

Dak Passing Yards VS SF

October 21, 2024

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[2]: import pandas as pd
df = pd.read_csv('DakPrescott.csv')
df = df.dropna()

print(df.head())
```

	Rk	Year	Date	G#	Week	Age	Team	Opp	Result	Cmp	Att	\
0	1.0	2016.0	9/11/2016	1.0	1.0	23.044	DAL	NYG	L 19-20	25.0	45.0	
1	2.0	2016.0	9/18/2016	2.0	2.0	23.051	DAL	WAS	W 27-23	22.0	30.0	
2	3.0	2016.0	9/25/2016	3.0	3.0	23.058	DAL	CHI	W 31-17	19.0	24.0	
3	4.0	2016.0	10/2/2016	4.0	4.0	23.065	DAL	SFO	W 24-17	23.0	32.0	
4	5.0	2016.0	10/9/2016	5.0	5.0	23.072	DAL	CIN	W 28-14	18.0	24.0	

	Cmp%	Pass_Yds	Pass_TD	Int	Passer_rating	Sk	Yds	Y/A	AY/A
0	55.56	227.0	0.0	0.0	69.4	0.0	0.0	5.04	5.04
1	73.33	292.0	0.0	0.0	103.7	4.0	14.0	9.73	9.73
2	79.17	248.0	1.0	0.0	123.6	0.0	0.0	10.33	11.17
3	71.88	245.0	2.0	0.0	114.7	2.0	11.0	7.66	8.91
4	75.00	227.0	1.0	0.0	117.9	1.0	5.0	9.46	10.29

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[3]: numerical_cols = ['Age', 'Cmp', 'Att', 'Cmp%', 'Pass_Yds', 'Pass_TD', 'Int', 'Passer_rating', 'Sk', 'Y/A']
features = df[numerical_cols]

pd.set_option('display.float_format', '{:,.2f}'.format)
print(features.describe(percentiles=[0.25,.5,.75]))
```

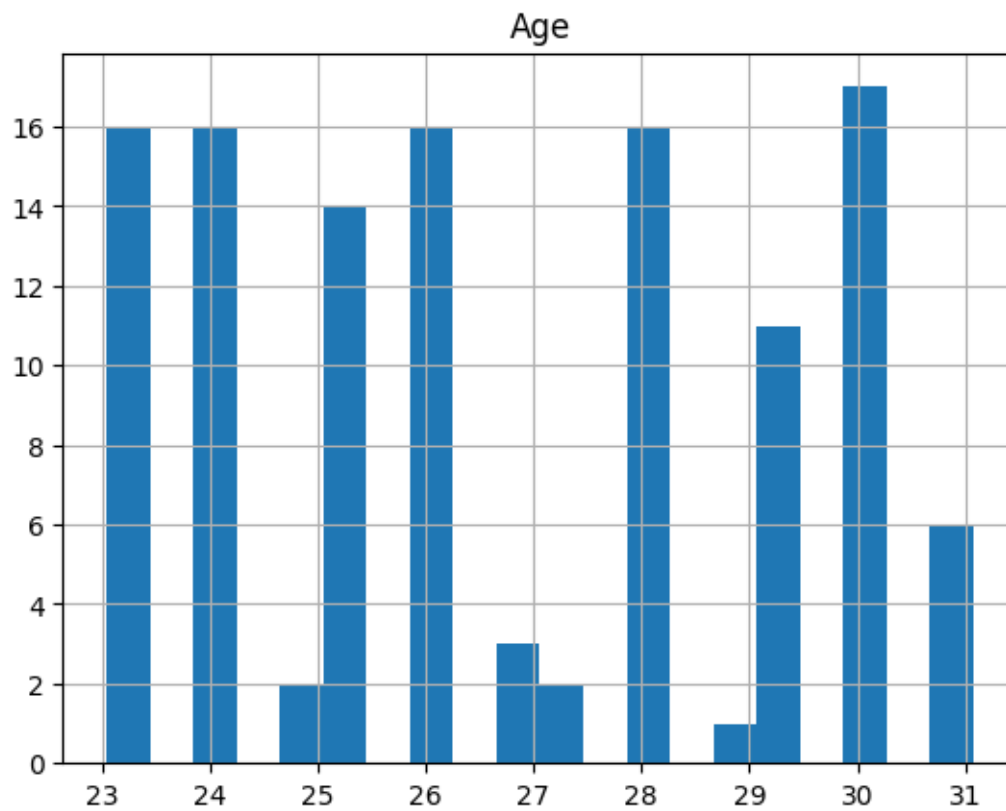
	Age	Cmp	Att	Cmp%	Pass_Yds	Pass_TD	Int	Passer_rating	\
count	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	
mean	26.72	22.81	34.14	67.15	258.84	1.75	0.67	98.55	
std	2.55	6.24	8.85	9.53	84.82	1.27	0.83	26.72	
min	23.04	4.00	8.00	37.84	37.00	0.00	0.00	30.40	
25%	24.15	19.00	27.00	61.54	207.75	1.00	0.00	80.77	
50%	26.13	22.00	33.00	66.67	249.50	2.00	0.00	101.05	
75%	29.12	27.00	39.00	72.64	295.25	3.00	1.00	116.67	
max	31.08	42.00	58.00	88.89	502.00	5.00	3.00	158.30	

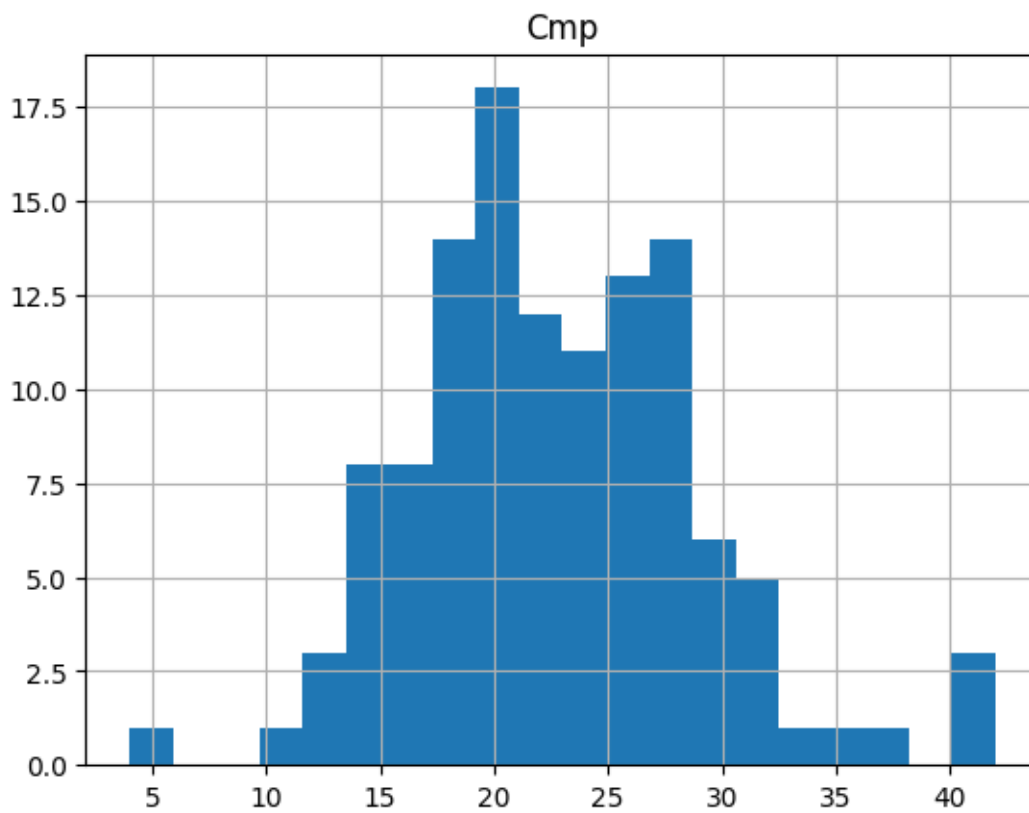
	Sk	Y/A
count	120.00	120.00

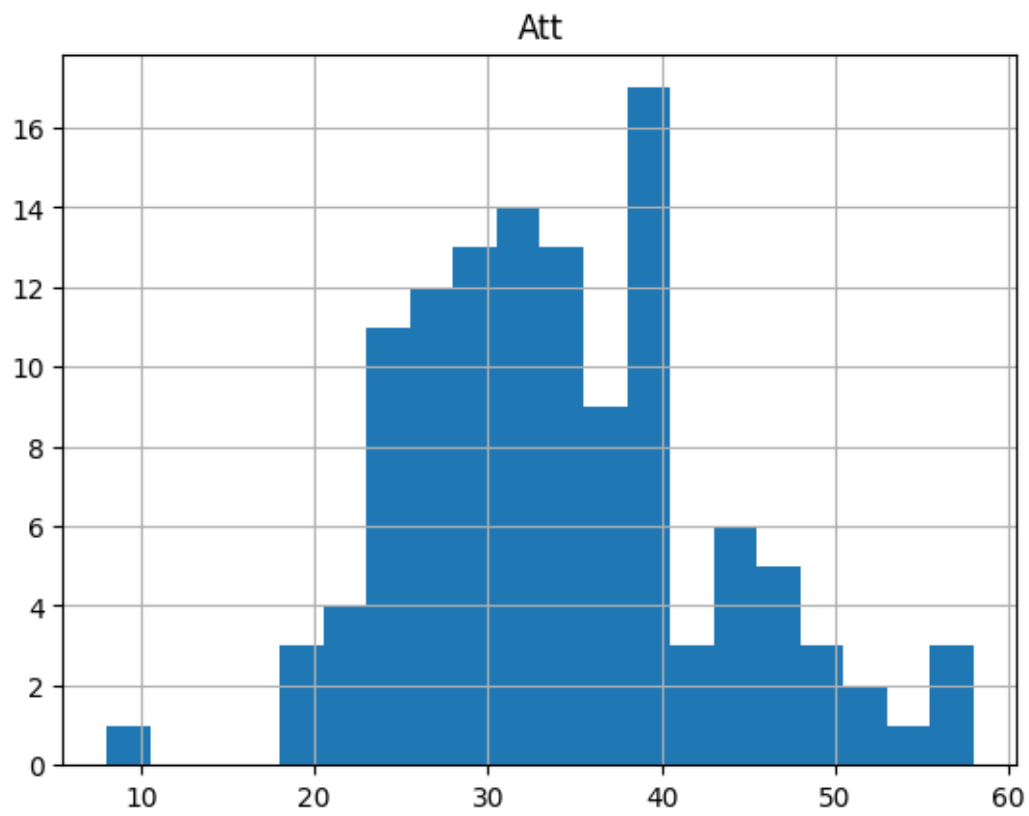
mean	2.09	7.64
std	1.66	1.81
min	0.00	3.46
25%	1.00	6.40
50%	2.00	7.69
75%	3.00	9.00
max	8.00	12.66

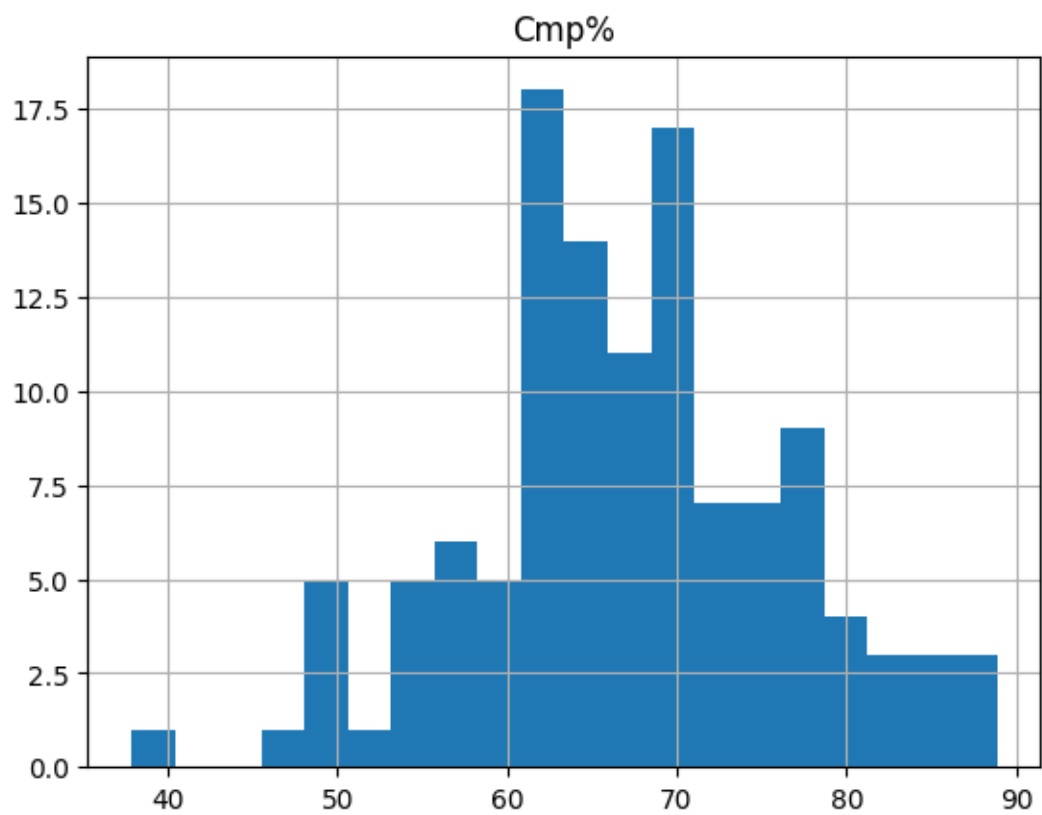
```
[4]: import matplotlib.pyplot as plt

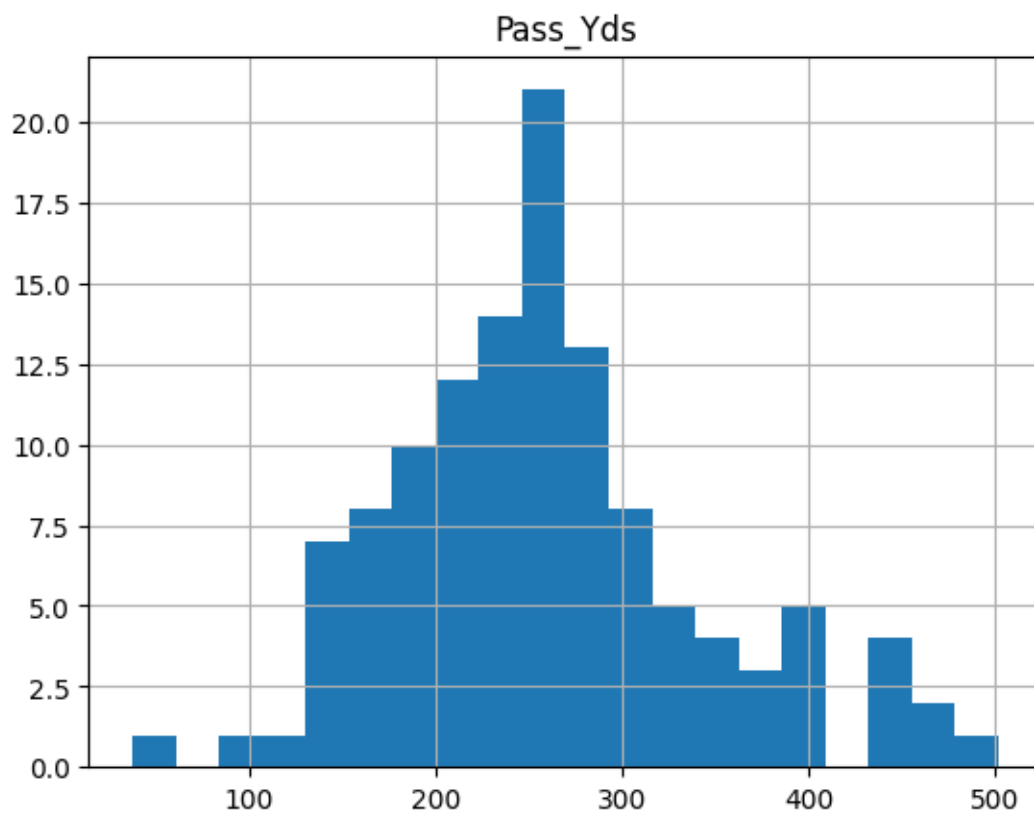
for feature in features:
    features[feature].hist(bins=20)
    plt.title(feature)
    plt.show()
```

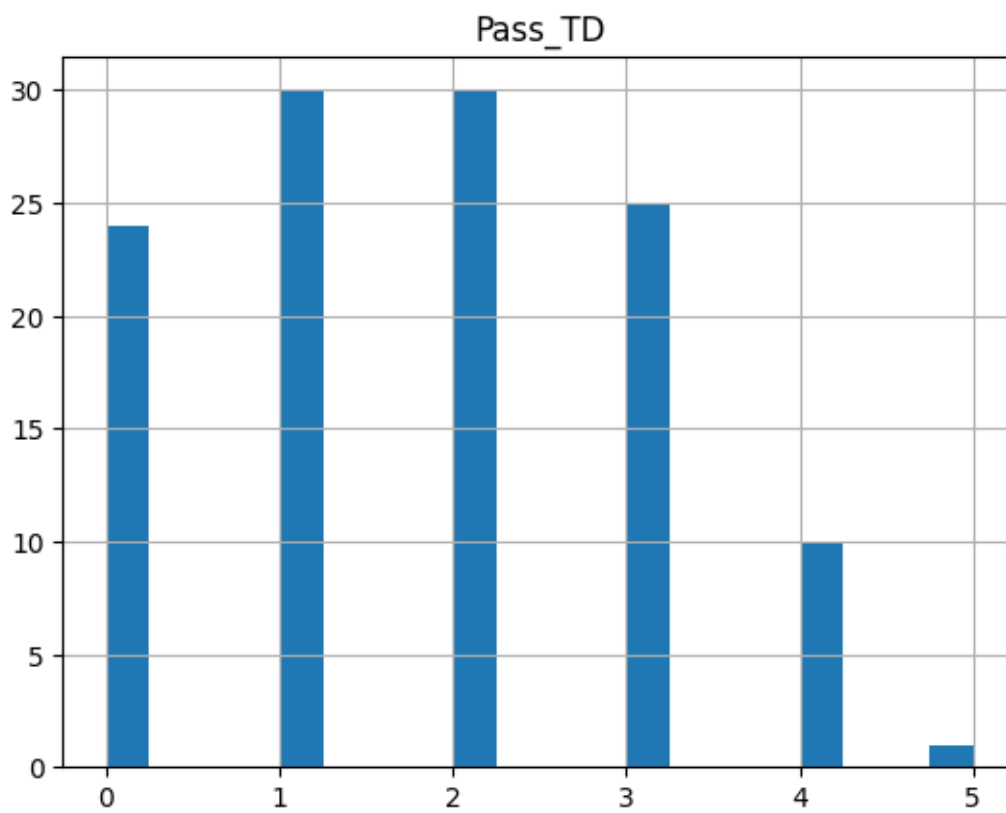


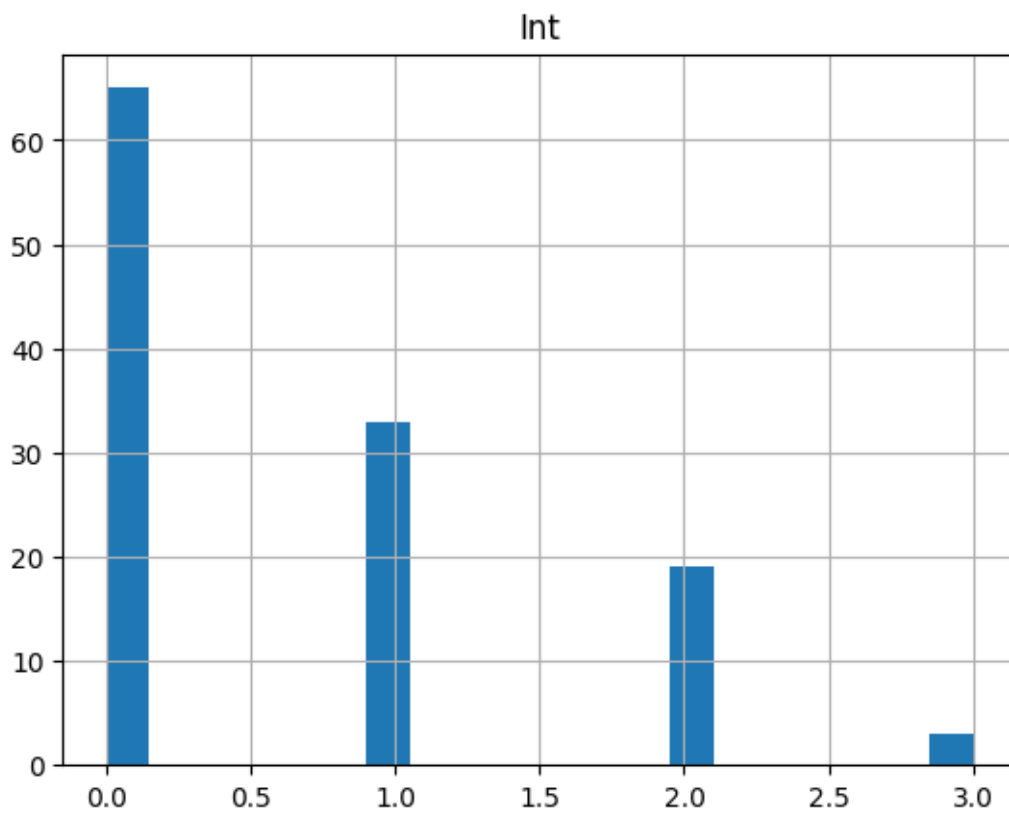


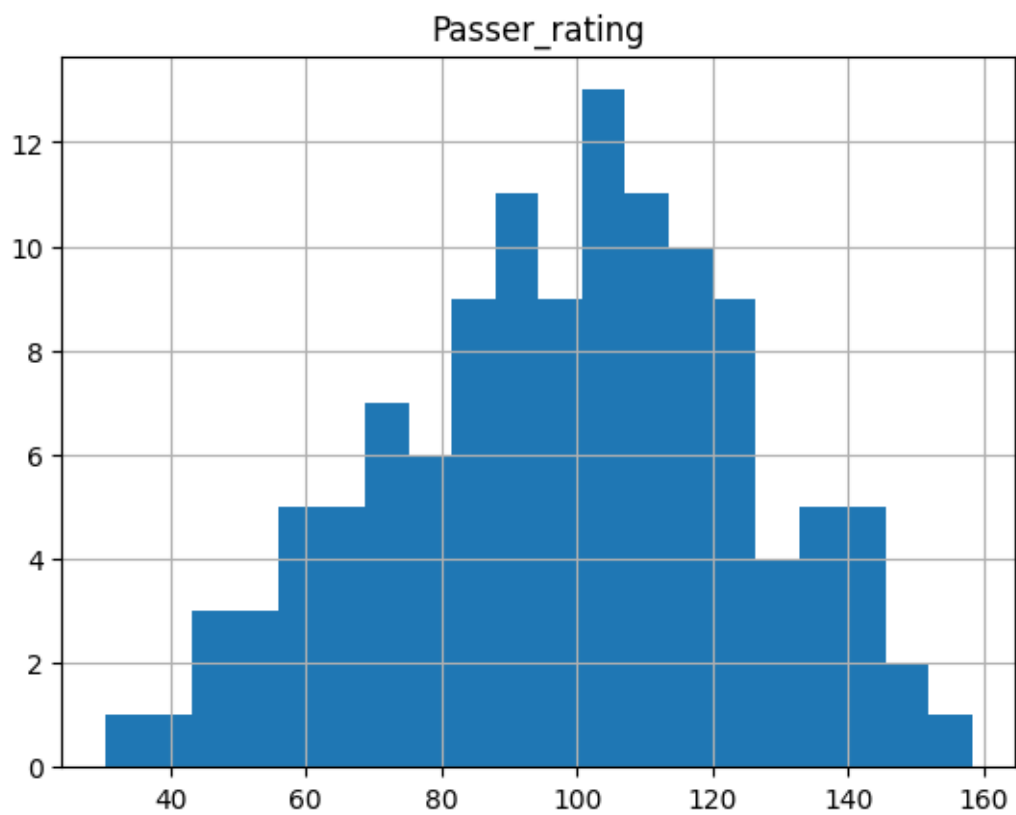


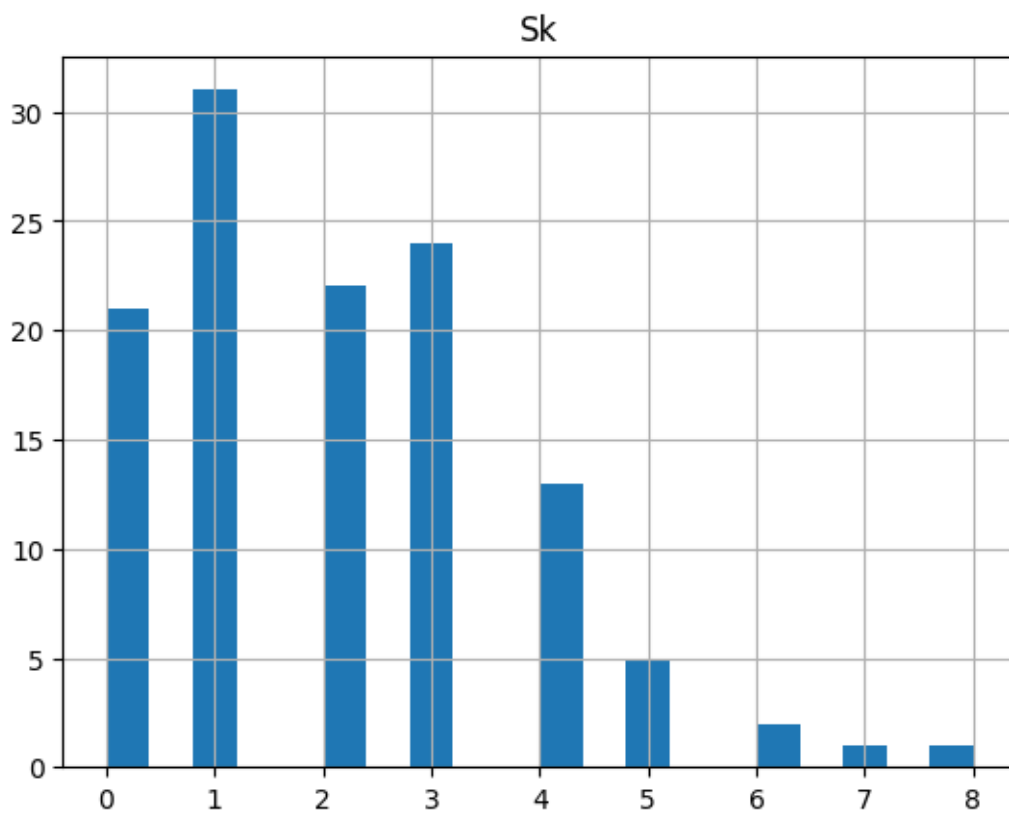


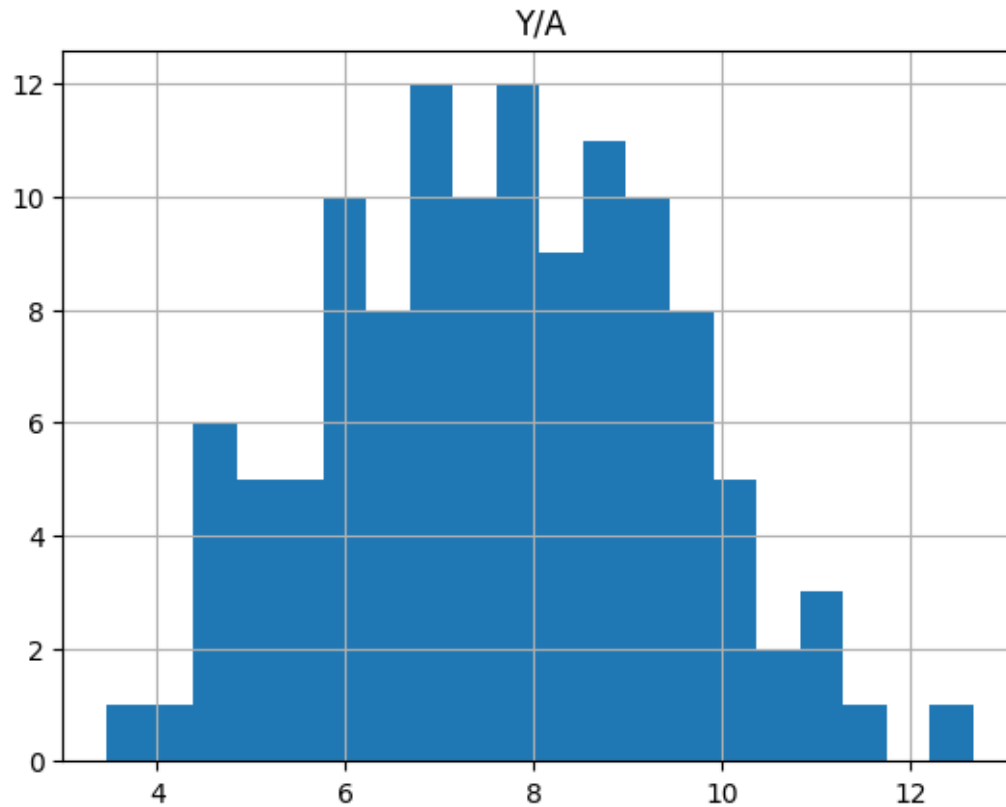












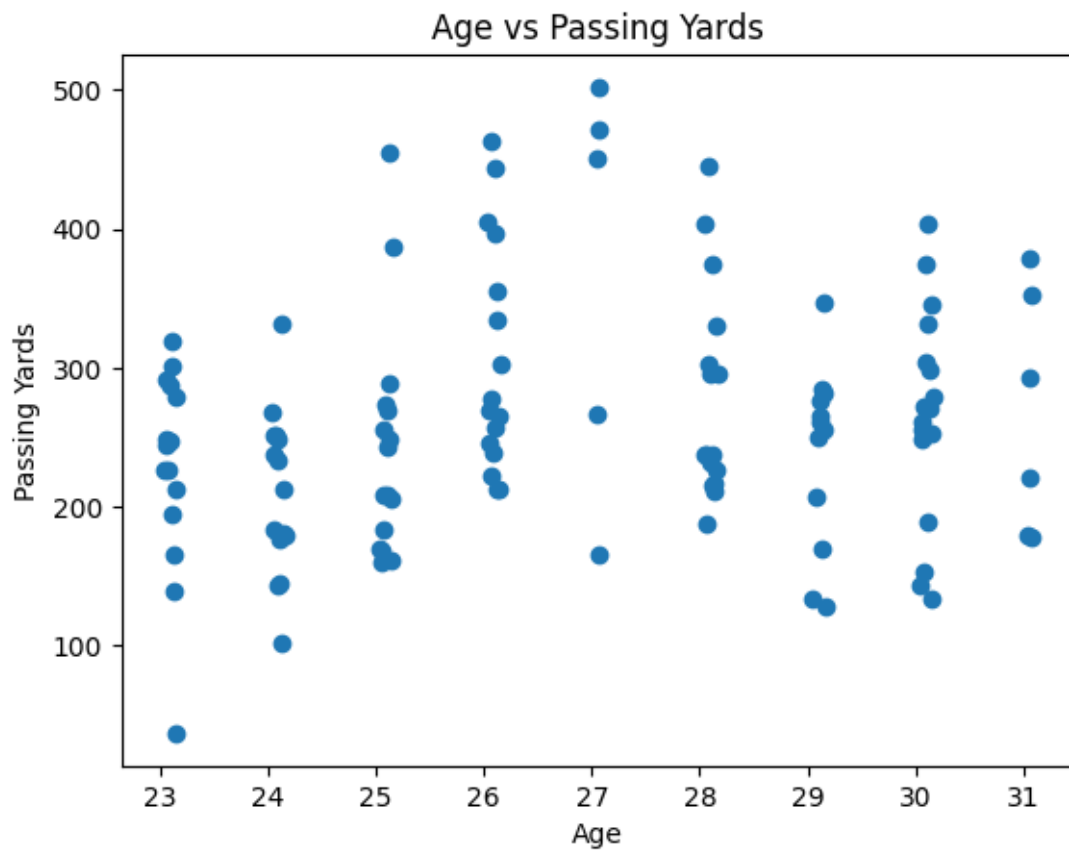
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[5]: features = features.drop(columns='Pass_Yds')
target = df['Pass_Yds']

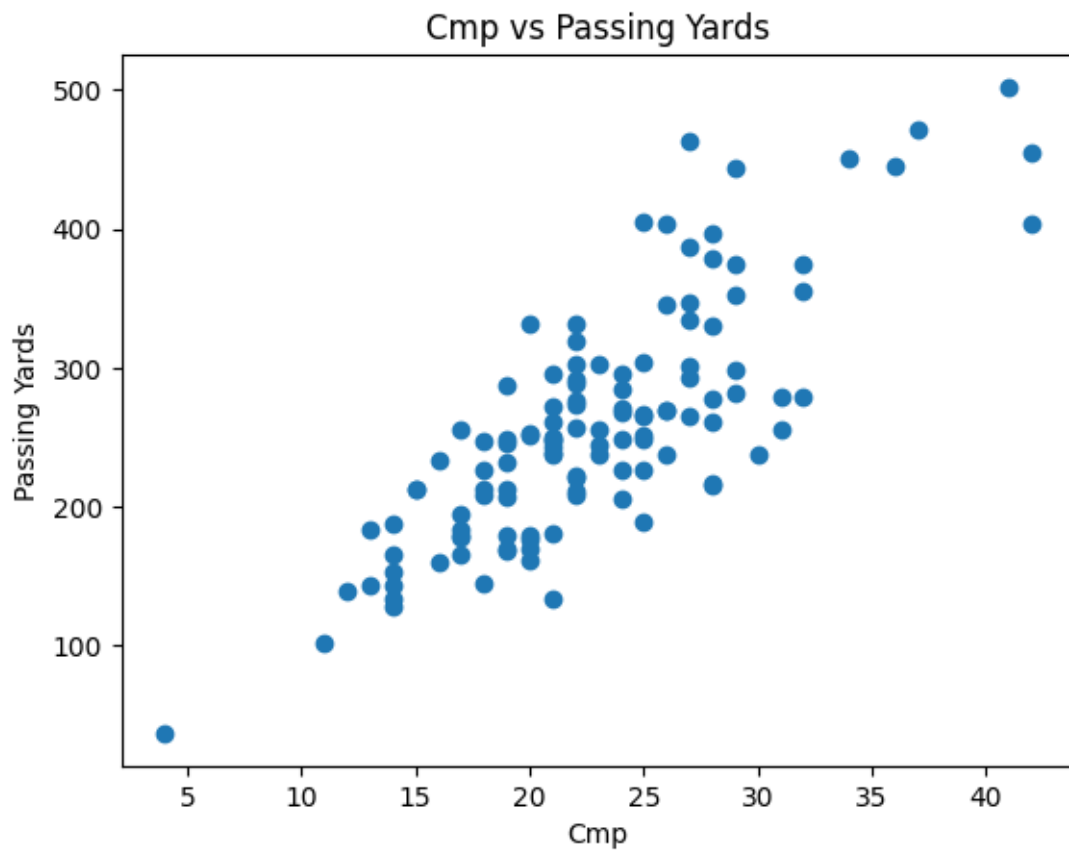
print(f'Shape of Features: {features.shape}\nShape of Target: {target.shape}')

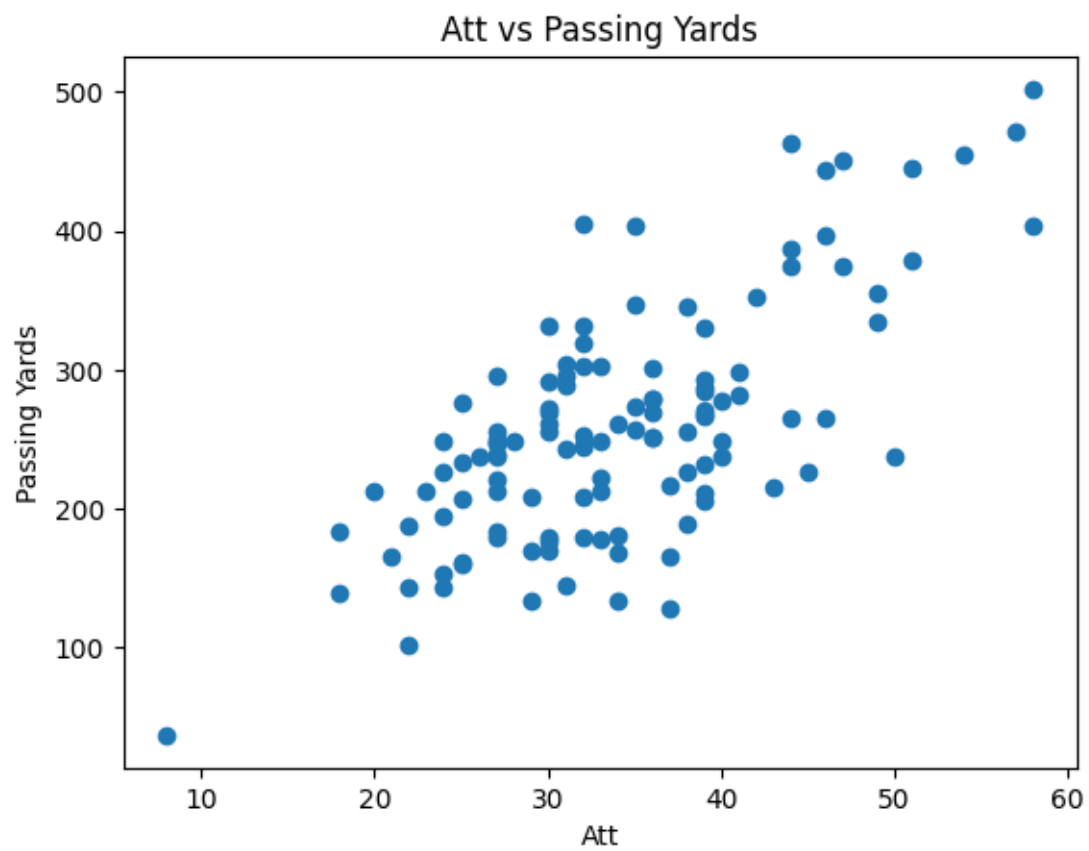
for feature in features:
    plt.scatter(x=df[feature], y=target)
    plt.title(f'{feature} vs Passing Yards')
    plt.xlabel(feature)
    plt.ylabel('Passing Yards')
    plt.show()
```

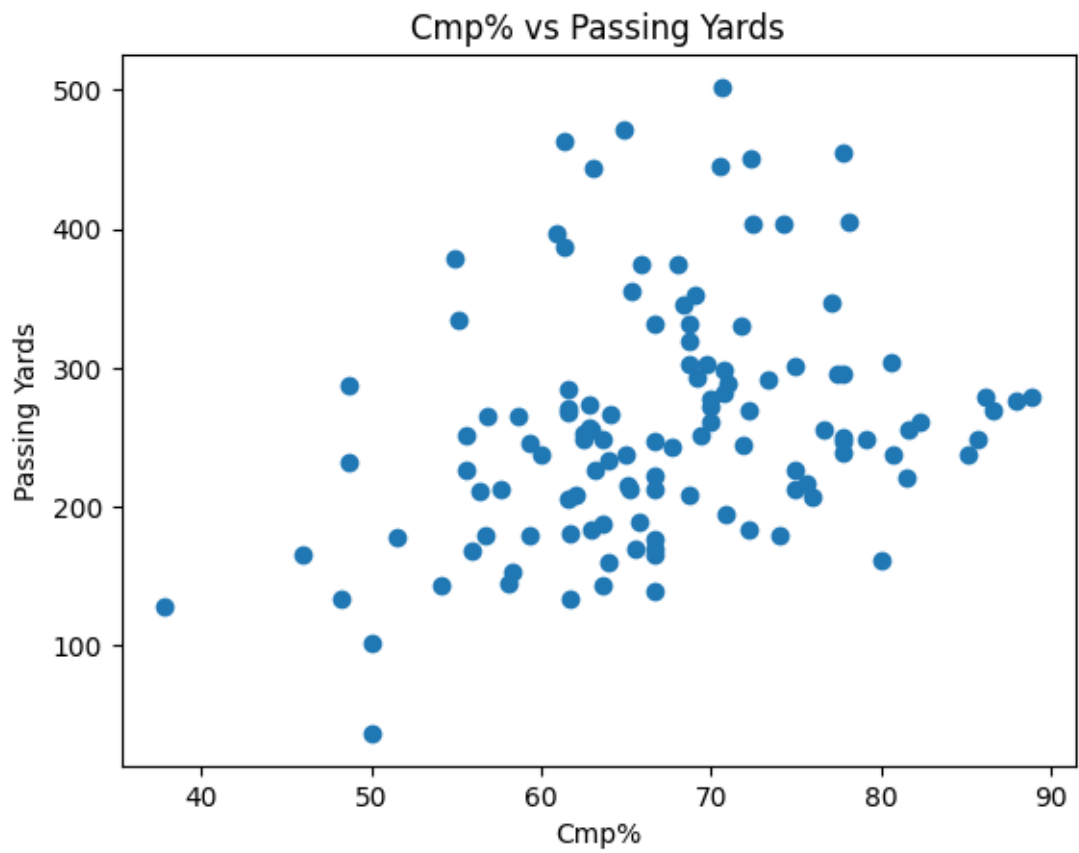
Shape of Features: (120, 9)

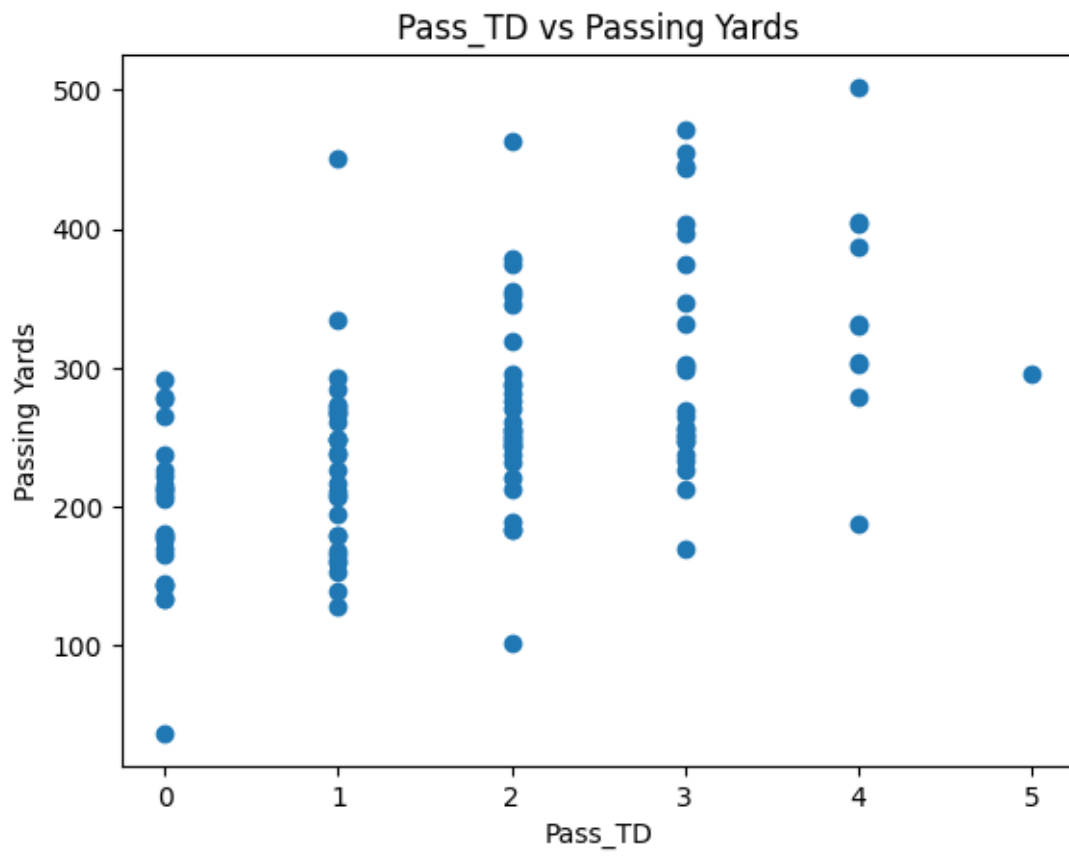
Shape of Target: (120,)

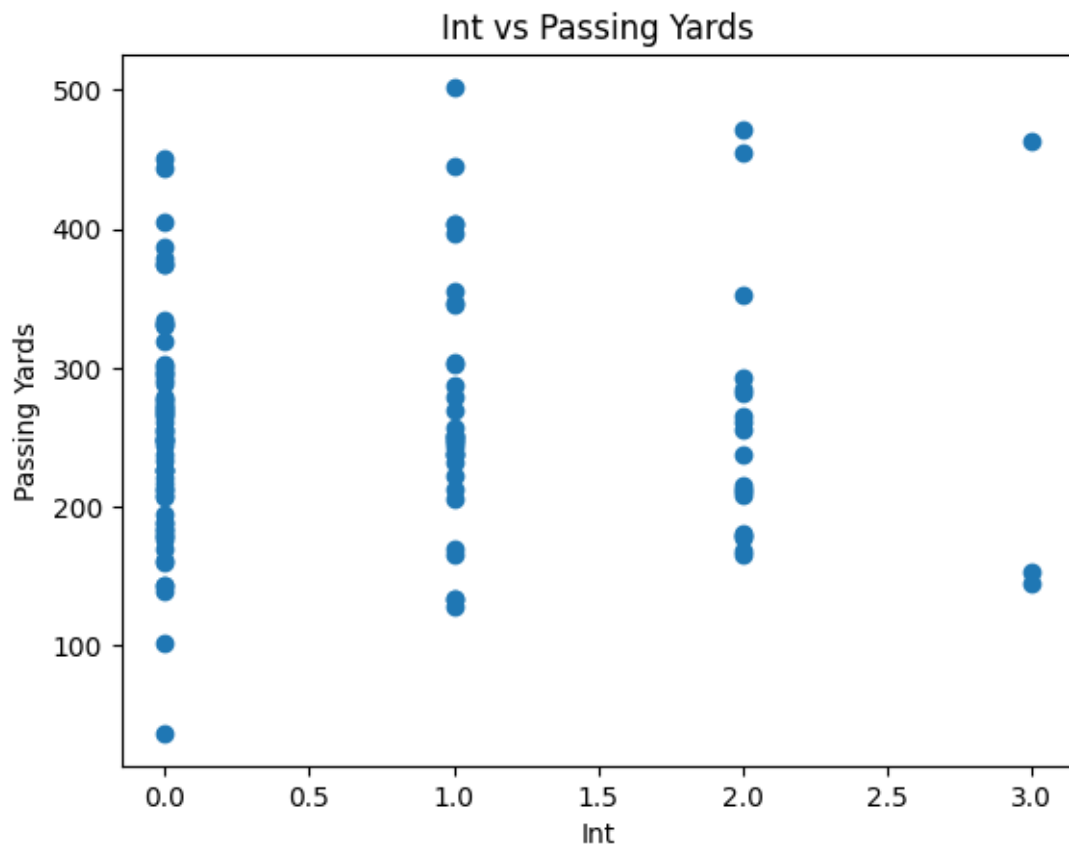


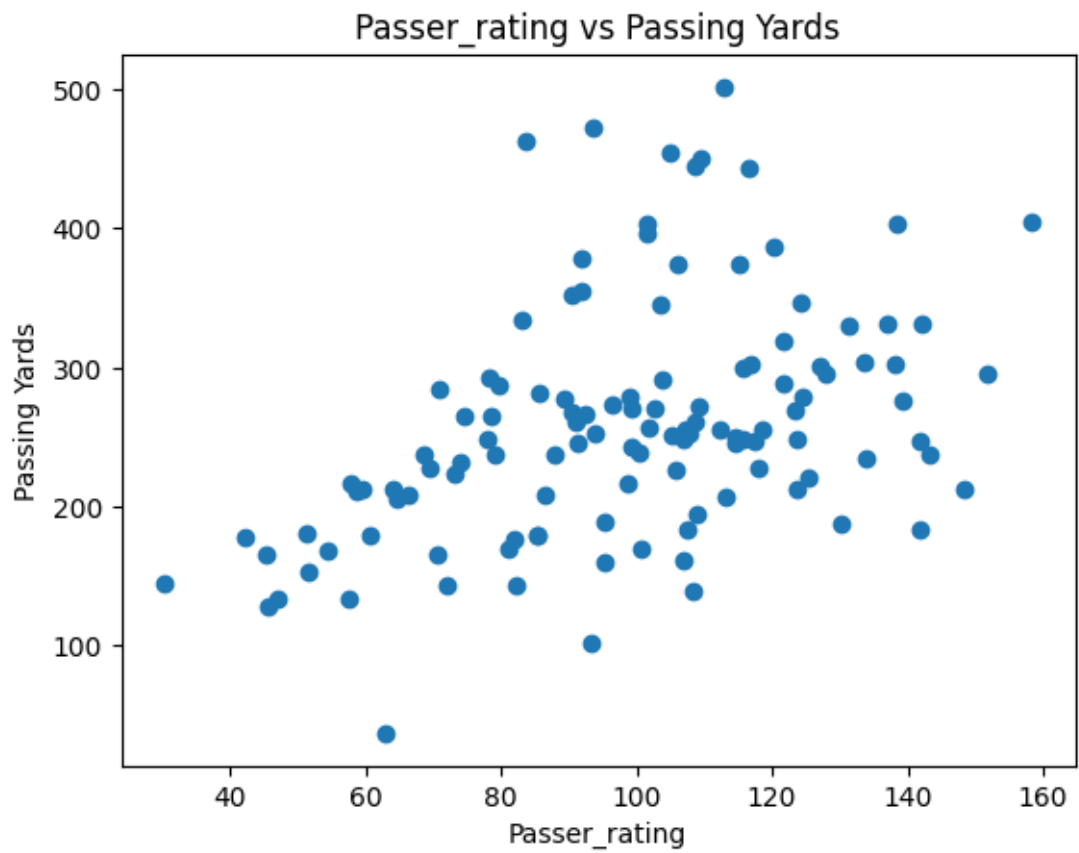


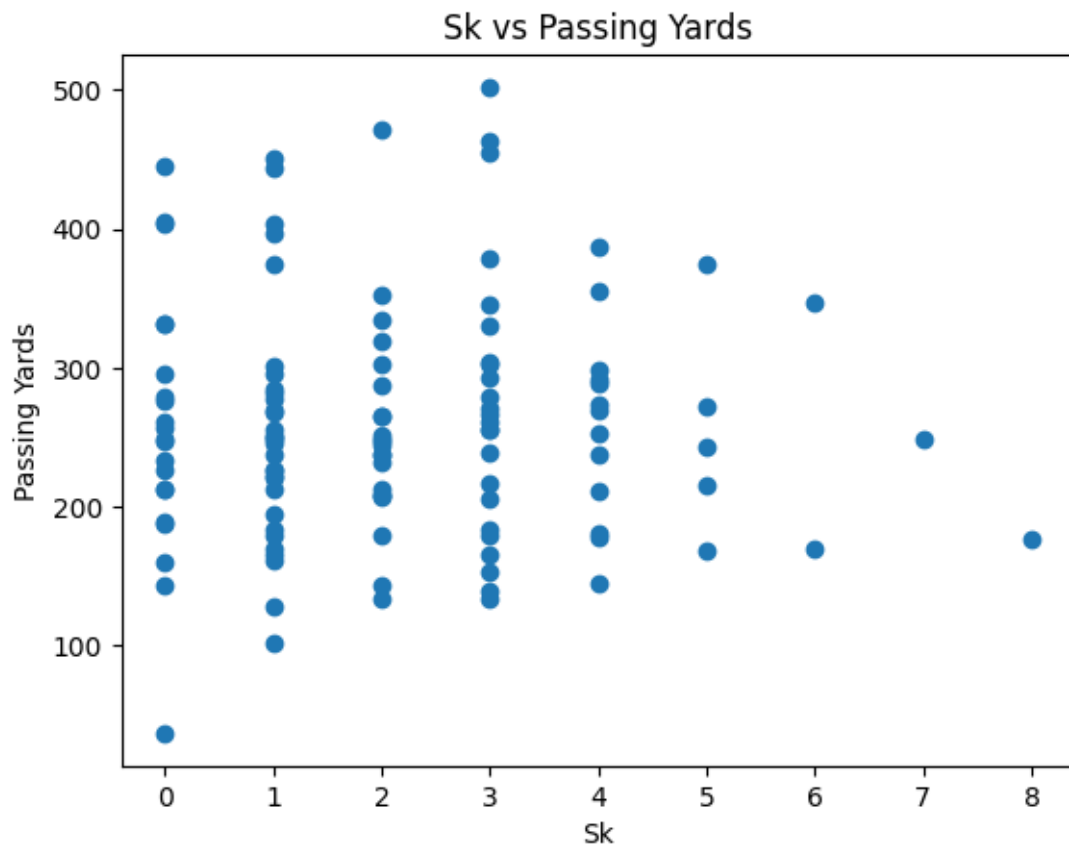


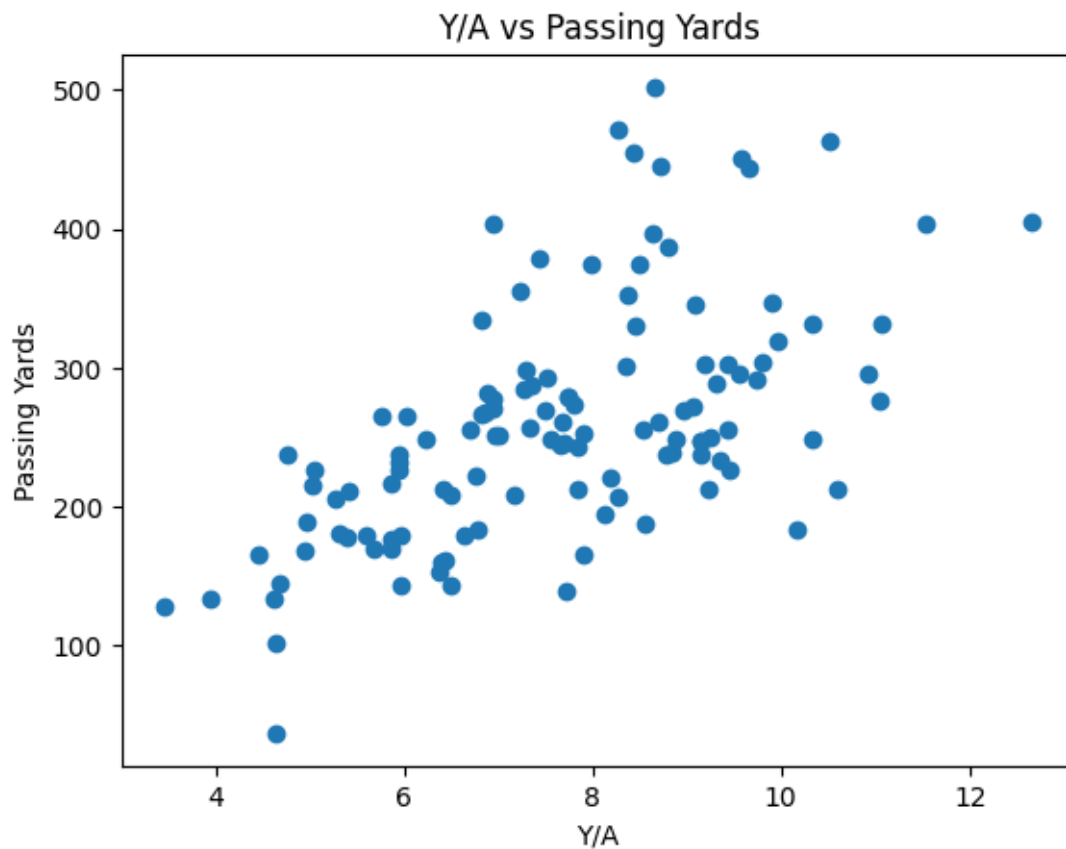








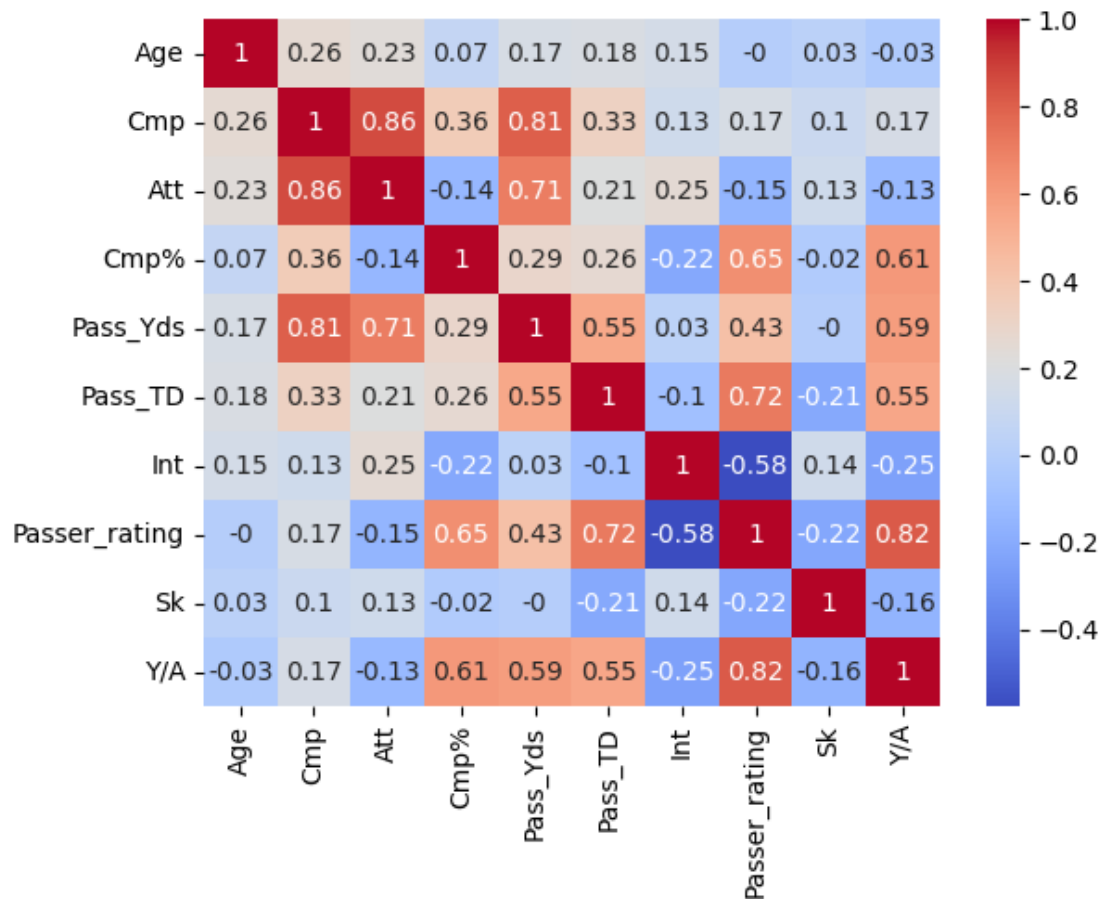




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[6]: import seaborn as sns

cor_matrix = df[nummerical_cols].corr()
sns.heatmap(cor_matrix, annot=cor_matrix.round(2), cmap='coolwarm',)
```

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[6]: <Axes: >
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```
[7]: from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(features, target,
                                                    test_size=.2, random_state=69)

print(X_train.shape, y_train.shape, X_test.shape, y_test.shape)
```

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(96, 9) (96,) (24, 9) (24,)
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```
[8]: from sklearn.linear_model import LinearRegression

linear_reg = LinearRegression() # Model using linear regression
linear_reg.fit(X_train,y_train) # Fit the model with our training data
linear_pred = linear_reg.predict(X_test) # Calc predictions

# Create lists for predicted, actual, and difference values
dif = []
table_data = []
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for i in range(len(linear_pred)):
    predicted = linear_pred[i]
    actual = y_test.values[i]
    difference = actual - predicted
    dif.append(difference)

    # Append each row as a dictionary
    table_data.append({"Predicted": predicted, "Actual": actual, "Difference":
↪difference})

# Convert the list of dictionaries into a pandas DataFrame
test_data = pd.DataFrame(table_data)
test_stats = test_data.describe(percentiles=[0.25,.5,.75])
# Display the DataFrame
print(test_data)
print(test_stats)

```

	Predicted	Actual	Difference
0	321.08	319.00	-2.08
1	268.66	238.00	-30.66
2	249.24	250.00	0.76
3	286.80	282.00	-4.80
4	183.17	178.00	-5.17
5	174.90	179.00	4.10
6	211.44	212.00	0.56
7	365.17	379.00	13.83
8	9.07	37.00	27.93
9	283.06	279.00	-4.06
10	190.14	195.00	4.86
11	260.76	261.00	0.24
12	201.13	188.00	-13.13
13	282.06	276.00	-6.06
14	372.35	375.00	2.65
15	286.66	279.00	-7.66
16	451.44	472.00	20.56
17	254.73	253.00	-1.73
18	418.35	444.00	25.65
19	212.48	208.00	-4.48
20	146.20	160.00	13.80
21	183.61	181.00	-2.61
22	172.33	168.00	-4.33
23	195.42	189.00	-6.42
	Predicted	Actual	Difference
count	24.00	24.00	24.00
mean	249.18	250.08	0.91
std	95.26	97.04	12.58
min	9.07	37.00	-30.66
25%	188.51	186.25	-4.89

50%	251.99	244.00	-1.91
75%	286.69	279.75	4.29
max	451.44	472.00	27.93

```
[9]: # Dak's Stats vs SF
# https://www.pro-football-reference.com/players/P/PresDa01/gamelog/?opp_id=sfo

num_games = 3

dak_cmp_SF = 53/num_games
dak_att_SF = 81/num_games
dak_cmpPer_SF = 65.43
dak_td_SF = 6/num_games
dak_int_SF = 3/num_games
dak_pRate_SF = 98.4
dak_sk_SF = 5/num_games
dak_ydsAtt_SF = 7.8


# 49's Defensive Stats 2024 (So far)
# https://www.pro-football-reference.com/teams/sfo/2024.htm#all_defense
games = 6

SF_passAlw = (1291)/games
SF_int = 6/games
SF_sks = 16/games
SF_pasTDAlw = 8/games
SF_passCmp = 120/games
SF_passAtt = 195/games
SF_cmpPer = (SF_passCmp/SF_passAtt)*100
SF_yardsAtt = (SF_passAlw/SF_passAtt)


# Normalizing stats
norm_cmp = (dak_cmp_SF/SF_passCmp) * dak_cmp_SF
norm_att = (dak_att_SF/SF_passAtt) * dak_att_SF
norm_cmpPer = (dak_cmpPer_SF/SF_cmpPer) * dak_cmpPer_SF
norm_TD = (dak_td_SF/SF_pasTDAlw) * dak_td_SF
norm_int = (dak_int_SF/SF_int) * dak_int_SF
norm_sacks = (dak_sk_SF/SF_sks) * dak_sk_SF
norm_yardsAtt = (dak_ydsAtt_SF/SF_yardsAtt) * dak_ydsAtt_SF


# On October 27th 2024 Dak will be 31.25 years old
stats_vs_SF = [31.25, norm_cmp, norm_att, norm_cmpPer, norm_TD, norm_int,
               ↪dak_pRate_SF, norm_sacks, norm_yardsAtt]

numerical_cols.remove('Pass_Yds')
```

```
test = pd.DataFrame([stats_vs_SF], columns=nummerical_cols)

print(test)
```

	Age	Cmp	Att	Cmp%	Pass_TD	Int	Passer_rating	Sk	Y/A
0	31.25	15.61	22.43	69.57	3.00	1.00	98.40	1.04	9.19

```
[10]: predict = linear_reg.predict(test)
pass_yards = predict[0]
print(f'This Model predicts Dak Prescott will pass for {pass_yards:.2f} yards_
↪vs SF on 10/27/2024')
```

This Model predicts Dak Prescott will pass for 235.80 yards vs SF on 10/27/2024

```
[11]: dak_yds_SF = 632/num_games
norm_passYards = (dak_yds_SF/SF_passAlw) * pass_yards

print(f'Dak AVG Passing Yards vs SF: {dak_yds_SF:.2f}\nSF AVG Passing Yards_
↪Allowed in 2024: {SF_passAlw:.2f}\nPredicted Passing Yards by Dak:_
↪{pass_yards:.2f}\nNormalized Predicted Pass Yards: {norm_passYards:.2f}')
```

Dak AVG Passing Yards vs SF: 210.67
 SF AVG Passing Yards Allowed in 2024: 215.17
 Predicted Passing Yards by Dak: 235.80
 Normalized Predicted Pass Yards: 230.87