Client Report - Finding relationships in baseball

Course CSE 250 Isabel Aranguren

Elevator pitch

Data is just information. Data for a particular entity or user can be stored in a container called a relational database. The purpose of this project is to find the relationship in baseball with players salary, batting average and their hits using data.world as our remote server. Finally, the chart made with the dataset from datdata.world provides a comparison of the Arizona Diamondbacks vs the San Diego Padres and their runs scored from doubles

GRAND QUESTION 1

Write an SQL query to create a new dataframe about baseball players who attended BYU-Idaho. The new table should contain five columns: playerID, schoolID, salary, and the yearID/teamID associated with each salary. Order the table by salary (highest to lowest) and print out the table in your report.

According to the database, the highest salary was $4000000 in 2014

TECHNICAL DETAILS

```
result = dw.query('byuidss/cse-250-baseball-database',
    '''
    SELECT
    p.playerid
    , c.schoolid
    , s.salary
    , s.yearid
    , s.teamid
    FROM people p
    JOIN collegeplaying c ON p.playerid = c.playerid
    JOIN salaries s on c.playerid = s.playerid
    WHERE c.schoolid = 'idbyuid'
    ORDER BY s.salary DESC
    ;
    ''')
```

```
table = result.dataframe
print(table.head(3).to_markdown())
table
```

	playerid	schoolid	salary	yearid	teamid
0	lindsma01	idbyuid	4000000	2014	CHA

	playerid	schoolid	salary	yearid	teamid
1	lindsma01	idbyuid	4000000	2014	CHA
2	lindsma01	idbyuid	3600000	2012	BAL

GRAND QUESTION 2

This three-part question requires you to calculate batting average (number of hits divided by the number of at-bats)

a. Write an SQL query that provides playerID, yearID, and batting average for players with at least one at bat. Sort the table from highest batting average to lowest, and show the top 5 results in your report.

TECHNICAL DETAILS

```
result = dw.query('byuidss/cse-250-baseball-database',
    '''
    SELECT
    playerid
    , yearid
    , h/ab AS batting_average
    FROM batting
    WHERE h >= 1
    ORDER BY batting_average DESC
    LIMIT 5
    ;
    ''')
```

```
table = result.dataframe
print(table.head(5).to_markdown())
table
```

	playerid	yearid	batting_average
0	mccafsp01	1889	1
1	snowch01	1874	1
2	oconnfr01	1893	1
3	gumbebi01	1893	1
4	baldwki01	1884	1

b. Use the same query as above, but only include players with more than 10 “at bats” that year. Print the top 5 results.

```
result = dw.query('byuidss/cse-250-baseball-database',
    '''
    SELECT
    playerid
    , yearid
    , h/ab AS batting_average
    FROM batting
    WHERE ab >= 1
    ORDER BY batting_average DESC
    LIMIT 5
    ;
    ''')
```

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	playerid	yearid	batting_average
0	snowch01	1874	1
1	baldwki01	1884	1
2	oconnfr01	1893	1
3	gumbebi01	1893	1
4	mccafsp01	1889	1

c. Now calculate the batting average for players over their entire careers (all years combined). Only include players with more than 100 at bats, and print the top 5 results.

```
result = dw.query('byuidss/cse-250-baseball-database',
    '''
    SELECT p.namefirst, p.namelast, SUM(b.h) as hits, SUM(b.ab) AS at_bat,
SUM(b.h)/SUM(b.ab) AS bat_avg
    FROM people p
    JOIN batting b ON p.playerid = b.playerid
    WHERE b.ab > 100
    GROUP BY p.playerid
    ORDER BY bat_avg DESC
    LIMIT 5
    ;
   ''')
```

```
table = result.dataframe
print(table.head(5).to_markdown())
table
```

	namefirst	namelast	hits	at_bat	bat_avg
0	Bob	Hazle	54	134	0.402985
1	Curt	Davis	40	105	0.380952
2	Showboat	Fisher	95	254	0.374016
3	Rynie	Wolters	51	138	0.369565
4	Ty	Cobb	4189	11436	0.366299

GRAND QUESTION 3

Pick any two baseball teams and compare them using a metric of your choice (average salary, home runs, number of wins, etc.). Write an SQL query to get the data you need. Use Python if additional data wrangling is needed, then make a graph in Altair to visualize the comparison. Provide the visualization and its description.

RED SOX VS NATIONALS

TECHNICAL DETAILS

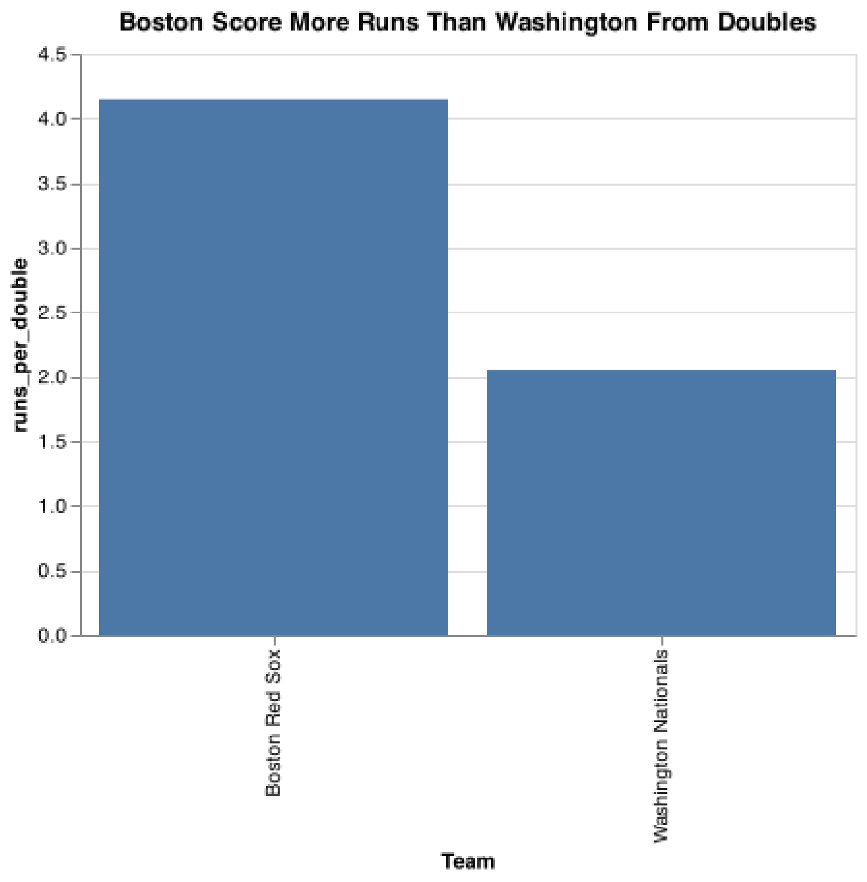
```
result = dw.query('byuidss/cse-250-baseball-database',
 '''
    -- At Bat vs Triples with Runs Scored

    SELECT    f.franchname AS Team
            , t.teamid
            , t.ab AS at_bat
            , t.2b AS doubles
            , t.r AS runs_scored
            , t.2b/t.ab AS doubles_by_at_bat
            , t.r/t.2b AS runs_per_double
    FROM teams t
    JOIN teamsfranchises f ON t.franchid = f.franchid
    WHERE f.active = "Y" AND t.teamid = "WAS" OR t.teamid = "BOS"
    GROUP BY f.franchname
    ORDER BY runs_scored DESC
    ;
   ''')

table = result.dataframe
print(table.head().to_markdown())
```

	Team	teamid	at_bat	doubles	runs_scored	doubles_by_at_bat	runs_per_double
0	Boston Red Sox	BOS	4866	183	759	0.0376079	4.14754
1	Washington Nationals	WAS	5426	311	639	0.0573166	2.05466

Boston Red Sox scores more than Washington Nationals per each double hit.



```
chart = (
    alt.Chart(table)
    .encode(
        alt.X('Team'),
        alt.Y('runs_per_double'))
    .mark_bar()
    .properties(width=400, title="Boston Score More Runs Than Washington From
Doubles")
)
chart.save('chart.png')
```

APPENDIX A (PYTHON CODE)

```
# To add a new cell, type '# %%'
# To add a new markdown cell, type '# %% [markdown]'
# %%
import datadotworld as dw
import pandas as pd
import altair as alt

# %% [markdown]
# ## GRAND QUESTION 1
# ### Write an SQL query to create a new dataframe about baseball players who
attended BYU-Idaho. The new table should contain five columns: playerID,
schoolID, salary, and the yearID/teamID associated with each salary. Order
the table by salary (highest to lowest) and print out the table in your
report.

# %%
#  The WHERE keyword allows us to filter down the table horizontally (fewer
rows).
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# %% [markdown]
# ## GRAND QUESTION 2
# ### This three-part question requires you to calculate batting average
(number of hits divided by the number of at-bats)
# %% [markdown]
#  a. Write an SQL query that provides playerID, yearID, and batting average
for players with at least one at bat. Sort the table from highest batting
average to lowest, and show the top 5 results in your report.
#

# %%
# LIMIT is used in a query to return up to a specific number of rows in the
results and comes after the WHERE clause if there is one
#  AS introduces the column name you would like to see in the results of a
query.
result = dw.query('byuidss/cse-250-baseball-database',
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    playerid
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    FROM batting
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# b. Use the same query as above, but only include players with more than 10
“at bats” that year. Print the top 5 results.
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