Final Report

Beyblade X combo analysis

Stock combo visualizations using pandas

Mini Project 3: Python for Data Science

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Abstract

For this project, I have chosen to use a dataset created in part using external resources and my own test data. The data I have chosen to visualize is Beyblade X stock beyblade data. This data set was created by me with some elements sourced through the internet. Weight and Height data was taken from beybladeplanner.com[2]. Data for each released Beyblade was available, except for Cobalt Drake, for which I got some weight and height data from fandom [1]. All other data was sourced on my own through testing of my own personal collection. Holes in this database for those values reflect Beyblades I do not yet own. Each row is a stock combo's data. The first three columns are each combo's parts, the fourth being the type of beyblade and the sixth being what type of Beyblade it is(Attack, Defense, Stamina, Balance). The seventh, eighth, and ninth columns are the weight, height, and width. The 10th column is solo spin time, which is the amount of time the Beyblade spun on it's own time. To test this, I did not factor in any results where the Beyblade left the stadium, as I was testing to see their overall stamina performance. Each beyblade was launched five times and the average was calculated using the total divided by five. The next four columns(11,12,13,14) were each beyblade's win-loss ratio against each type. This was done by battling each beyblade in my collection three times against each other beyblade. The data from those battles were used for both the Beyblade being tested and the opposing Beyblade. Battle results from failed launches or self-outs within the first three seconds were not counted, as this is a user error and not the Beyblade. I also timed each of these battles to get the Beyblade's average battle time, which is row fifteen. The last rows of the original dataset consist of how the victory was achieved, either through burst, pocket out, over-finish, and spin finish. This data was collected so that I would be able to tell which stock beyblade performs the best, as well as how each Beyblade performs overall.

Keywords: Beyblade, Bey A Beyblade is a spinning top that is launched into the stadium to combat another beyblade, short for Beyblade,

Contents

Introduction

My research is on Beyblade X, the newest version of Beyblade, released this year. Beyblades are spinning tops that battle in an arena, with Beyblade X introducing the "Extreme Line" in stadiums. This extreme line allows Beyblades to spin and connect with it, allowing for high-speed attacks if the Bey rotates fast enough and meets the line. The game is simple, you win if your Beyblade is still spinning in the arena and your opponent is not. In official settings, matches are determined via a point system. The points are calculated depending on how your Beyblade wins, up to four points. There are four ways to win in Beyblade X, a spin finish which is worth one point, a pocket out which is worth two points, a burst which is worth 2 points, and an extreme, AKA Over, finish which is worth three points. The winner is whoever gets four points first, which higher scoring wins are obviously more ideal.

Research questions/hypotheses

Hypothesis: The questions I am seeking to answer are questions that many who use these products have. My data aims to clear up some confusion on what affects Bey's performance and how they fair against each other. The new "Extreme Line" is leading me to believe attack-type Beyblades, would perform better than ever before and make the new generation attack dominated. I hypothesize that attack-type Beyblades will win more and gain more points than any other type. I believe other factors influence a bey's performance, but ultimately with the new stadium design, attack types will flourish. I believe that Dransword's stock combo will win the most, as its flat bit should have a slight stamina edge over the other attack type, Sharkedge. I believe heavier beys will win more battles as they should lose less momentum. I believe taller beys will lose more because they are more vulnerable to burst and have a higher center of gravity. I believe that beys with bigger widths will win more as they have a better chance to contact enemy beys. I believe the bey with the most losses will be Wizard Arrow, since it has the least defensive property in an attack-based stadium.

Research questions

- How does a Beyblade's weight, height, and width affect the Bey's chance to win?
- How much does a Beyblade's stamina matter in Beyblade X with the stadium changes that seem to favor attack types?
- Which Beyblade could be considered the "best" stock combo? Which Beyblade scores the most points? Which Beyblade scores the least points?
- Which Beyblade Wins the most?
- Which Beyblade loses the most?
- What type of Beyblade performs the worst?

Dataset

Blade	Ratchet	Bit	Type	Spin	Weight	Height	Width	Solo Spin Time	W/L Vs attack	W/L Vs defense	W/L Vs stamina	W/L Vs balance	avg. battle time	own burst opp	opp burst own	own over opp	opp over own	own out opp	opp out own	own spin opp	opp spin own
Dran Sword	3-60	Flat	Attack	Right	43.13g	35.64mm	48.25mm	(31.79 + 31.50 + 32.54 + 34.62 + 33.92) /5	0-3	6-3	3-0	3-3	(6.50 + 19.26 + 9.59 +	3	0	2	1	5	0	0	8
Wizard Arrow	4-80	Ball	Stamina	Right	40.95g	37.97mm	48.09mm	(96.54 + 107.10 +86.21 +94.99 + 96.38) /5	1-5	3-6	0-0	4-2	(6.50 + 19.26 + 9.59 +	1	5	2	1	1	7	4	0
Knight Shield	3-80	Needle	Defense	Right	41.37g	37.75mm	47.99mm	(132.35 + 132.25 + 132.64 +138.89 + 130.24) /5	3-3	3-3	2-1	2-4	(23.31 + 16.08 + 6.28 +	1	2	1	3	1	2	7	4
Hells scythe	4-60	Taper	Balance	Right	41.18g	36.15mm	47.99mm	(49.48 + 45.85 + 52.12 + 51.74 + 40.83) /5	3-3	5-4	2-1	2-1	(9.37 + 7.20 + 16.95 +	1	1	3	3	2	4	3	2
Dranzer Spiral	3-80	Taper	Balance	Right	36.57g	37.37mm	48.10mm														
Knight Lance	4-80	High Needle	Defense	Right	42.04g	38.76mm	47.44mm	(124.88 + 114.84 + 109.01 + 113.9 + 108.61) / 5	3-3	3-3	1-2	2-4	(7.82 + 15.12 + 15.37 +	2	1	0	1	1	4	6	6
Shark Edge	3-60	Low Flat	Attack	Right	42.93g	34.92mm	48.88mm	(40.64 + 33.75 + 43.40 + 38.77 + 39.96) / 5	3-0	6-3	2-1	4-2	(5.80 + 4.87 + 8.15 + 1	5	0	4	2	2	0	5	3
Viper Tail	5-80	Orb	Stamina	Right	43.85g	37.69mm	48.35mm														
Leon Claw	5-60	Point	Balance	Right	40.06g	35.59mm	48.34mm														
Rhino Horn	3-80	Spike	Defense	Right	41.07g	37.58mm	45.05mm	(84.09 + 76.26 + 80.80 + 81.50 + 73.36) / 5	0-6	3-3	2-1	3-3	(6.62 + 6.53 + 4.45 +3.(	2	4	1	2	4	2	1	5
Dran Dagger	4-60	Rush	Attack	Right	42.91g	35.92mm	47.54mm														
Hells Chain	5-60	High Taper	Balance	Right	42.02g	36.22mm	48.13mm	(60.18 + 72.28 + 46.87 + 52.93 + 75.92) /5	2-4	6-3	3-0	1-2	(20.68 + 4.78 + 5.10 + 4	1	3	1	1	5	1	5	4
Cobalt Drake	4-60	Flat	Attack	Right	46.67g	36.64mm	40.19mm														

Figure 1: original data set provided before processing

Data Analysis

The data in the graph 2 shows that the Beyblade that lost the least was Sharkedge. The bey that lost the most was Wizard Arrow. Most Beys seemed to fall into the 9-12 range, showing that so far the releases are pretty balanced.

The data in the Height vs. Total Wins/losses graph 3shows that shorter beys win the most, while taller beys lose the most. In the middle of the graph, the cut-off for how tall a bey can be and still be viable seems to be 36.22mm, reflecting that once you reach the ”taller” side, you experience more losses.

This graph 4 shows a correlation between higher width and more wins, with lower width showing fewer wins. The middle of the graph shows width doesn't seem to matter as much towards the middle of the spectrum.

The data in this graph 5 seems to correlate lower weights with more losses and higher weights with higher losses, as the blue line over red reflects higher wins than losses. The higher weights appear to win the most while the lower weights are losing the most.

This graph 6 shows which Beyblades generated the most points, colored by type. red is attack, yellow is stamina, blue is defense, and green is balance. Judging by the data, attack types seem to dominate all other types in terms of points. The only other types to even have positive points are Balance types. Stamina types generate the lowest points overall.

Using this graph 7 to see the effect the spin time I calculated has on a Beyblade, it seems the longer a Beyblade can spin, the fewer wins it gets. The graph shows the highest wins are gained on the lowest end of spin time, with a steep drop-off when going over 60 seconds and an increase in wins once passing 100 seconds.

I colored this data 8 by type, where red is attack, green is balance, blue is defense, and yellow is stamina. This data showed me that interestingly enough, defense types seem to last the longest. attack types have the lowest overall stamina out of all beys, and balance comes second to last.

The graph 9 shows that the bey with the best win-loss ratio is by far Sharkedge. This makes it the clear best beyblade as its ratio of 2.5 is more than 1 win over the

next best bey. Second place is a tie between three beys, with one being attack and two being balance. the worst win-loss being a tie between a stamina and defense type bey.

The graph Average Battle Time for Each Beyblade Type 10 shows Defense types had the longest average battle time, and balance types had the lowest. This is interesting because even though attack types had the shortest solo spin time 8

Data Visualization

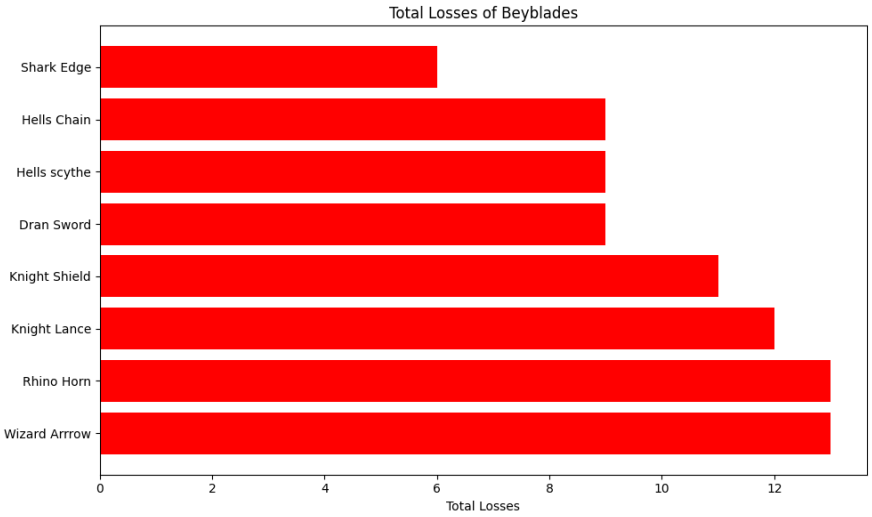

Figure 2: Total Losses of Beyblades

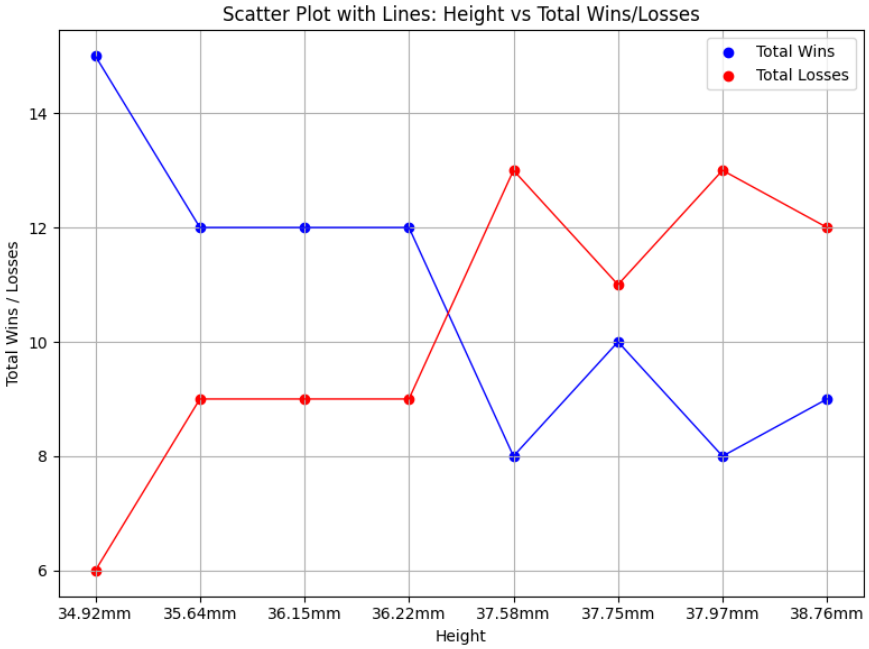

Figure 3: Height vs Total wins/Losses

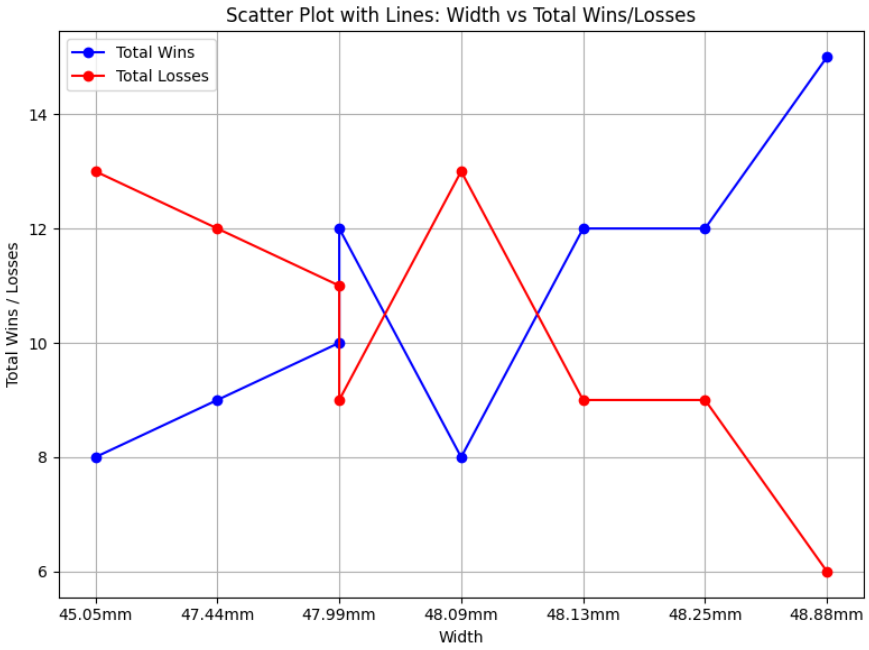

Figure 4: Width Vs. Total Wins/Losses

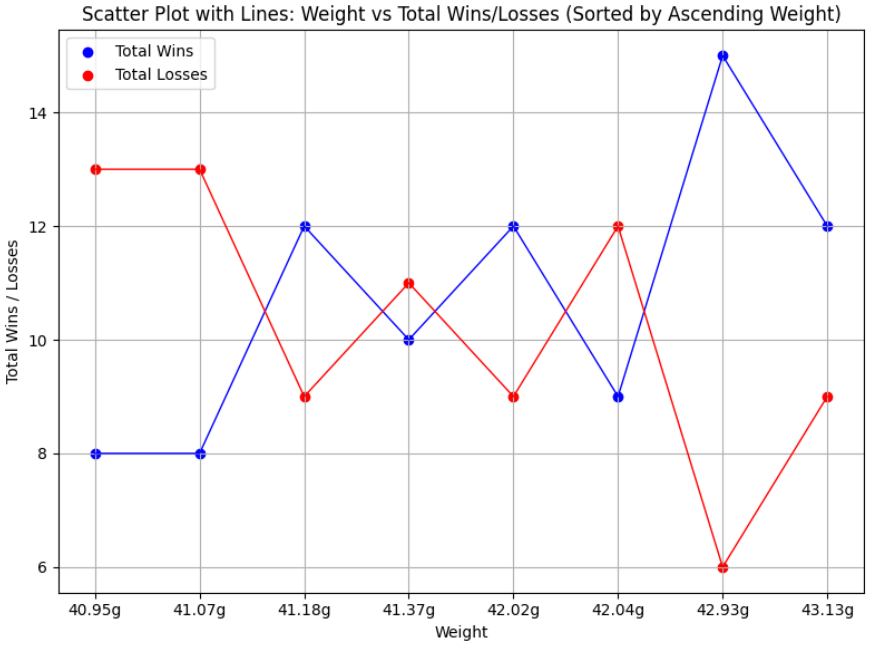

Figure 5: Enter Caption

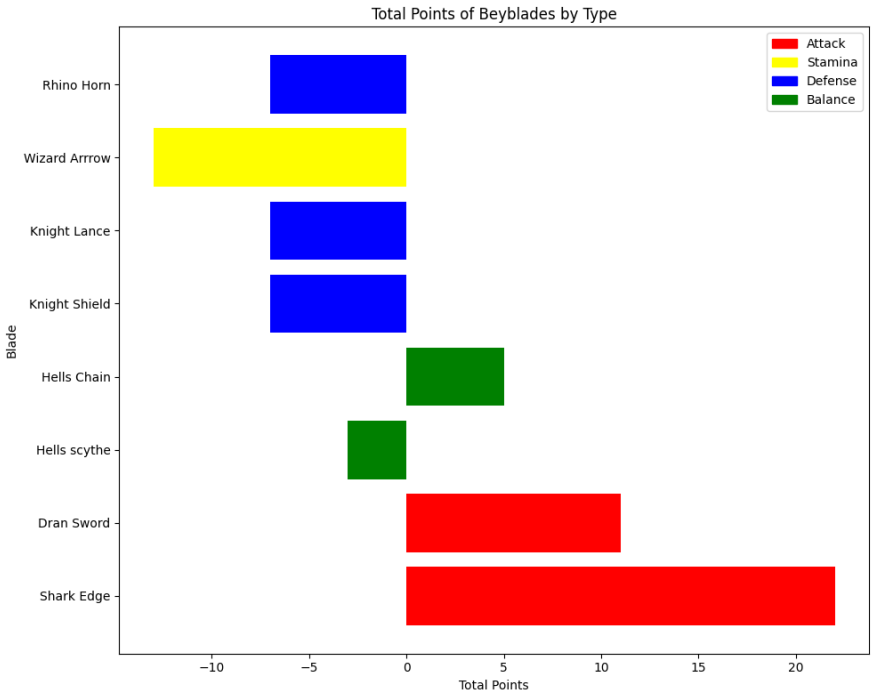

Figure 6: Total points of Beyblade by type

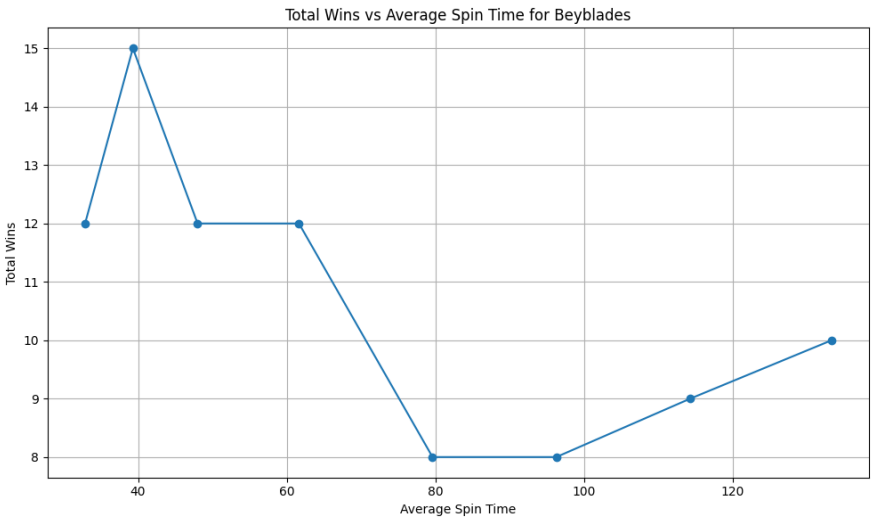

Figure 7: Total Wins vs Average Spin Time for Beyblades

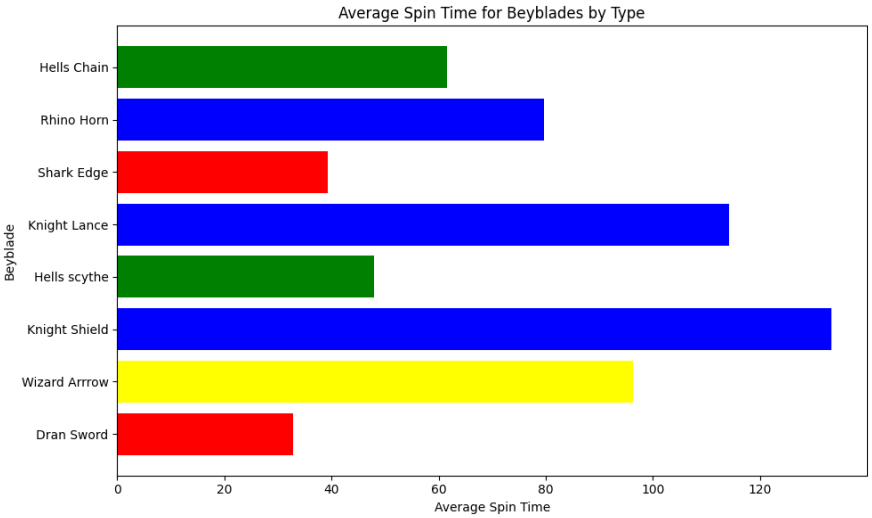

Figure 8: Average spin time for Beyblades by Type

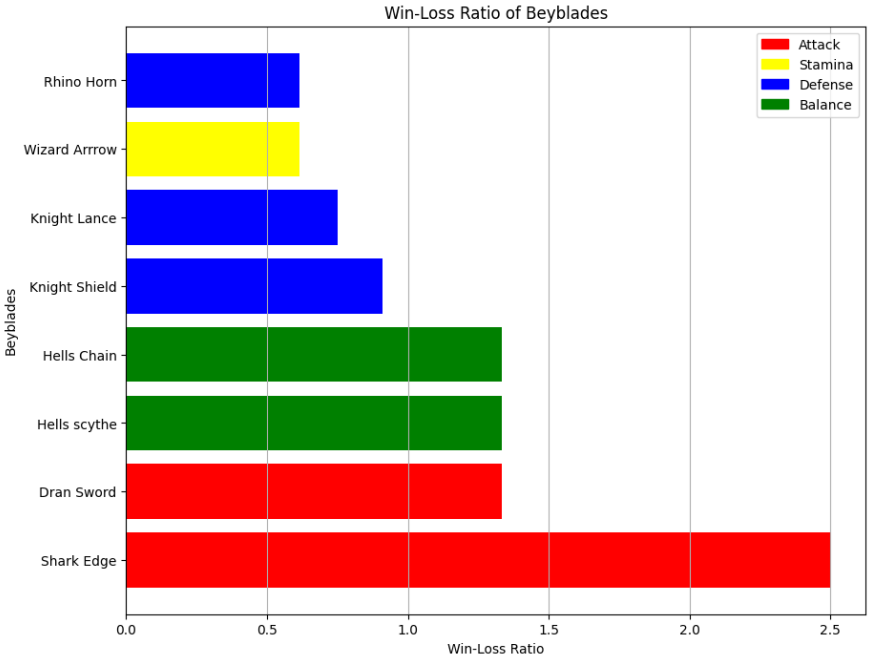

Figure 9: Win-Loss Ration of Beyblades

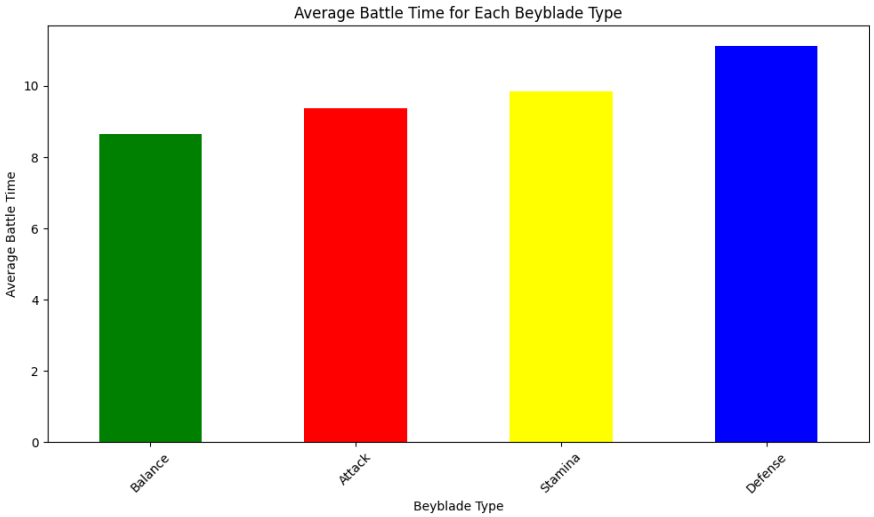

Figure 10: Average Battle Time for Each Beyblade Type

Conclusion

My hypotheses were partially correct, my belief that shorter, heavier, and wider beys would perform the best was true. My belief that Dransword's stock combo would win the most was wrong, as it had the second most wins as compared to Sharkedge which had the most. I was correct that attack types would be the best type due to the stadium changes. Attack types won the most battles by far and acquired the most points to boot. I was also wrong about Dransword's stock combo having teh best average stamina out of the two attack types though, as Sharkedge did have the edge over it. The bey with the most losses was a tie between Wizard Arrow and Rhino Horn, which I was partially right being that I guessed Wizard Arrow would lose the most. Wizard arrow was also the worst performer, as it scored the worst in total points and wins. 6. My data determiend that Sharkedge is currently the best combo due to it's weight and height distribution, as well as it's wide frame. It is currently the best performing beyblade I have, and I intend to update this data when I get more.

Bibliography

[1] URL https://beyblade.fandom.com/wiki/Cobalt_Drake_4-60F.

[2] URL https://beybladeplanner.com/build.php.