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DS210

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## **DS210 Final Project Write-Up**

### **What My Project Does:**

For this project, I analyzed a dataset from Kaggle, titled, “NBA Stats (1947 - Present)” (can be found on the following URL: <https://www.kaggle.com/datasets/sumitrodatta/nba-aba-baa-stats>).

My project utilizes various graphical algorithms, such as betweenness and closeness centrality, in order to analyze the relationships between player performance/shooting (nodes) and team statistics (nodes). From there, a correlation was found as to what statistic impacts a team’s playoff chances the most. Edges are present between these nodes to construct centrality analyses. Additionally, my project uses the statistics in an analytic-manner, by looking at specific players (in this case, one player from each team in 2022) and seeing where their statistics matched up against the team’s averages in that same area. This would tell how effective that player is. In general, the data is first loaded and filtered from the CSV files present, and then analytical and graphical methods are utilized to make conclusions about how player shooting statistics affect the success rate of a team, including how much that player really contributes to that team and their efficiency individually.

### **How To Run The Project:**

Running the program is not that difficult at all; for me to make changes and edit into the main branch of the project, I cloned my repository and placed the dataset into my designated project

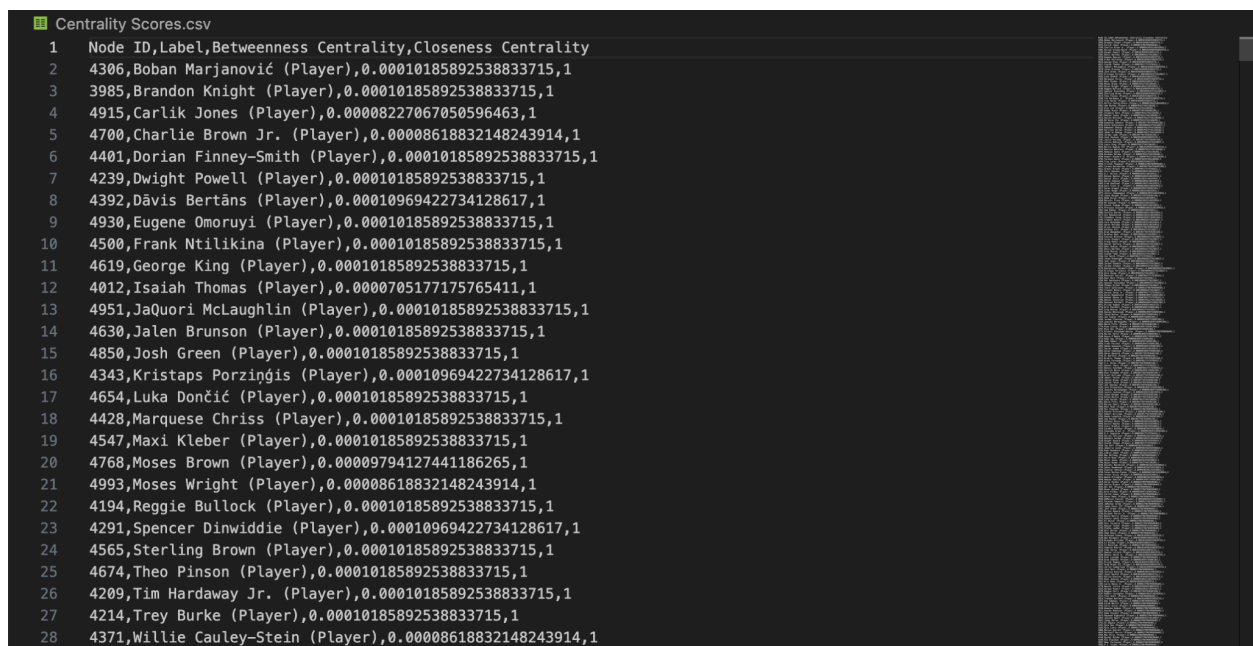
folder (including the copied repository folder, too). From there, all I needed to do was build the cargo file using “cargo build,” and proceeded to run my program using “cargo run --release.”

The function “cargo test” was utilized to test the functionality of my different modules.

### **What My Output Looks Like:**

Here are a few screenshots of the three CSV files my program outputted (excerpts of them):

#### Centrality Scores.csv:



1	Node ID,Label,Betweenness Centrality,Closeness Centrality
2	4306,Boban Marjanović (Player),0.00010185892538833715,1
3	3985,Brandon Knight (Player),0.00010185892538833715,1
4	4915,Carlisle Jones (Player),0.00008227067050596463,1
5	4700,Charlie Brown Jr. (Player),0.00008618832148243914,1
6	4401,Dorian Finney-Smith (Player),0.00010185892538833715,1
7	4239,Dwight Powell (Player),0.00010185892538833715,1
8	4392,Dāvis Bertāns (Player),0.00010969422734128617,1
9	4930,Eugene Omoruyi (Player),0.00010185892538833715,1
10	4500,Frank Ntilikina (Player),0.00010185892538833715,1
11	4619,George King (Player),0.00010185892538833715,1
12	4012,Isaiah Thomas (Player),0.0000705177175765411,1
13	4951,JaQuori McLaughlin (Player),0.00010185892538833715,1
14	4630,Jalen Brunson (Player),0.00010185892538833715,1
15	4850,Josh Green (Player),0.00010185892538833715,1
16	4343,Kristaps Porziņģis (Player),0.00010969422734128617,1
17	4654,Luka Dončić (Player),0.00010185892538833715,1
18	4428,Marquese Chriss (Player),0.00010185892538833715,1
19	4547,Maxi Kleber (Player),0.00010185892538833715,1
20	4768,Moses Brown (Player),0.00009794127441186265,1
21	4993,Moses Wright (Player),0.00008618832148243914,1
22	4194,Reggie Bullock (Player),0.00010185892538833715,1
23	4291,Spencer Dinwiddie (Player),0.00010969422734128617,1
24	4565,Sterling Brown (Player),0.00010185892538833715,1
25	4674,Theo Pinson (Player),0.00010185892538833715,1
26	4209,Tim Hardaway Jr. (Player),0.00010185892538833715,1
27	4214,Trey Burke (Player),0.00010185892538833715,1
28	4371,Willie Cauley-Stein (Player),0.00008618832148243914,1

#### Player Shooting Stats Analytics.csv:

Player Shooting Stats Analytics.csv				
1	Player ID	Player Name	Team Name	Statistic Name,Correlation Coefficient
2	4475	Bogdan Bogdanović	Atlanta Hawks	FG Percent Diff,-0.03899999999999998
3	4475	Bogdan Bogdanović	Atlanta Hawks	FG Percent Ratio,0.9170212765957447
4	4475	Bogdan Bogdanović	Atlanta Hawks	FG Percent from 2P Range Diff,-0.0150000000000000013
5	4475	Bogdan Bogdanović	Atlanta Hawks	FG Percent from 2P Range Ratio,0.9717514124293785
6	4475	Bogdan Bogdanović	Atlanta Hawks	FG Percent from 3P Range Diff,-0.0060000000000000005
7	4475	Bogdan Bogdanović	Atlanta Hawks	FG Percent from 3P Range Ratio,0.9839572192513368
8	4805	Aaron Nesmith	Boston Celtics	FG Percent Diff,-0.07
9	4805	Aaron Nesmith	Boston Celtics	FG Percent Ratio,0.8497854077253219
10	4805	Aaron Nesmith	Boston Celtics	FG Percent from 2P Range Diff,0.06499999999999995
11	4805	Aaron Nesmith	Boston Celtics	FG Percent from 2P Range Ratio,1.1188299817184642
12	4805	Aaron Nesmith	Boston Celtics	FG Percent from 3P Range Diff,-0.08599999999999997
13	4805	Aaron Nesmith	Boston Celtics	FG Percent from 3P Range Ratio,0.7584269662921349
14	4064	Andre Drummond	Brooklyn Nets	FG Percent Diff,0.135
15	4064	Andre Drummond	Brooklyn Nets	FG Percent Ratio,1.2842105263157895
16	4064	Andre Drummond	Brooklyn Nets	FG Percent from 2P Range Diff,0.07499999999999996
17	4064	Andre Drummond	Brooklyn Nets	FG Percent from 2P Range Ratio,1.1394052044609664
18	4064	Andre Drummond	Brooklyn Nets	FG Percent from 3P Range Diff,-0.361
19	4064	Andre Drummond	Brooklyn Nets	FG Percent from 3P Range Ratio,0
20	4465	Alex Caruso	Chicago Bulls	FG Percent Diff,-0.08199999999999996
21	4465	Alex Caruso	Chicago Bulls	FG Percent Ratio,0.8291666666666667
22	4465	Alex Caruso	Chicago Bulls	FG Percent from 2P Range Diff,-0.07300000000000001
23	4465	Alex Caruso	Chicago Bulls	FG Percent from 2P Range Ratio,0.8635514018691589
24	4465	Alex Caruso	Chicago Bulls	FG Percent from 3P Range Diff,-0.035999999999999976
25	4465	Alex Caruso	Chicago Bulls	FG Percent from 3P Range Ratio,0.9024390243902439
26	4905	Arnoldas Kulboka	Charlotte Hornets	FG Percent Diff,-0.468
27	4905	Arnoldas Kulboka	Charlotte Hornets	FG Percent Ratio,0
28	4905	Arnoldas Kulboka	Charlotte Hornets	FG Percent from 2P Range Diff,-0.542

Players' Contribution To Team.csv:

Players' Contribution To Team.csv				
1	Player ID	Player Name	Statistic Name	Correlation Coefficient
2	0	All Players	FG Percent	0.13016065337295707
3	0	All Players	FG Percent from 3P Range	0.033794041008999506
4	0	All Players	FG Percent from 2P Range	0.19450651375529768
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