

The background of the slide is a photograph of a roller coaster's track structure. The tracks are dark, silhouetted against a sky that transitions from a deep blue at the top to a lighter, orange-tinged glow near the horizon, suggesting a sunset or sunrise. The tracks form various loops and curves, with a prominent vertical loop in the center. The overall mood is dramatic and adventurous.

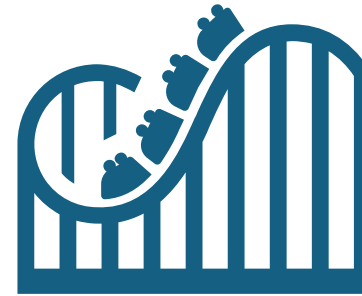
Coast to coast: the best roller coasters

Team 15600

The Problem



Most roller coaster rating systems rely on subjectivity – people's rankings – to determine the best roller coasters



Our task was to create an objective system to rate and rank roller coasters, and create a list of the top roller coasters

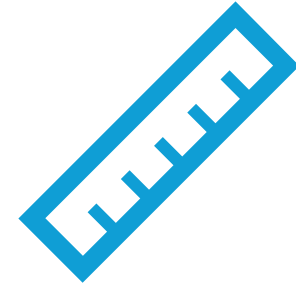
Our Algorithm



We started by determining the important numerical characteristics (height, speed, number of inversions, drop height, duration, G force, vertical angle)



Length was ignored because it would correlate with duration



Time was converted to a decimal number

Our Algorithm

- We found the average of each category and the count, excluding zeroes
- The count would be used to determine weight

135.515805	59.6774248	3149.93923		3.9702381	153.184397	0.0883102	4.29634146	74.7406593
299	296	295		168	141	222	82	91

Our Algorithm

- The height of a coaster would be divided by the average height to determine the height score for that coaster, basically how much better it is than average.
- This process was repeated for all other numerical metrics

Height score	Speed Score	Time Score	Inversions Score	Drop Score	G Force
3.3649	2.1449	0.2202	0.0000	2.7287	0.0000
3.0993	2.0108	0.2359	0.0000	2.6112	0.0000
2.3488	1.5919	1.8873	0.0000	2.0028	0.0000
3.0624	1.6757	0.2202	0.0000	2.1419	1.0474
1.4389	1.1227	1.4941	1.5112	1.1098	0.8612
2.2580	1.5416	1.6356	0.0000	1.9976	0.0000
2.7842	1.6757	0.2202	0.0000	2.1419	1.0474
2.2507	1.5081	1.4155	0.0000	1.9584	0.0000
2.2876	1.5584	1.1009	0.0000	1.9584	0.0000
1.1069	1.0054	1.4155	1.7631	0.8356	0.8845
1.2323	1.1395	1.2582	1.7631	0.9792	0.0000
1.7917	1.4159	1.9817	0.0000	1.6705	0.0000
1.9127	1.3539	1.6986	0.0000	1.4995	0.8146
1.7673	1.3221	1.8873	0.0000	1.4349	0.9310
1.2109	1.0825	1.1166	1.5112	0.9642	0.9310
1.8396	1.3958	1.4155	0.0000	1.6705	0.8845
1.8079	1.4243	1.6514	0.0000	1.6647	0.0000
1.1069	1.0892	1.5334	1.7631	0.9792	1.0474
1.7341	1.4243	1.4155	0.0000	1.6647	0.0000
2.3982	1.5919	0.0000	0.0000	2.0890	0.0000
0.5328	0.8848	1.2975	3.5262	0.6424	1.0474
1.3873	1.1730	1.1796	1.7631	1.1163	0.0000
1.4139	1.0992	0.7235	0.7556	1.1555	1.0474
1.4094	1.0992	0.7235	0.7556	1.1555	1.0474
1.7120	1.2568	1.6750	0.0000	1.3774	0.0000
1.5127	1.2400	1.1796	1.0075	1.3056	0.0000
1.2545	1.1227	1.2582	1.5112	1.0706	0.0000
1.5423	1.3405	1.2818	0.0000	1.4688	0.9310
1.6972	1.3405	1.4155	0.0000	1.4035	0.0000
1.0552	1.0054	1.3683	1.7631	0.8813	0.8845
1.5718	1.2400	1.4155	0.0000	1.3383	0.8146
1.5127	1.2568	1.4155	0.0000	1.3383	0.8146
1.0774	0.9216	1.1796	1.5112	0.7116	0.0000
1.1069	1.0557	1.4155	1.7631	0.9205	0.0000
1.8640	1.4779	0.0000	0.2519	1.7561	1.1172

Our Algorithm

- Each of these scores was multiplied by the weight (number of coasters who reported it) and then the average was taken

Weighted avg score

1.1487398
1.07554676
1.03813225
1.02348841
0.87222649
0.98352616
0.97743043
0.94668791
0.92237025
0.79143991
0.78590116
0.90271446
0.90142489
0.89557685
0.77329112
0.87792099
0.86571807
0.83828178
0.82450209
0.82105313
0.81844084
0.81808627
0.71122938
0.71049636
0.80284654
0.79433064
0.77052504
0.78955561
0.78427491
0.7806559
0.77891937
0.77189219
0.67054947
0.76614597

Our Algorithm

A horizontal bar chart with six rows. Each row consists of a text label on the left and a numerical value on the right, with a colored bar extending from the label to the value. The values are: Inverted (1.15, orange bar), Flying (1.1, blue bar), Suspended (1.05, light blue bar), Wing (1.025, pink bar), Sit Down (1, purple bar), and Stand Up (0.85, green bar).

Inverted	1.15
Flying	1.1
Suspended	1.05
Wing	1.025
Sit Down	1
Stand Up	0.85

- To consider nonnumeric data, each roller coaster type was given a multiplier based on a poll
- Using a 2014 [poll](#) from an online roller coaster forum (36 respondents, margin of error [16%](#))
- The score calculated by the previous step was multiplied by the multiplier based on the type of coaster to create a final ranking

Intended Strategy

- The intended strategy for this model was to be able to form a score regarding each category that we picked, average them, and then multiply it by a multiplier assigned to each type of roller coaster (i.e., Standing, sit down, etc.)

$$score = w \sum_{categories} \frac{v_c n_r}{\sum_{rollercoasters} v_r}$$

Our Top 10 Roller Coasters

1.	Kingda Ka	1.1487398
2.	Top Thrill Dragster	1.07554676
3.	Steel Dragon: 2000	1.03813225
4.	Superman: Escape from Krypton	1.02348841
5.	Alpengeist	1.00306046
6.	Leviathan	0.98352616
7.	Tower of Terror II	0.97743043
8.	Intimidator 305	0.94668791
9.	Millenium Force	0.92237025
10.	Montu	0.9101559