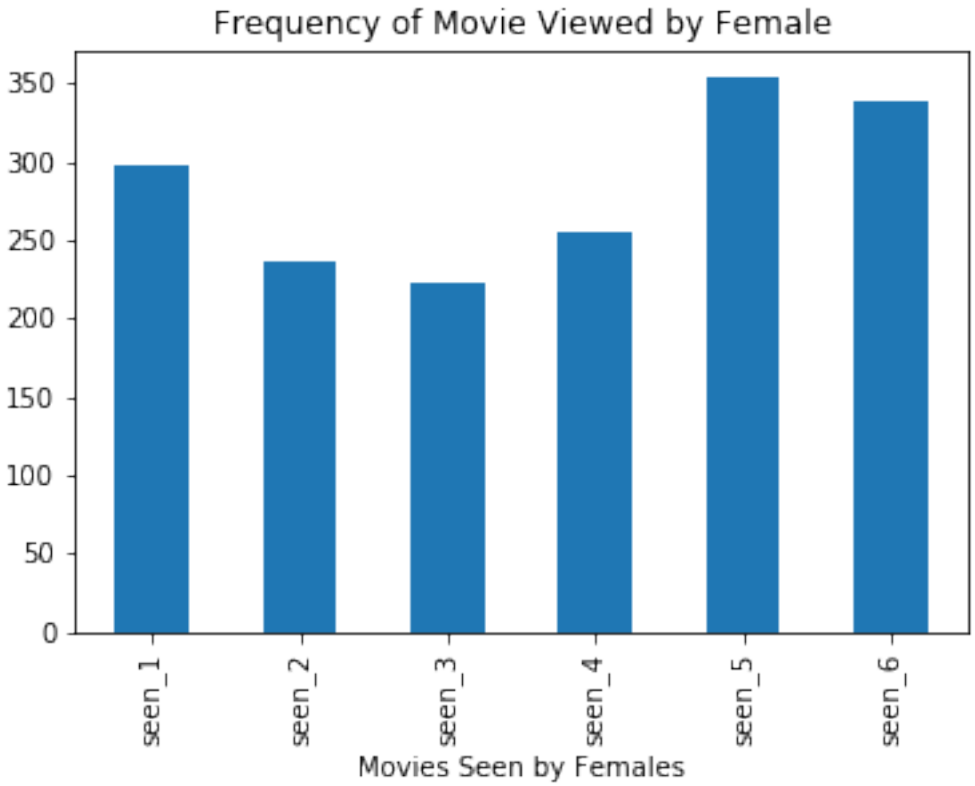
```
In [17]: print(females[cols].sum())
```

```
seen_1    298
seen_2    237
seen_3    222
seen_4    255
seen_5    353
seen_6    338
dtype: int64
```

## 15 Plot # of Movies Seen by Females

```
In [18]: fig, ax = plt.subplots()
         ax.bar(range(1,7), females[cols].sum(), 0.5, align="center")
         ax.set_xticks(range(1,7))
         ax.set_xticklabels(cols, rotation=90)
         ax.set_xlabel("Movies Seen by Females")
         ax.set_title("Frequency of Movie Viewed by Female")
```

```
Out[18]: Text(0.5,1,'Frequency of Movie Viewed by Female')
```



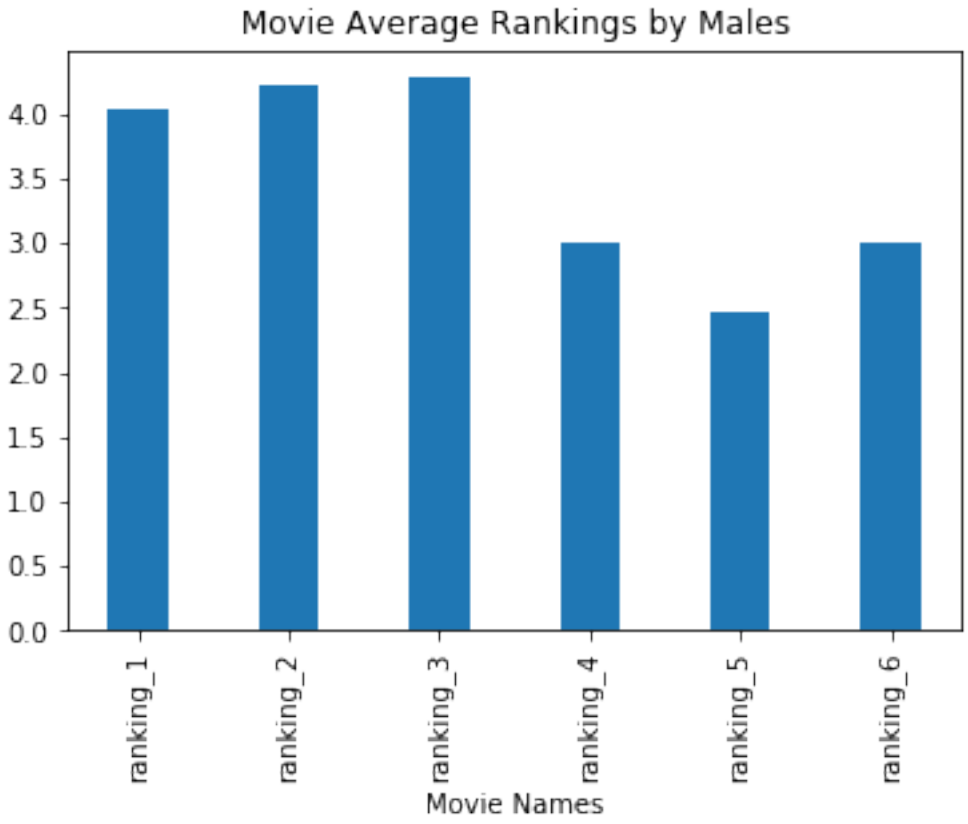

## 16 Plot Average Movie Rankings by Males

```
In [19]: cols = star_wars.columns[9:15].values
         print( males[cols].mean())
```

```
ranking_1    4.037825
ranking_2    4.224586
ranking_3    4.274882
ranking_4    2.997636
ranking_5    2.458629
ranking_6    3.002364
dtype: float64
```

```
In [20]: fig, ax = plt.subplots()
         ax.bar(range(1,7), males[cols].mean(), 0.40, align="center")
         ax.set_xticks(range(1,7))
         ax.set_xticklabels(cols, rotation=90)
         ax.set_xlabel("Movie Names")
         ax.set_title("Movie Average Rankings by Males")
```

```
Out[20]: Text(0.5,1,'Movie Average Rankings by Males')
```



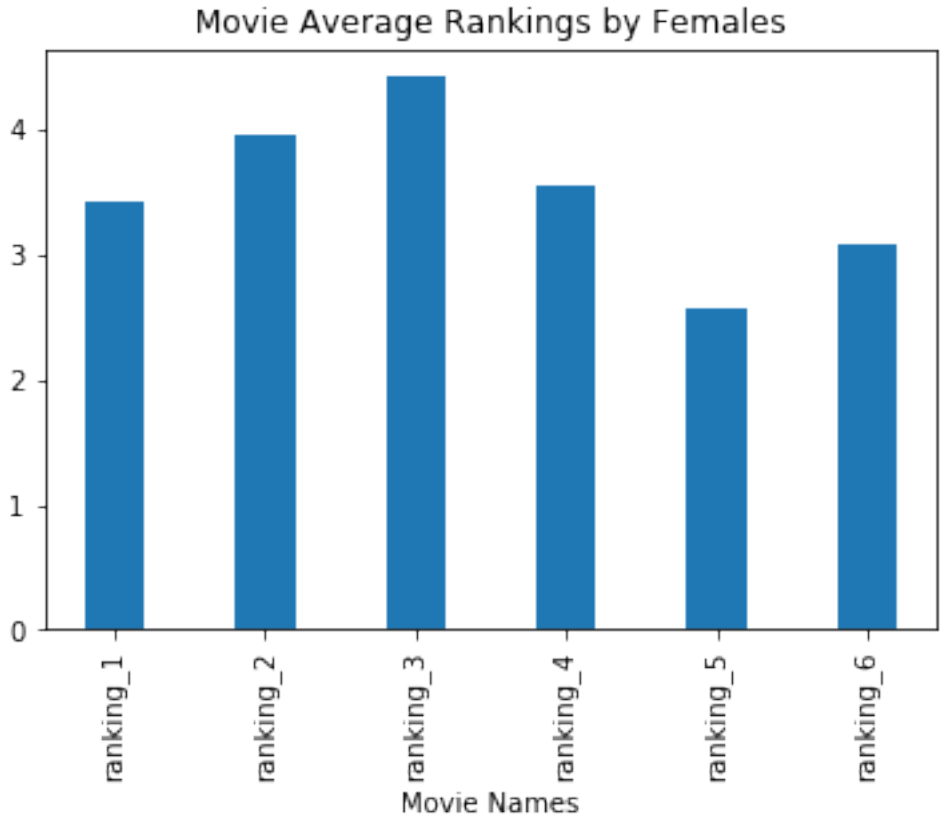

## 17 Plot Average Movie Rankings by Females

```
In [21]: print(females[cols].mean())
```

```
ranking_1    3.429293
ranking_2    3.954660
ranking_3    4.418136
ranking_4    3.544081
ranking_5    2.569270
ranking_6    3.078086
dtype: float64
```

```
In [22]: fig, ax = plt.subplots()
         ax.bar(range(1,7), females[cols].mean(), 0.40, align="center")
         ax.set_xticks(range(1,7))
         ax.set_xticklabels(cols, rotation=90)
         ax.set_xlabel("Movie Names")
         ax.set_title("Movie Average Rankings by Females")
```

```
Out[22]: Text(0.5,1,'Movie Average Rankings by Females')
```




## 17.1 Finding the Characters' Preference Pattern

```
In [23]: print(star_wars['Please state whether you view the following characters favorably, uni

['Very favorably' nan 'Somewhat favorably'
 'Neither favorably nor unfavorably (neutral)' 'Somewhat unfavorably'
 'Unfamiliar (N/A)' 'Very unfavorably']
```

## 17.2 Providing Character Rating Column Names

```
In [24]: cols = star_wars.columns.values
         for i in range(15,29):
             cols[i] = "character_" + str(i-14)
         star_wars.columns = cols
         print(star_wars.columns[15:29])
         print(star_wars['character_5'].unique())

Index(['character_1', 'character_2', 'character_3', 'character_4',
       'character_5', 'character_6', 'character_7', 'character_8',
```

```
       'character_9', 'character_10', 'character_11', 'character_12',
       'character_13', 'character_14'],
      dtype='object')
['Very favorably' nan 'Somewhat favorably' 'Very unfavorably'
 'Neither favorably nor unfavorably (neutral)' 'Somewhat unfavorably'
 'Unfamiliar (N/A)']
```

### 17.3 Filtering the Character Rating Column Responses

```
In [25]: cols = star_wars.columns[15:29].values
         for col in cols:
             star_wars[col] = star_wars[~star_wars[col].isin(['Unfamiliar (N/A)'])][col]
             star_wars = star_wars.dropna(subset=[col])
```

### 17.4 Setup the Voting Index based on the Character Ranking

```
In [26]: # Assigning voting map based on the level of likes/dislikes
         char_map = {
             'Very favorably': 2,
             'Somewhat favorably': 1,
             'Neither favorably nor unfavorably (neutral)': 0,
             'Somewhat unfavorably': -1,
             'Very unfavorably': -2,
         }

         for i in star_wars.columns[15:29]:
             star_wars[i] = star_wars[i].map(char_map)
         star_wars.iloc[:,15:29].head()
```

Out[26]:

| | character_1 | character_2 | character_3 | character_4 | character_5 | \ |
|---|---|---|---|---|---|---|
| 4 | 2 | 2 | 2 | 2 | 2 | |
| 5 | 2 | 1 | 1 | -1 | 2 | |
| 6 | 2 | 2 | 2 | 2 | 2 | |
| 7 | 2 | 2 | 1 | 1 | 2 | |
| 8 | 2 | 1 | 2 | 0 | 2 | |

| | character_6 | character_7 | character_8 | character_9 | character_10 | \ |
|---|---|---|---|---|---|---|
| 4 | 1 | 2 | 1 | -1 | 2 | |
| 5 | -2 | 1 | 0 | 2 | 1 | |
| 6 | 0 | 2 | 0 | 1 | 1 | |
| 7 | 2 | 2 | 2 | 2 | 1 | |
| 8 | -2 | -1 | 0 | 1 | 1 | |

| | character_11 | character_12 | character_13 | character_14 |
|---|---|---|---|---|
| 4 | 2 | 2 | 2 | 2 |
| 5 | 1 | -2 | 1 | 1 |
| 6 | 1 | 1 | 0 | 2 |

```
7             2            -1              1             2
8             1            -2             -1             2
```

### 17.5 Segregatting Respondents Voting Preferences

```
In [27]: for i in range(2):
             for col in cols:
                 if i == 0:
                     star_wars[col + str("_likes")] = star_wars[star_wars[col] > 0][col]
                 else:
                     star_wars[col + str("_dislikes")] = star_wars[star_wars[col] <= 0][col]

         print(star_wars.columns[38:68])
```

```
Index(['character_1_likes', 'character_2_likes', 'character_3_likes',
       'character_4_likes', 'character_5_likes', 'character_6_likes',
       'character_7_likes', 'character_8_likes', 'character_9_likes',
       'character_10_likes', 'character_11_likes', 'character_12_likes',
       'character_13_likes', 'character_14_likes', 'character_1_dislikes',
       'character_2_dislikes', 'character_3_dislikes', 'character_4_dislikes',
       'character_5_dislikes', 'character_6_dislikes', 'character_7_dislikes',
       'character_8_dislikes', 'character_9_dislikes', 'character_10_dislikes',
       'character_11_dislikes', 'character_12_dislikes',
       'character_13_dislikes', 'character_14_dislikes'],
      dtype='object')
```

### 17.6 Respondents "Like" Response for Characters

```
In [28]: print(star_wars.iloc[:,38:52].sum().sort_values(ascending=False))
```

```
character_1_likes     872.0
character_5_likes     860.0
character_14_likes    856.0
character_2_likes     831.0
character_3_likes     821.0
character_11_likes    806.0
character_10_likes    730.0
character_7_likes     557.0
character_4_likes     509.0
character_13_likes    383.0
character_8_likes     380.0
character_9_likes     350.0
character_6_likes     311.0
character_12_likes    235.0
dtype: float64
```

### 17.7 Respondents "Dislike" Response for Characters

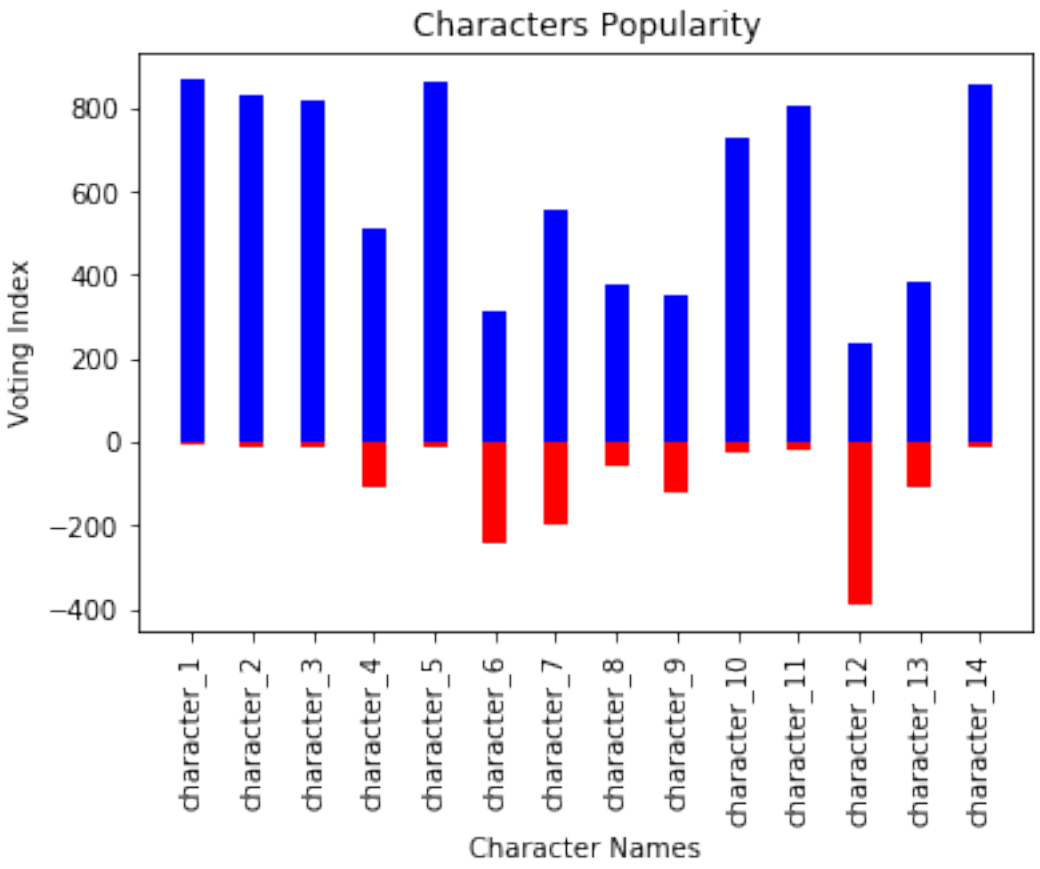
```
In [29]: print(star_wars.iloc[:,52:69].sum().sort_values())
```

```
character_12_dislikes   -392.0
character_6_dislikes    -241.0
character_7_dislikes    -199.0
character_9_dislikes    -122.0
character_4_dislikes    -110.0
character_13_dislikes   -106.0
character_8_dislikes     -56.0
character_10_dislikes    -26.0
character_11_dislikes    -17.0
character_5_dislikes     -16.0
character_14_dislikes    -16.0
character_3_dislikes     -14.0
character_2_dislikes     -12.0
character_1_dislikes      -8.0
dtype: float64
```

### 17.8 Plot of Respondents' Character Preference Pattern

```
In [30]: col_like = star_wars.columns[38:52].values
         col_dislike = star_wars.columns[52:69].values
         char_names = star_wars.columns[15:29].values
         bar_height_like = star_wars[col_like].sum()
         bar_height_dislike = star_wars[col_dislike].sum()

         fig, ax = plt.subplots()
         ax.bar(range(1,15), bar_height_like, 0.40, align="center", color="blue")
         ax.bar(range(1,15), bar_height_dislike, 0.40, align="center", color='red')
         ax.set_xticks(range(1,15))
         ax.set_xticklabels(char_names, rotation=90)
         ax.set_xlabel("Character Names")
         ax.set_ylabel("Voting Index")
         ax.set_title("Characters Popularity")
         plt.show()
```




### 17.9 Male Respondents' "Like" Response for Characters

```
In [31]: col_like = list(star_wars.columns[38:52])
         male_char_like = star_wars[star_wars["Gender"] == "Male"][col_like]
         print(male_char_like.sum().sort_values(ascending=False))
```

```
character_1_likes     507.0
character_5_likes     494.0
character_2_likes     480.0
character_14_likes    478.0
character_3_likes     470.0
character_11_likes    434.0
character_10_likes    383.0
character_7_likes     348.0
character_4_likes     270.0
character_9_likes     226.0
character_8_likes     226.0
character_13_likes    217.0
character_6_likes     201.0
character_12_likes    111.0
```

```
dtype: float64
```

### 17.10 Male Respondents' "Dislike" Response for Characters

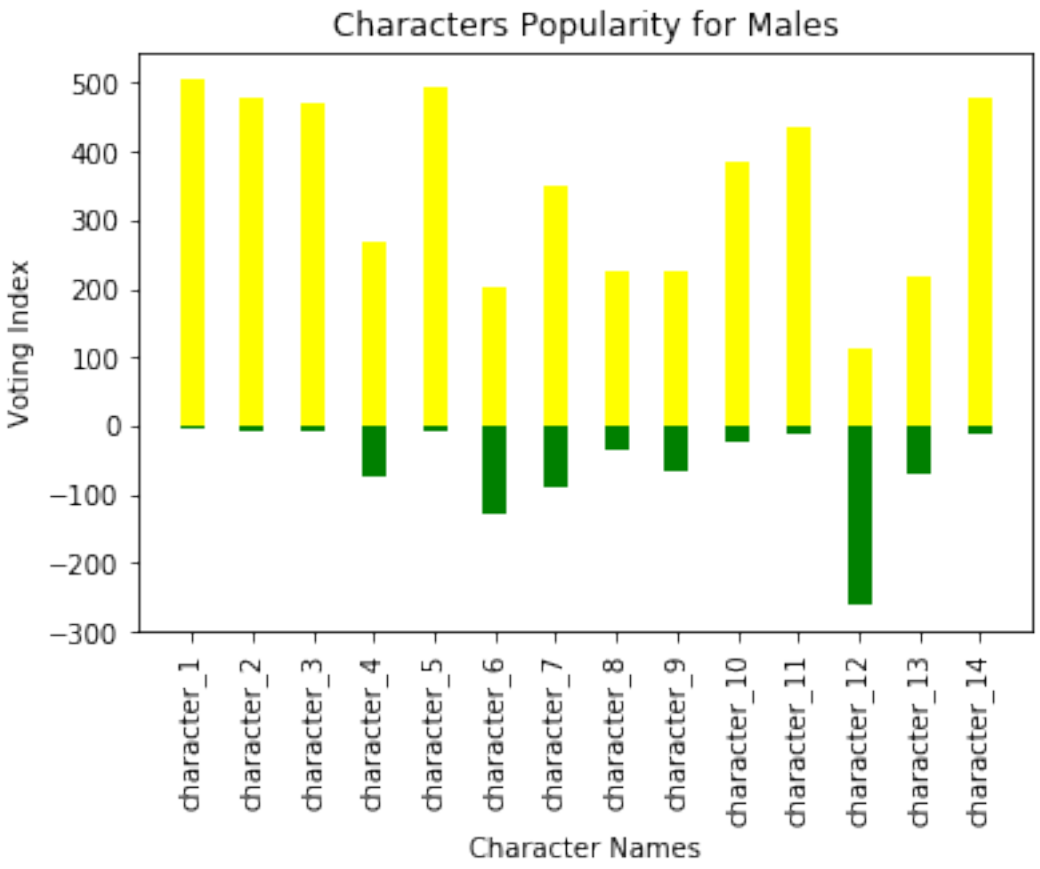
```
In [32]: col_dislike = list(star_wars.columns[52:69])
         male_char_dislike = star_wars[star_wars["Gender"] == "Male"][col_dislike]
         print(male_char_dislike.sum().sort_values())
```

```
character_12_dislikes   -262.0
character_6_dislikes    -129.0
character_7_dislikes     -90.0
character_4_dislikes     -74.0
character_13_dislikes    -69.0
character_9_dislikes     -66.0
character_8_dislikes     -36.0
character_10_dislikes    -22.0
character_11_dislikes    -13.0
character_14_dislikes    -12.0
character_5_dislikes      -9.0
character_2_dislikes      -7.0
character_3_dislikes      -7.0
character_1_dislikes      -6.0
dtype: float64
```

### 17.11 Plot of Male Respondents' Character Preference Pattern

```
In [33]: bar_height_like = male_char_like.sum()
         bar_height_dislike = male_char_dislike.sum()

         fig, ax = plt.subplots()
         ax.bar(range(1,15), bar_height_like, 0.40, align="center", color="yellow")
         ax.bar(range(1,15), bar_height_dislike, 0.40, align="center", color='green')
         ax.set_xticks(range(1,15))
         ax.set_xticklabels(char_names, rotation=90)
         ax.set_xlabel("Character Names")
         ax.set_ylabel("Voting Index")
         ax.set_title("Characters Popularity for Males")
         plt.show()
```




### 17.11.1 Female Respondents' "Like" Response for Characters

```
In [34]: col_like = list(star_wars.columns[38:52])
         female_char_like = star_wars[star_wars["Gender"] == "Female"][col_like]
         print(female_char_like.sum().sort_values(ascending=False))
```

```
character_14_likes    364.0
character_11_likes    358.0
character_5_likes     352.0
character_1_likes     351.0
character_2_likes     338.0
character_3_likes     337.0
character_10_likes    333.0
character_4_likes     224.0
character_7_likes     200.0
character_13_likes    156.0
character_8_likes     147.0
character_12_likes    119.0
character_9_likes     115.0
character_6_likes     100.0
```

```
dtype: float64
```

### 17.11.2 Female Respondents' "Dislike" Response for Characters

```
In [35]: col_dislike = list(star_wars.columns[52:69])
         female_char_dislike = star_wars[star_wars["Gender"] == "Female"][col_dislike]
         print(female_char_dislike.sum().sort_values())
```

```
character_12_dislikes   -125.0
character_6_dislikes    -110.0
character_7_dislikes    -105.0
character_9_dislikes     -55.0
character_4_dislikes     -36.0
character_13_dislikes    -36.0
character_8_dislikes     -20.0
character_3_dislikes      -6.0
character_5_dislikes      -6.0
character_2_dislikes      -4.0
character_14_dislikes     -4.0
character_10_dislikes     -3.0
character_11_dislikes     -3.0
character_1_dislikes      -1.0
dtype: float64
```

### 17.11.3 Plot of Female Respondents' Character Preference Pattern

```
In [36]: bar_height_like = female_char_like.sum()
         bar_height_dislike = female_char_dislike.sum()

         fig, ax = plt.subplots()
         ax.bar(range(1,15), bar_height_like, 0.40, align="center", color="black")
         ax.bar(range(1,15), bar_height_dislike, 0.40, align="center", color='grey')
         ax.set_xticks(range(1,15))
         ax.set_xticklabels(char_names, rotation=90)
         ax.set_xlabel("Character Names")
         ax.set_ylabel("Voting Index")
         ax.set_title("Characters Popularity for Females")
         plt.show()
```