Project 1 - A Star Wars Story

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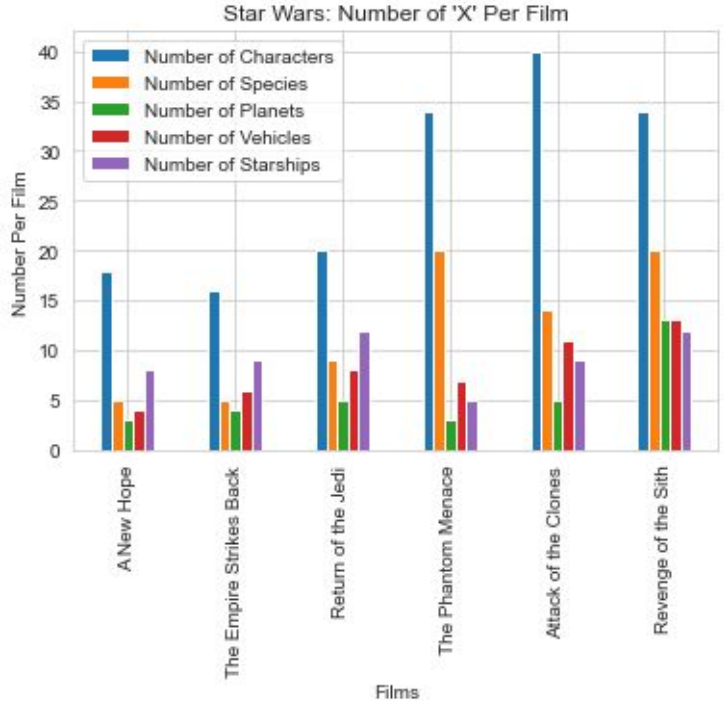
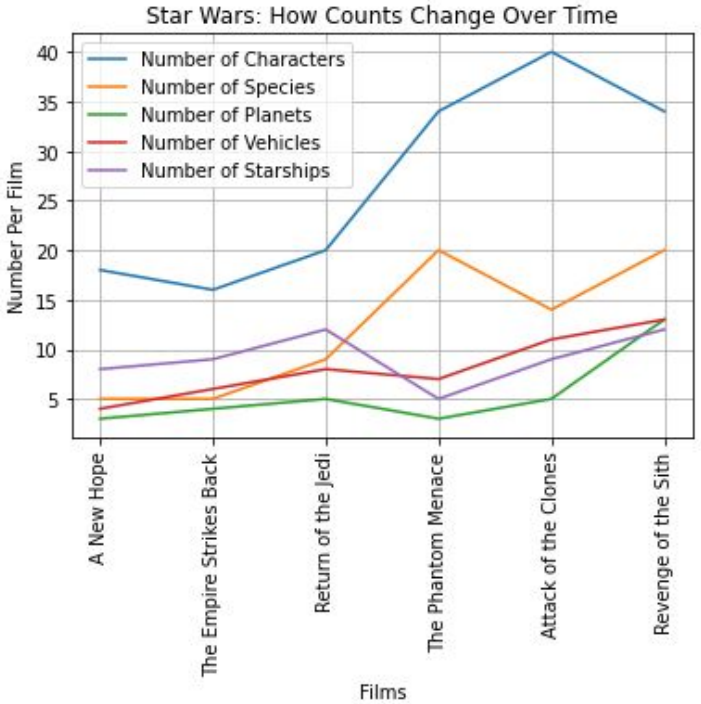
Disclaimer: Data covers only the first 6 Star Wars films.

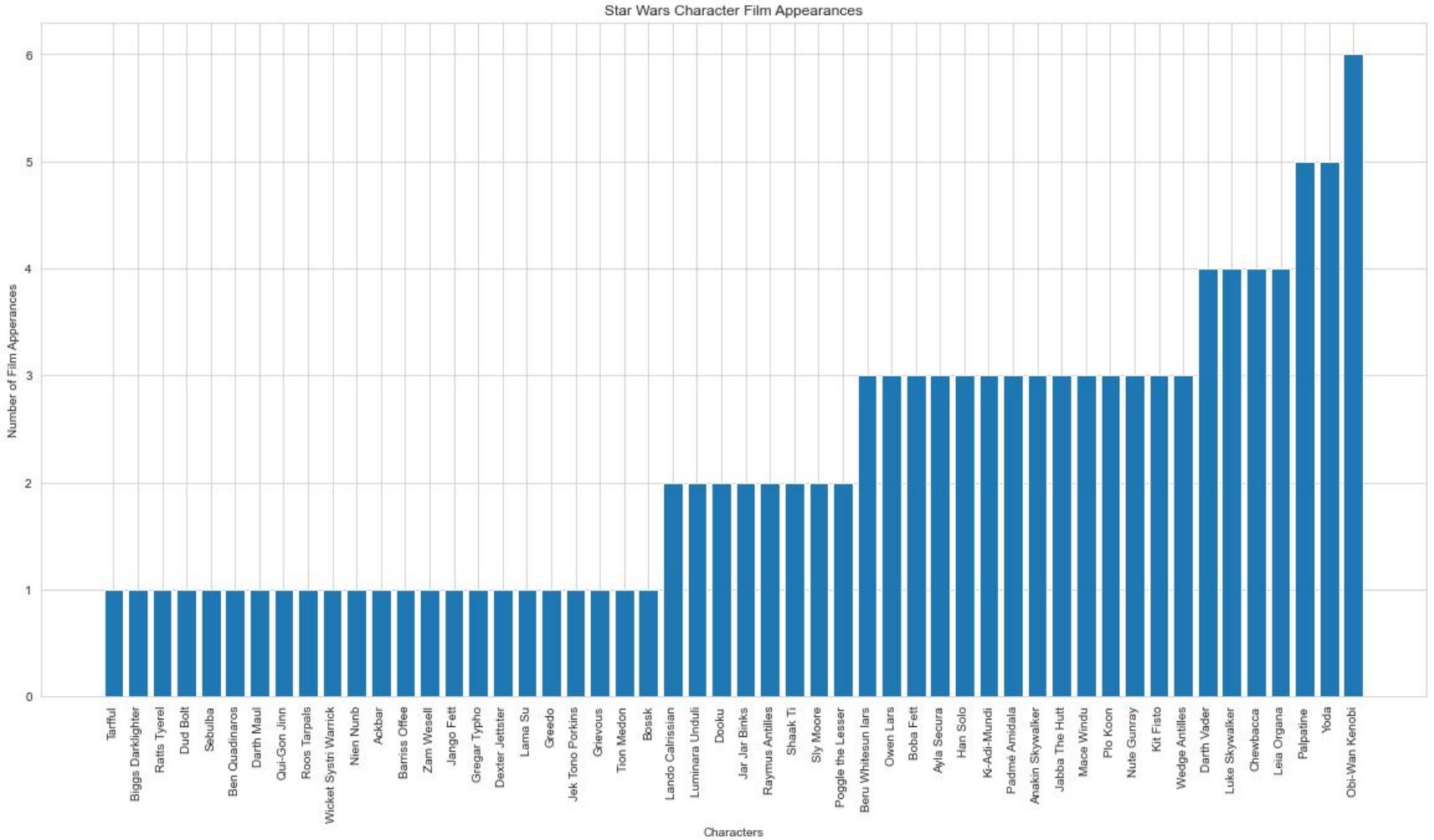
Project Description / Outline

- Utilizing the Star Wars API from the class activities (SWAPI)
- Determine & visualize the number of characters, species, vehicles, starships, and planets per film and how they changed over time
- Compare the length and maximum atmosphering speed of vehicles
- Compare starship prices and extrapolate Death Star price
- Compare actual cost of Death Star to planets in our solar system
- Determine the Smallest Character and how many it would take to match the length of the Longest Starship
- Compare the mass of characters with and without Jabba and visualize in different ways, compare the statistical results

	Title	Episode ID	Release Date	Characters/Film	Species/Film	Planets/Film	Vehicles/Film	Starships/Film
0	A New Hope	4	1977-05-25	18	5	3	4	8
1	The Empire Strikes Back	5	1980-05-17	16	5	4	6	9
2	Return of the Jedi	6	1983-05-25	20	9	5	8	12
3	The Phantom Menace	1	1999-05-19	34	20	3	7	5
4	Attack of the Clones	2	2002-05-16	40	14	5	11	9
5	Revenge of the Sith	3	2005-05-19	34	20	13	13	12

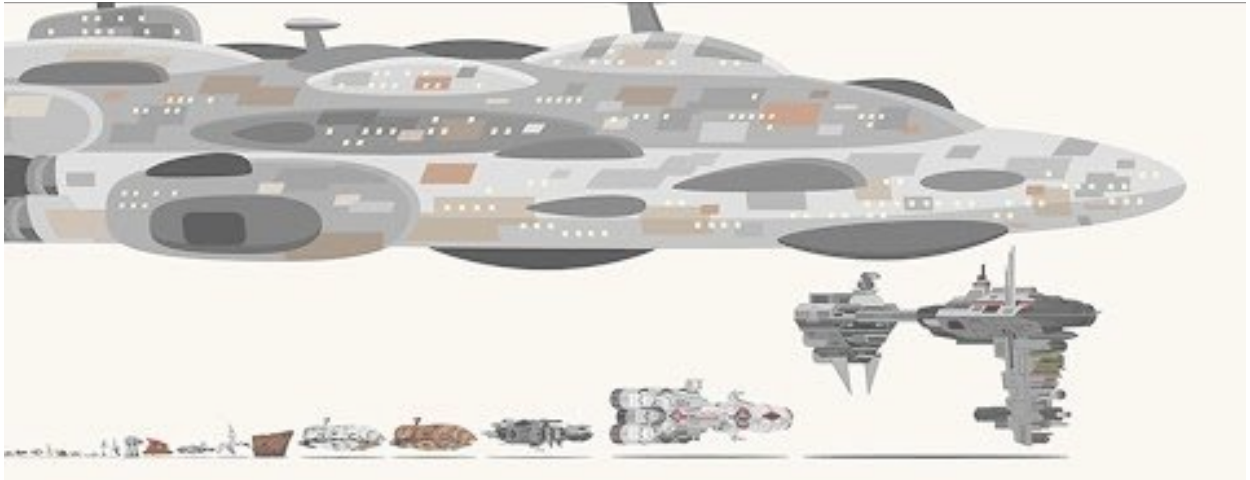





Star Wars Character Film Appearances
Number of Film Apperances
0
1
2
3
4
5
6
Characters
Tarfful
Biggs Darklighter
Ratts Tyerel
Dud Bolt
Sebulba
Ben Quadinaros
Darth Maul
Qui-Gon Jinn
Roos Tarpals
Wicket Systri Warrick
Nien Nunb
Ackbar
Barriss Offee
Zam Wesell
Jango Fett
Gregar Typho
Dexter Jettster
Lama Su
Greedo
Jek Tono Porkins
Grievous
Tion Medon
Bossk
Lando Calrissian
Luminara Unduli
Dooku
Jar Jar Binks
Raymus Antilles
Shaak Ti
Sly Moore
Poggle the Lesser
Beru Whitesun lars
Owen Lars
Boba Fett
Ayla Secura
Han Solo
Ki-Adi-Mundi
Padme Amidala
Anakin Skywalker
Jabba The Hutt
Mace Windu
Plo Koon
Nute Gunray
Kit Fisto
Wedge Antilles
Darth Vader
Luke Skywalker
Chewbacca
Leia Organa
Palpatine
Yoda
Obi-Wan Kenobi

Vehicles... transports of the galaxy

There are 39 vehicles in this API.



```
Sand Crawler found!
T-16 skyhopper found!
X-34 landspeeder found!
TIE/LN starfighter found!
Snowspeeder found!
TIE bomber found!
AT-AT found!
AT-ST found!
Storm IV Twin-Pod cloud car found!
Sail barge found!
Bantha-II cargo skiff found!
TIE/IN interceptor found!
Imperial Speeder Bike found!
Vulture Droid found!
Multi-Troop Transport found!
Armored Assault Tank found!
Single Trooper Aerial Platform found!
C-9979 landing craft found!
Tribubble bongo found!
Sith speeder found!
Zephyr-G swoop bike found!
Koro-2 Exodrive airspeeder found!
XJ-6 airspeeder found!
LAAT/i found!
LAAT/c found!
AT-TE found!
SPHA found!
Flitknot speeder found!
Neimoidian shuttle found!
Geonosian starfighter found!
Tsmeu-6 personal wheel bike found!
Emergency Firespeeder found!
Droid tri-fighter found!
Oevvaor jet catamaran found!
Raddaugh Gnasp fluttercraft found!
Clone turbo tank found!
Corporate Alliance tank droid found!
Droid gunship found!
AT-RT found!
```

Vehicles... transports of the galaxy (Introduction)

- Collect vehicle length (m)
- Clean out unknowns and outliers
- Sort vehicle length in ascending order & on a bar graph (*Figure A*)

- Collect vehicle max atmosphering speed (km/hr)
- Clean and sort speed in ascending order & on a bar graph (*Figure B*)

- Compare vehicle length and speed on a scatter plot (*Figure C*)
- Calculate regression line and coefficient of determination (r-squared)

Vehicles... transports of the galaxy

The shortest vehicle is Sith speeder (1.50m)

The longest vehicle is C-9979 landing craft (210m)

Clear outliers... (*C-9979 landing craft & SPHA*)

The longest vehicle is Clone turbo tank (49.40m)

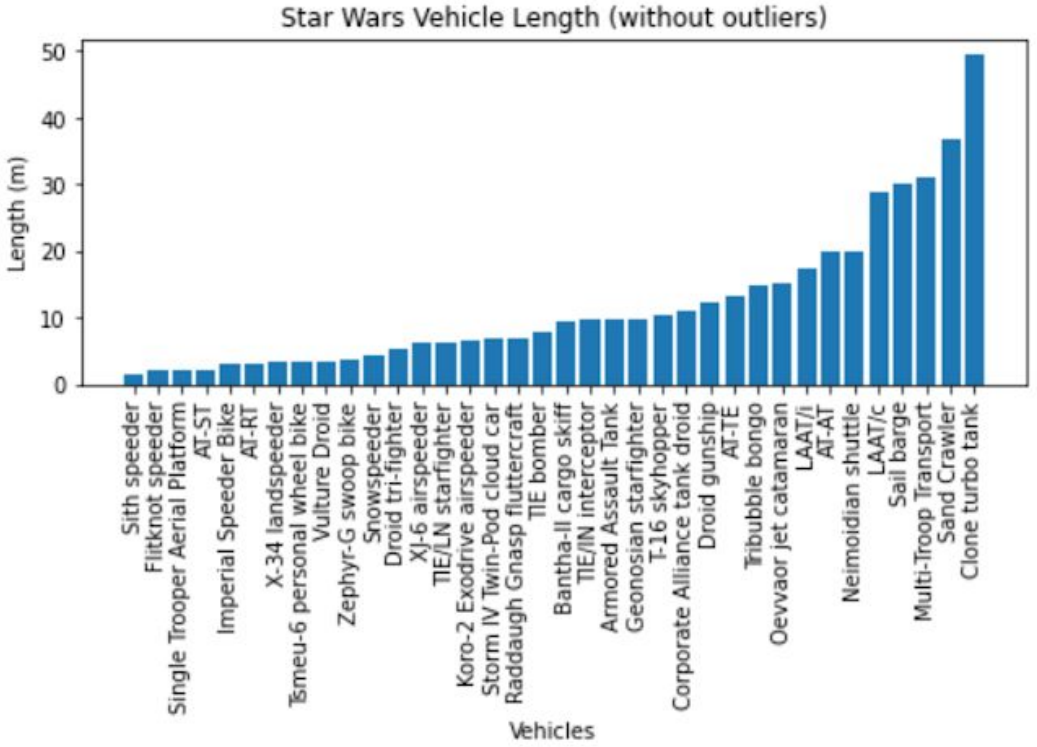


Figure A. Vehicle Length

Vehicles... transports of the galaxy

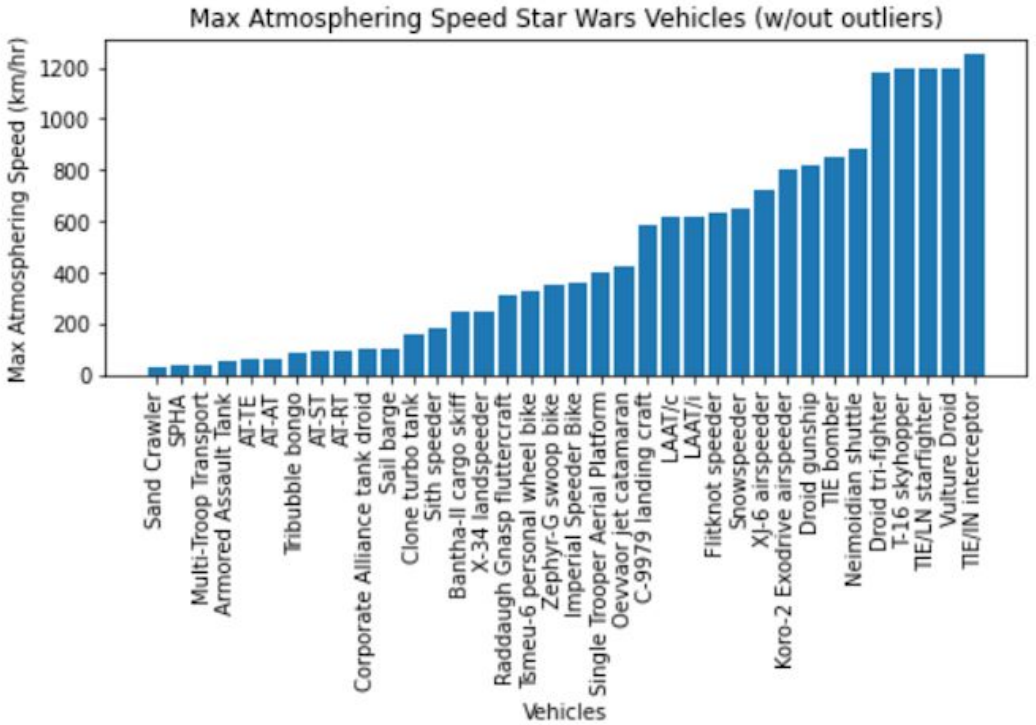


Figure B. Vehicle Max Atmosphering Speed

The slowest vehicle is Sand Crawler (30.0 km/hr)

The fastest vehicle is TIE/IN interceptor (1250.0 km/hr)

Clear outliers... (*Geonosian starfighter & Storm IV Twin-Pod cloud car*)

The fastest vehicle is Geonosian starfighter (20,000 km/hr)

Vehicles... transports of the galaxy

- Coefficient of determination: the adjusted R-squared value is around 5.28%
- Regression line y = -8.28x + 569.5

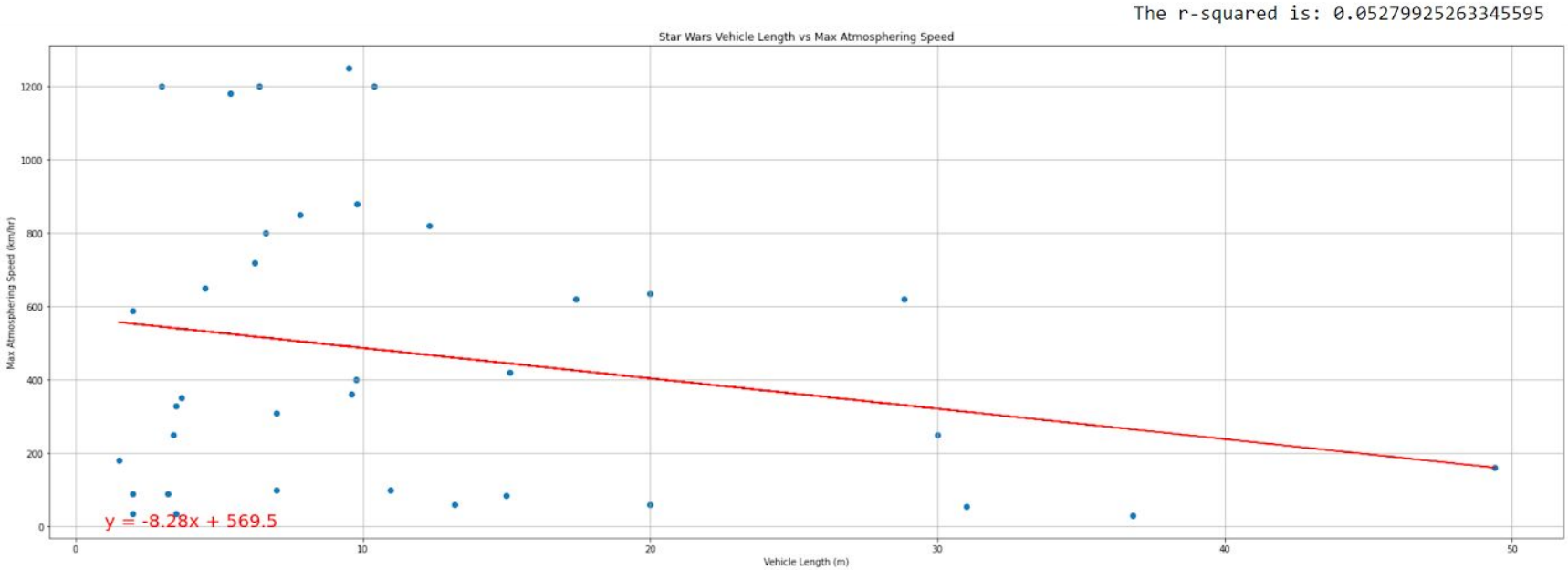
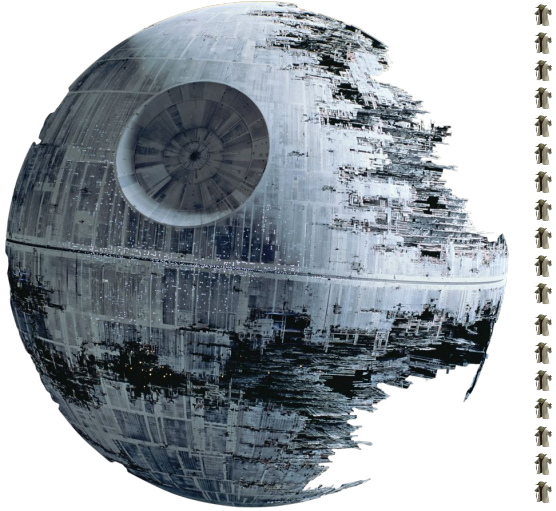


Figure C. Vehicle Length vs. Max Atmosphering Speed

Vehicles... transports of the galaxy

- The average length of a Star Wars vehicle is 11.88 m.
- The average maximum atmosphering speed of a Star Wars vehicle is 471.14 km/hr.
- The average length of a Star Wars vehicle vs. the average speed is 25.22/hr.
- There’s a low correlation between length of the vehicle and max atmosphering speed, but a slight trend

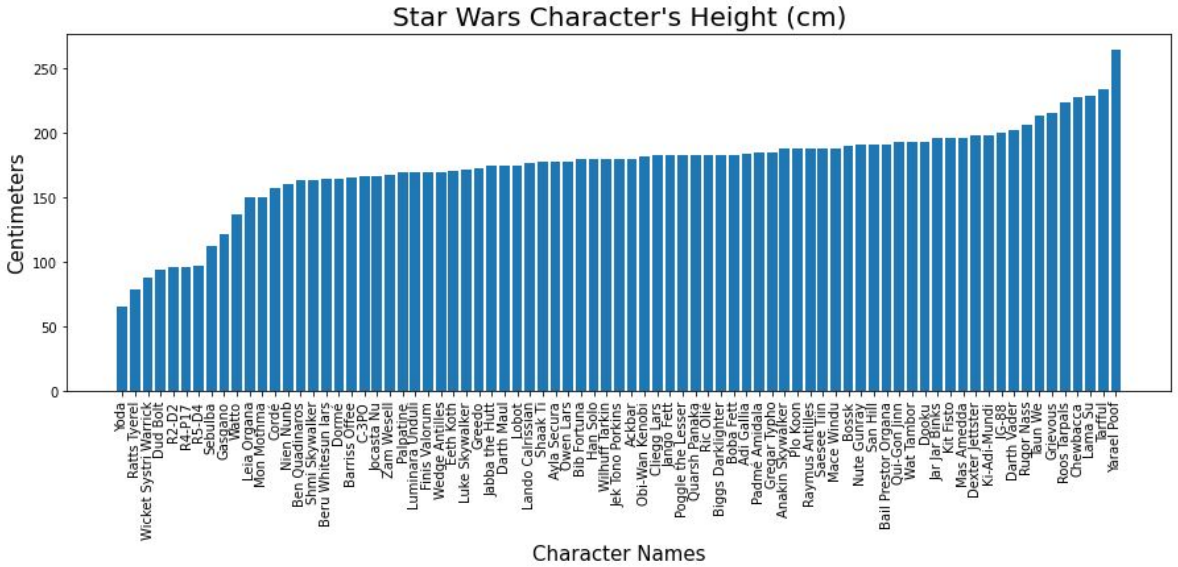
Yoda vs Death Star (Introduction)



- List the order of Characters from shortest to tallest
- List the order of Starships from smallest to longest
- Determine any unexpected results from the data
- Determine the Smallest Character and determine how many it would take to match the length of the Longest Starship

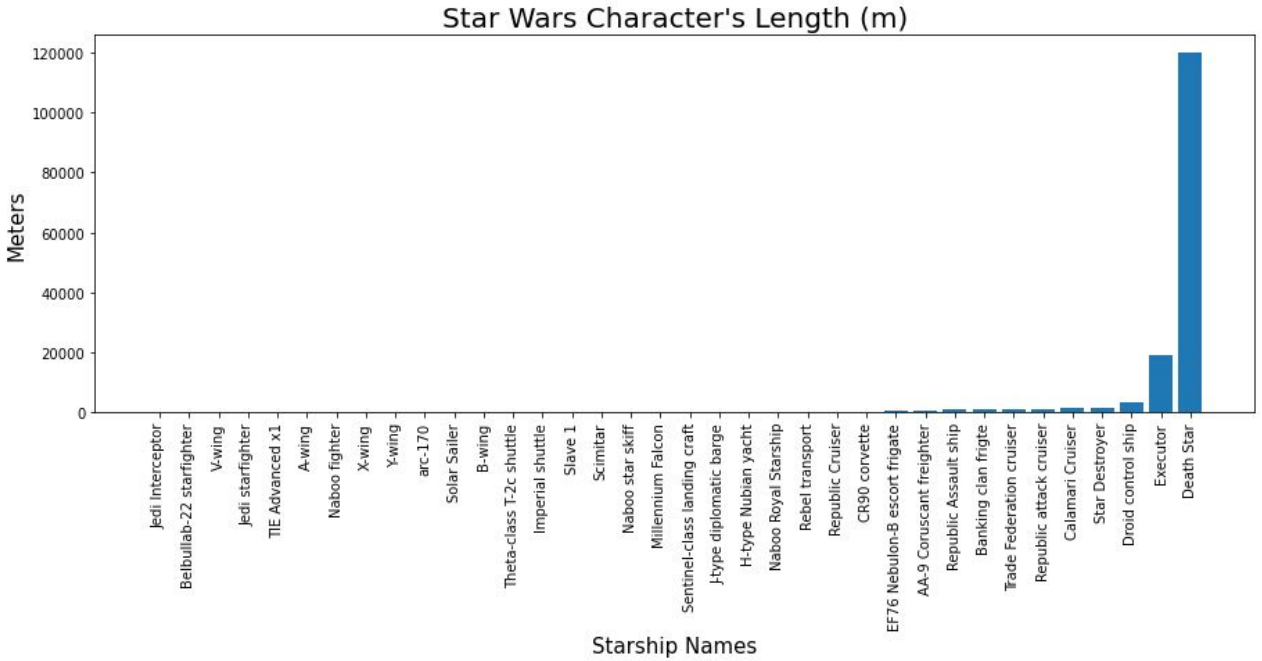
Yoda vs Death Star (Character Heights)

The Shortest Character in the Star Wars films is Yoda



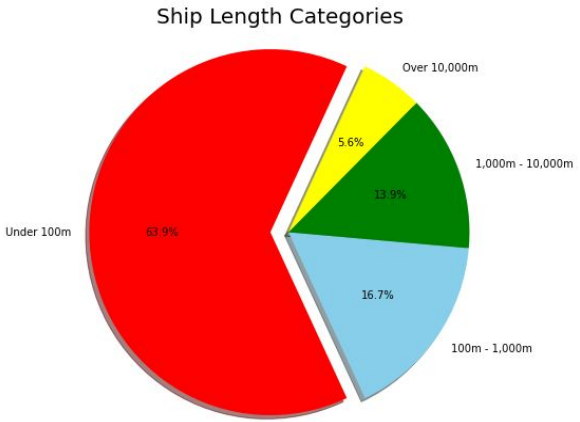
Yoda vs Death Star (Starship Lengths)

The Largest Starship in the Star Wars films is the Death Star



Yoda vs Death Star (conclusion)

- It takes just over 181,818 Yodas stacked on top of each other to be as long as a Death Star.
- Some extra data that we learned along the way are the how different starship sizes can be.
- Further took that data and categorized how often starships are built at more specific size groups and was surprised that the majority of the starships are built at under 100 m long.



Starships and Death Star (Introduction)

- Using SWAPI, estimating the price of constructing the Death Star I in Star Wars currency (Credits)
- Using the length and price of starships, creating a scatter plot (Figure A)
- From scatter plot, obtaining an linear regression equation for starship prices
- Using the equation, to extrapolate a price for one Death Star
- Finally, comparing the actual cost to the estimated cost (Figure B)

Starships and Death Star (Graphs)

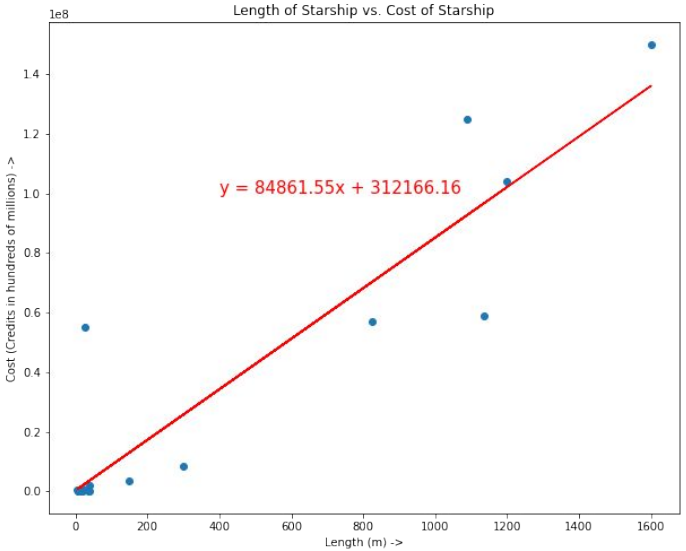


Figure A. Length vs. Cost Scatter Plot

	Actual Cost	Estimated Cost
Credits (in billions)	1000.0	10.183698

Figure B. Comparison Chart

Starships and Death Star (Conclusions)

- The actual cost of the death star is 98.2 times the estimated cost derived from the equation
- Therefore, cost per length extrapolation is not an accurate way to predict the cost of starships

Death Star and Planets (Introduction)

- Using SWAPI, estimating the real life prices of planets based on the actual cost of Death Star (USD)
- First, calculating how many Death Stars fit in each planet's diameter
- Then, using that factor to calculate the price of each planet in Star Wars currency (Credits)
- Also, obtaining an approximate conversion rate between Credits and USD
- Finally, creating a bar plot of the prices per planet (Figure C)

Death Star and Planets (Graphs)

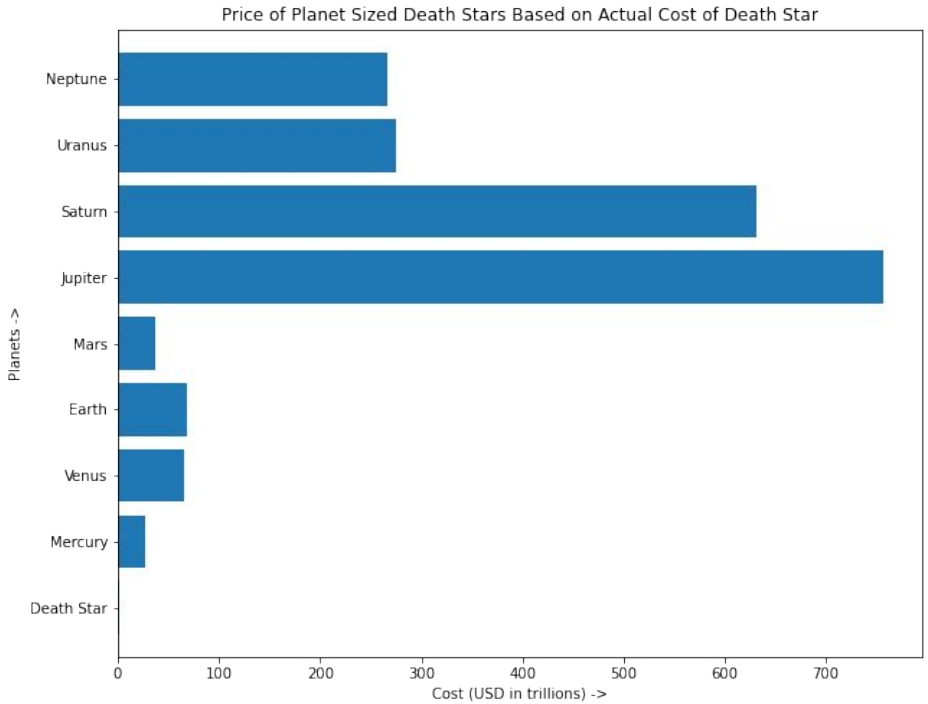
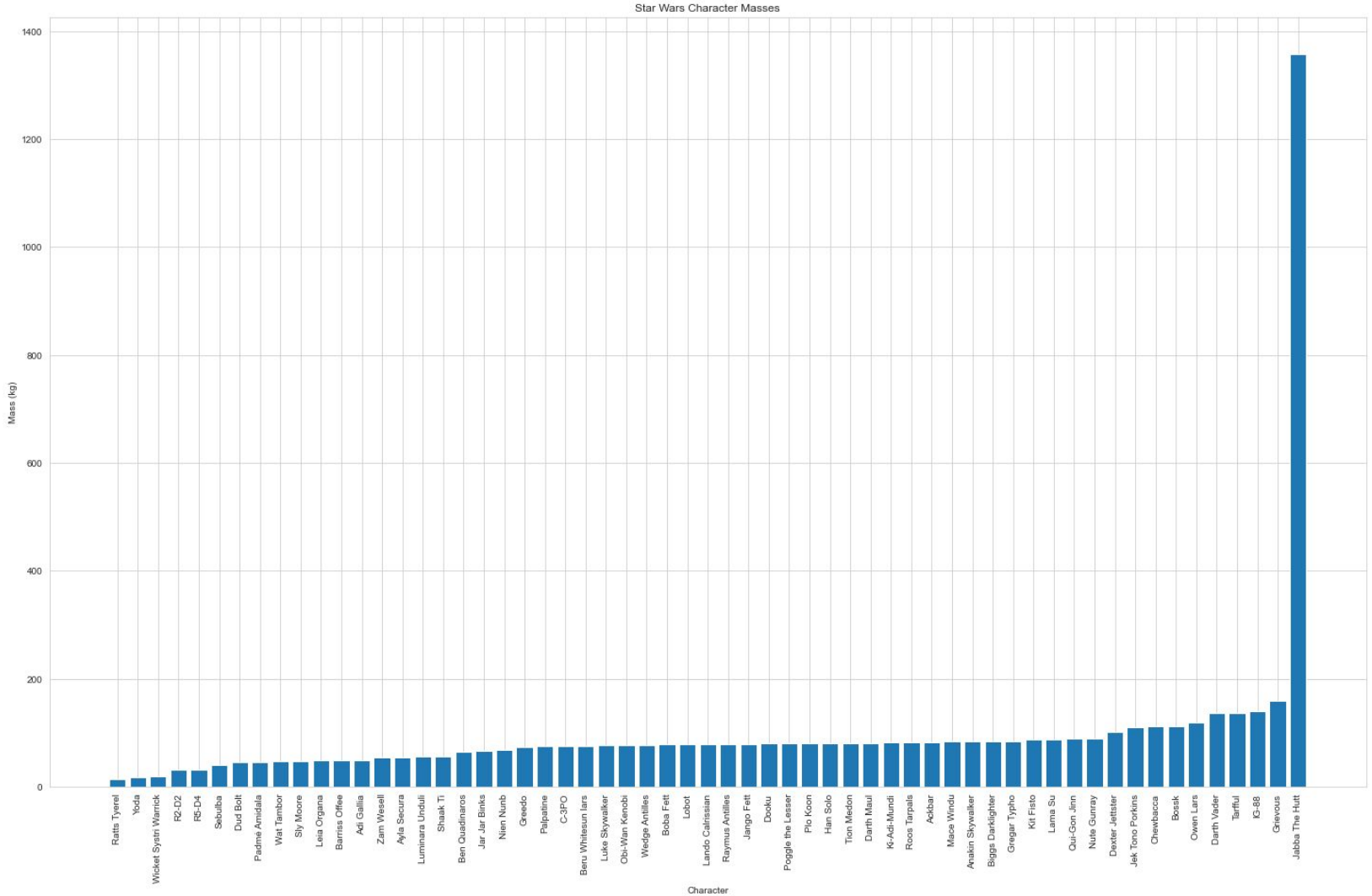
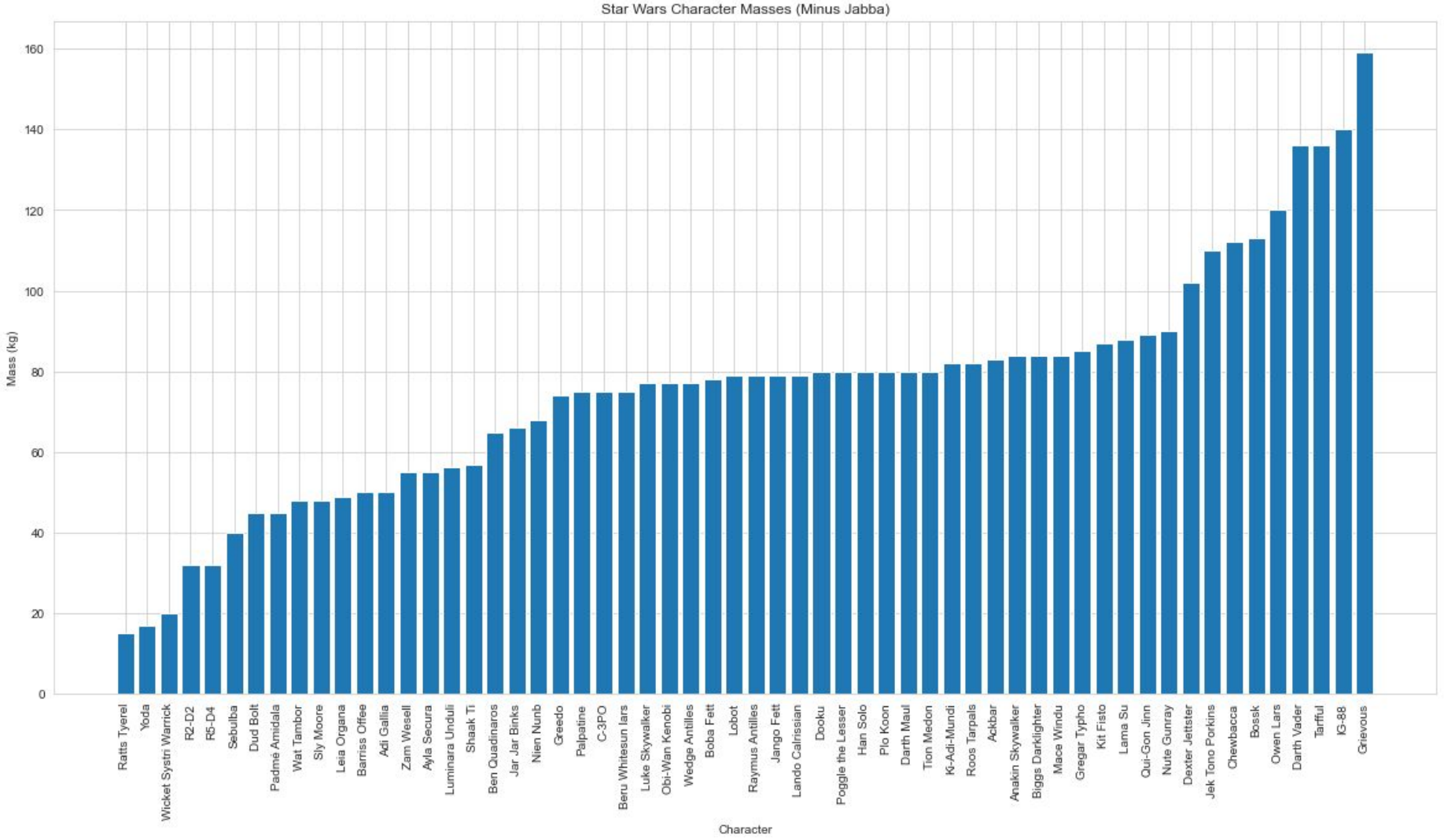


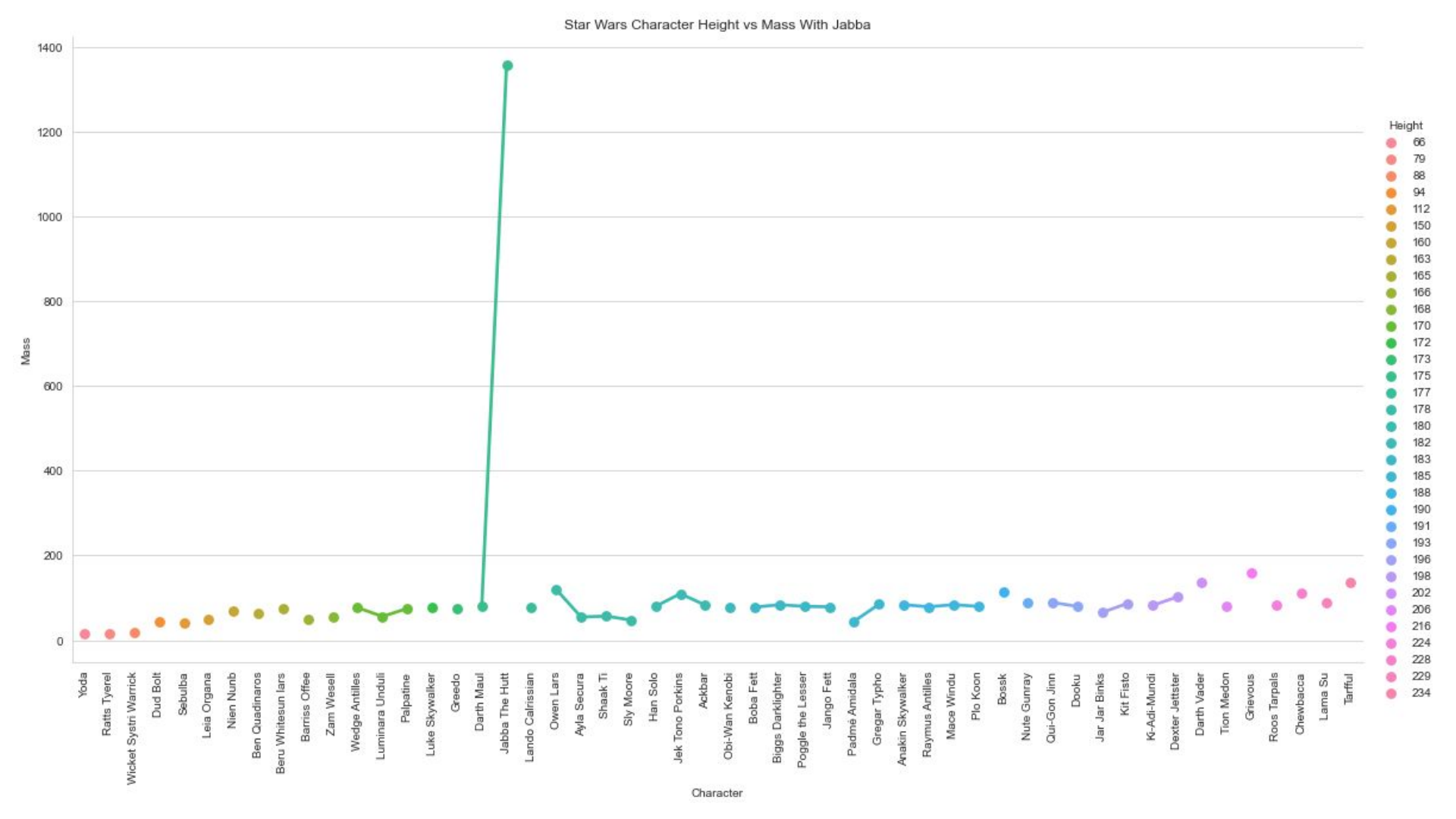
Figure C. Price of Planets Bar Graph

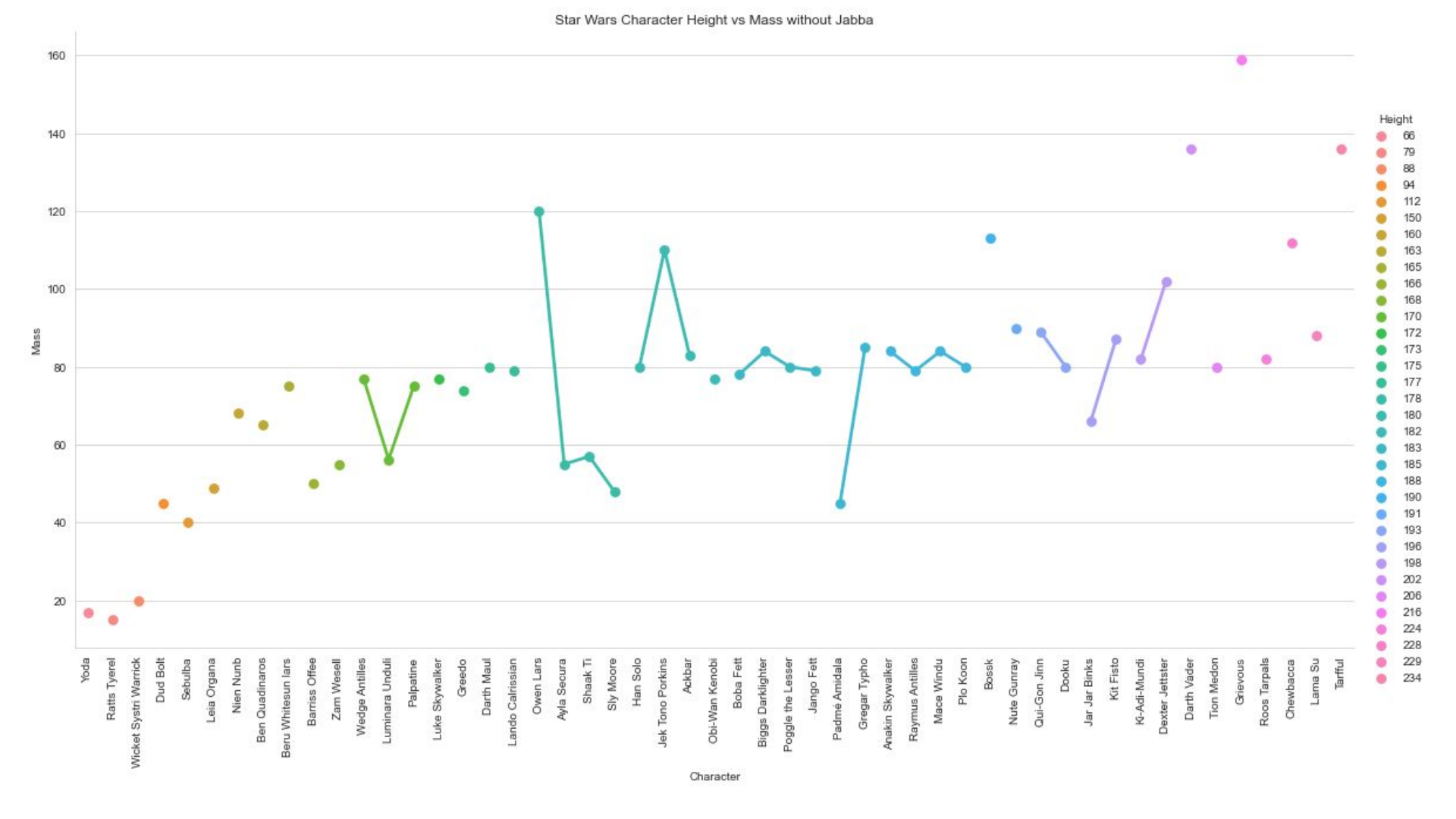
Death Star and Planets (Conclusions)

- The Death Star is smaller than the smallest planet (Mercury) by a magnitude of 10
- According to the bar graph, it might be possible (monetarily) to build an Earth-sized Death Star


Star Wars Character Masses
Mass (kg)
0
200
400
600
800
1000
1200
1400
Character
Ratts Tyerel
Yoda
Wicket Systri Warrick
R2-D2
R5-D4
Sebulba
Dud Bolt
Padmé Amidala
Wat Tambor
Sly Moore
Leia Organa
Barriss Offee
Adi Gallia
Zam Wesell
Ayla Secura
Luminara Unduli
Shaak Ti
Ben Quadinaros
Jar Jar Binks
Nien Nunb
Greedo
Palpatine
C-3PO
Beru Whitesun lars
Luke Skywalker
Obi-Wan Kenobi
Wedge Antilles
Boba Fett
Lobot
Lando Calrissian
Raymus Antilles
Jango Fett
Dooku
Poggle the Lesser
Plo Koon
Han Solo
Tion Medon
Darth Maul
Ki-Adi-Mundi
Roos Tarpals
Ackbar
Mace Windu
Anakin Skywalker
Biggs Darklighter
Gregar Typho
Kit Fisto
Lama Su
Qui-Gon Jinn
Nute Gunray
Dexter Jettster
Jek Tono Porkins
Chewbacca
Bosak
Owen Lars
Darth Vader
Tarfful
IG-88
Grievous
Jabba The Hutt


Star Wars Character Masses (Minus Jabba)
Mass (kg)
0
20
40
60
80
100
120
140
160
Character
Ratts Tyerel
Yoda
Wicket Systri Warrick
R2-D2
R5-D4
Sebulba
Dud Bolt
Padme Amidala
Wat Tambor
Sly Moore
Leia Organa
Barriss Offee
Adi Gallia
Zam Wesell
Ayla Secura
Luminara Unduli
Shaak Ti
Ben Quadinaros
Jar Jar Binks
Nien Nunb
Greedo
Palpatine
C-3PO
Beru Whitesun lars
Luke Skywalker
Obi-Wan Kenobi
Wedge Antilles
Boba Fett
Lobot
Raymus Antilles
Jango Fett
Lando Calrissian
Dooku
Poggle the Lesser
Han Solo
Plo Koon
Darth Maul
Tion Medon
Ki-Adi-Mundi
Roos Tarpals
Ackbar
Anakin Skywalker
Biggs Darklighter
Mace Windu
Gregar Typho
Kit Fisto
Lama Su
Qui-Gon Jinn
Nute Gunray
Dexter Jettster
Jek Tono Porkins
Chewbacca
Bossk
Owen Lars
Darth Vader
Tarfful
IG-88
Grievous


Star Wars Character Height vs Mass With Jabba
Mass
Character
Height
66
79
88
94
112
150
160
163
165
166
168
170
172
173
175
177
178
180
182
183
185
188
190
191
193
196
198
202
206
216
224
228
229
234
0
200
400
600
800
1000
1200
1400
Yoda
Ratts Tyerel
Wicket Systri Warrick
Dud Bolt
Sebulba
Leia Organa
Nien Nunb
Ben Quadinaros
Beru Whitesun lars
Barriss Offee
Zam Wesell
Wedge Antilles
Luminara Unduli
Palpatine
Luke Skywalker
Greedo
Darth Maul
Jabba The Hutt
Lando Calrissian
Owen Lars
Ayla Secura
Shaak Ti
Sly Moore
Han Solo
Jek Tono Porkins
Ackbar
Obi-Wan Kenobi
Boba Fett
Biggs Darklighter
Poggle the Lesser
Jango Fett
Padmé Amidala
Gregar Typho
Anakin Skywalker
Raymus Antilles
Mace Windu
Plo Koon
Bossk
Nute Gunray
Qui-Gon Jinn
Dooku
Jar Jar Binks
Kit Fisto
Ki-Adi-Mundi
Dexter Jettster
Darth Vader
Tion Medon
Grievous
Roos Tarpals
Chewbacca
Lama Su
Tarffful


Star Wars Character Height vs Mass without Jabba
Mass
Character
Height
66
79
88
94
112
150
160
163
165
166
168
170
172
173
175
177
178
180
182
183
185
188
190
191
193
196
198
202
206
216
224
228
229
234
Yoda
Ratts Tyerel
Wicket Systri Warrick
Dud Bolt
Sebulba
Leia Organa
Nien Nunb
Ben Quadinaros
Beru Whitesun lars
Barriss Offee
Zam Wesell
Wedge Antilles
Luminara Unduli
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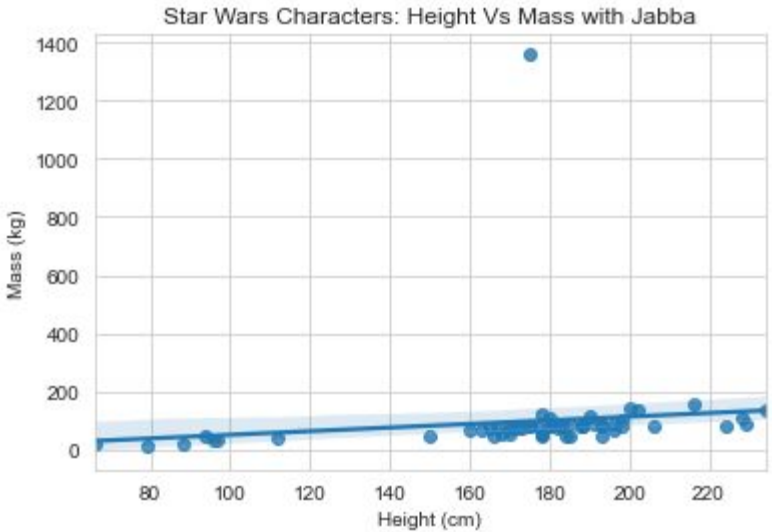
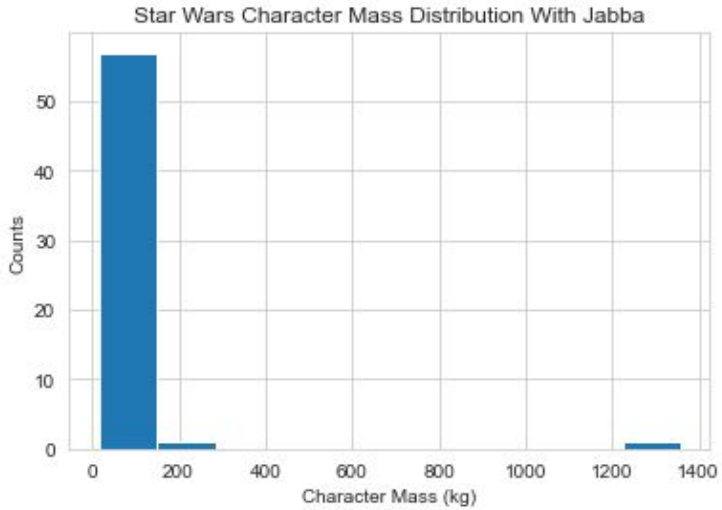
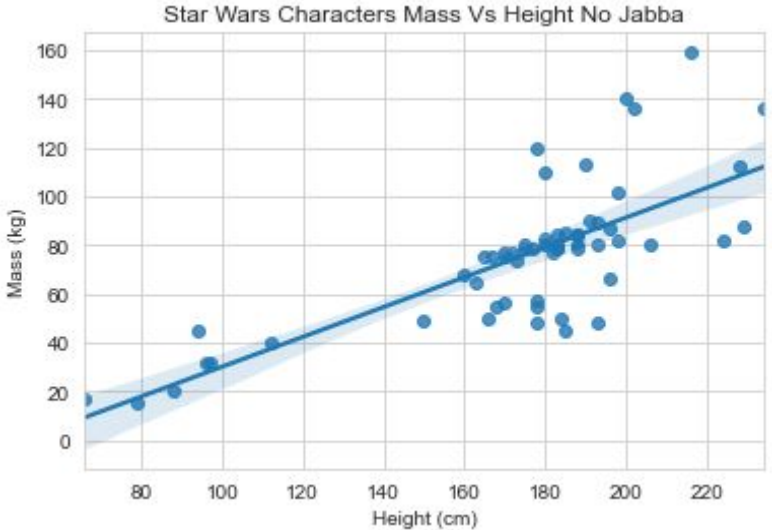
Ayla Secura
Shaak Ti
Sly Moore
Han Solo
Jek Tono Porkins
Ackbar
Obi-Wan Kenobi
Boba Fett
Biggs Darklighter
Poggle the Lesser
Jango Fett
Padmé Amidala
Gregar Typho
Anakin Skywalker
Raymus Antilles
Mace Windu
Plo Koon
Bossk
Nute Gunray
Qui-Gon Jinn
Dooku
Jar Jar Binks
Kit Fisto
Ki-Adi-Mundi
Dexter Jettster
Darth Vader
Tion Medon
Grievous
Roos Tarpals
Chewbacca
Lama Su
Tarful



With Jabba

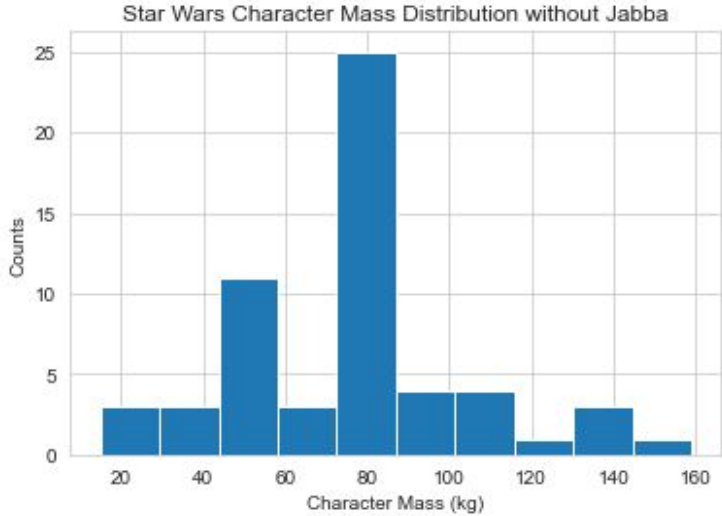
<u>Statistics:</u>
Mean: 97.3 kg
StDev: 168.0 kg
Var: 28229.0 kg
Min: 15.0 kg
Max: 1358.0 kg





Without Jabba

<u>Statistics:</u>
Mean: 75.6 kg
StDev: 29.0 kg
Var: 841.0 kg
Min: 15.0 kg
Max: 159.0 kg



References

- https://swapi.dev/api/
- https://www.quora.com/How-much-are-Republic-Credits-worth