Client Report - [Finding relationships in baseball]

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Elevator pitch

Hi, I studied a MLB baseball data. I could see which players attended BYU-Idaho, who's batting average in which year is the highest in the whole MLB history, and comparison of two teams in terms of total salary of all players in the team.

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.

ANALYSIS

Two of all the players graduated from BYU Idaho.

TECHNICAL DETAILS

```
q1 = pd.read_sql_query("""
  SELECT cp.playerid, s.yearid, s.teamid, s.salary
  FROM CollegePlaying AS cp
    JOIN Salaries AS s on cp.playerid = s.playerid
  where cp.playerid = 'catetr01' or cp.playerid =  'lindsma01' or
cp.playerid = 'stephga01'
  GROUP BY s.yearid
  ORDER BY s.salary DESC
""", con)
q1
```

The output is the chart below.

playerID	schoolID	yearID	teamID	k_salary
lindsma01	idbyuid	2014	CHA	4000
lindsma01	idbyuid	2012	BAL	3600
lindsma01	idbyuid	2011	COL	2800
lindsma01	idbyuid	2013	CHA	2300
lindsma01	idbyuid	2010	HOU	1625
stephga01	idbyuid	2001	SLN	1025

playerID	schoolID	yearID	teamID	k_salary
stephga01	idbyuid	2002	SLN	900
stephga01	idbyuid	2003	SLN	800
stephga01	idbyuid	2000	SLN	550
lindsma01	idbyuid	2009	FLO	410
lindsma01	idbyuid	2008	FLO	395
lindsma01	idbyuid	2007	FLO	380
stephga01	idbyuid	1999	SLN	215
stephga01	idbyuid	1998	PHI	185
stephga01	idbyuid	1997	PHI	150

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 1 at bat that year. Sort the table from highest batting average to lowest, and then by playerid alphabetically. Show the top 5 results in your report.

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

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

Analysis

For c, I can see a batting average of Ty Cobb in 1905 is the highest in the whole history of MLB.

TECHNICAL DETAILS

a)

playerID	yearID	AB	H	Average_Hits
aberal01	1957	1	1	1000
abernte02	1960	1	1	1000
abramge01	1923	1	1	1000
acklefr01	1964	1	1	1000
alanirj01	2019	1	1	1000

b)

playerID	yearID	AB	H	Average_Hits
nymanny01	1974	14	9	642
carsoma01	2013	11	7	636
altizda01	1910	10	6	600
johnsde01	1975	10	6	600
silvech01	1948	14	8	571

c)

playerID	yearID	Carrer_At_Bats	Career_Hits	Average_Hits
cobbty01	1905	11436	4189	366
barnero01	1871	2391	860	359
hornsro01	1915	8173	2930	358
jacksjo01	1908	4981	1772	355
meyerle01	1871	1443	513	355

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, then make a graph in Altair to visualize the comparison.

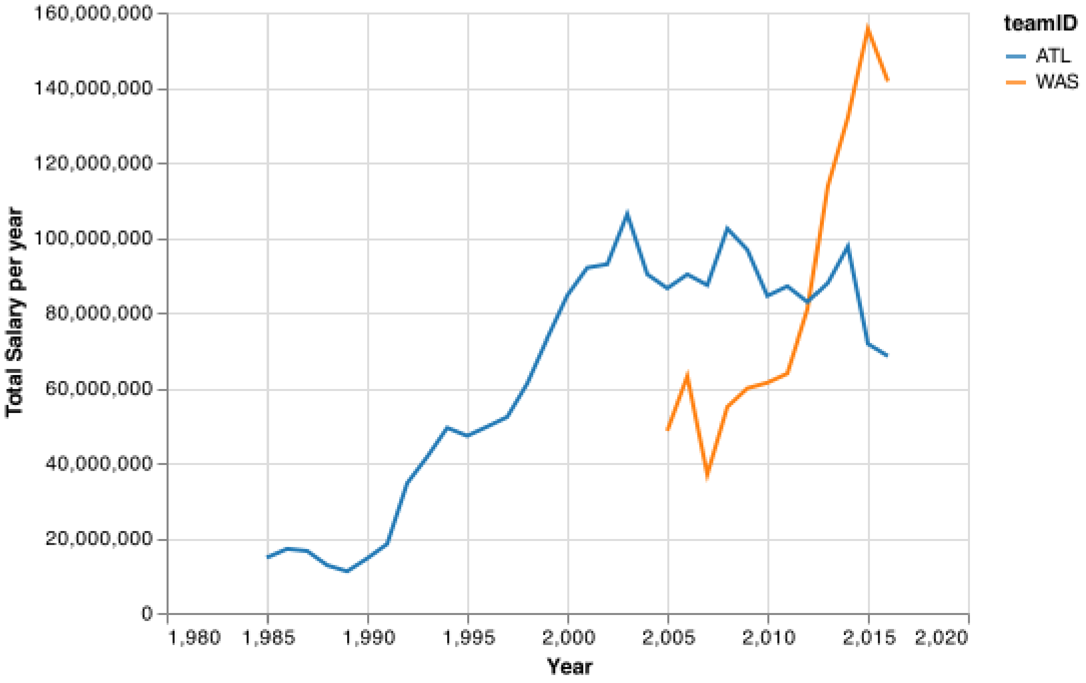
Anylysis

I compared annual salaries of ATL, Braves, and WAS, Natonals. I don't know why I didn't get data before 2005. With data I got from the dataframe, Nationals pay for the players more that Braves does recently.

TECHNICAL DETAILS

```
was_salary = pd.read_sql_query("""
  from teamID, sum(salary) as sum_salary, yearID
  where teamID = 'WAS'
  group by yearID
""", con)
was_salary

atl_salary = pd.read_sql_query("""
  select teamID, sum(salary) as sum_salary, yearID
  from Salaries
  where teamID = 'ATL'
  group by yearID
""", con)
atl_salary
```



Appendix

Q1

```
q1 = pd.read_sql_query("""
  SELECT cp.playerid, cp.schoolid, s.yearid, s.teamid, (s.salary/1000) AS
k_salary
  FROM CollegePlaying AS cp
    JOIN Salaries AS s on cp.playerid = s.playerid
  where cp.playerid = 'catetr01' or cp.playerid =  'lindsma01' or
cp.playerid = 'stephga01'
  GROUP BY s.yearid
  ORDER BY s.salary DESC
""", con)
q1
```

Q2

```
q2a = pd.read_sql_query("""
  select playerID, yearID, AB, H, H*1000 / AB AS Average_Hits
  from Batting
  where AB >= 1
  order by Average_Hits desc, playerID
  limit 5
""", con)
```

```
q2a

q2b = pd.read_sql_query("""
  select playerID, yearID, AB, H, (H * 1000 / AB) AS Average_Hits
  from Batting
  where AB >= 10
  order by Average_Hits desc, playerID
  limit 5
""", con)
q2b

q2c = pd.read_sql_query("""
  select playerID, SUM(AB) AS Carrer_At_Bats, SUM(H) AS Career_Hits,
SUM(H)*1000 / SUM(AB) AS Average_Hits
  from Batting
  group by playerID
  having Carrer_At_Bats >= 100
  order by Average_Hits desc, playerID
""", con)
q2c
```

Q3

```
was_salary = pd.read_sql_query("""
  select teamID, sum(salary) as sum_salary, yearID
  from Salaries
  where teamID = 'WAS'
  group by yearID
""", con)
was_salary

# %%
atl_salary = pd.read_sql_query("""
  select teamID, sum(salary) as sum_salary, yearID
  from Salaries
  where teamID = 'ATL'
  group by yearID
""", con)
atl_salary
#%%

was = alt.Chart(was_salary).mark_line().encode(
    x=alt.X("yearID"),
    y=alt.Y("sum_salary"),
            color = alt.Color("teamID",
scale=alt.Scale(scheme='category10')
    ),
).interactive()
was
# %%
atl = alt.Chart(atl_salary).mark_line().encode(
    x=alt.X("yearID", title = 'Year'),
    y=alt.Y("sum_salary", title = 'Total Salary per year'),
    color = alt.Color("teamID", scale=alt.Scale(scheme='category10')
    ),
).interactive()
atl
# %%
was_and_atl = was + atl
was_and_atl
was_and_atl.save("./was_atl_salary.png")
```