РК ИУ5

Ларичева Мария

ИУ5-61Б

12 вариант

Импорт библиотек

In [1]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from pandas.plotting import scatter_matrix
import warnings
warnings.filterwarnings('ignore')
sns.set(style="ticks")
%matplotlib inline
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import LabelEncoder
from sklearn.metrics import mean_absolute_error, mean_squared_error,  median_absolut
```

In [2]:
```
data = pd.read_csv('dc-wikia-data.csv')
data = data.fillna(0)
```

In [3]:
```
data.head()
```

Out[3]:

	page_id	name	urlslug	ID	ALIGN	EYE	HAIR	Sl
0	1422	Batman (Bruce Wayne)	\/wiki\/Batman_(Bruce_Wayne)	Secret Identity	Good Characters	Blue Eyes	Black Hair	Ma Characte
1	23387	Superman (Clark Kent)	\/wiki\/Superman_(Clark_Kent)	Secret Identity	Good Characters	Blue Eyes	Black Hair	Ma Characte
2	1458	Green Lantern (Hal Jordan)	\/wiki\/Green_Lantern_(Hal_Jordan)	Secret Identity	Good Characters	Brown Eyes	Brown Hair	Ma Characte
3	1659	James Gordon (New Earth)	\/wiki\/James_Gordon_(New_Earth)	Public Identity	Good Characters	Brown Eyes	White Hair	Ma Characte
4	1576	Richard Grayson (New Earth)	\/wiki\/Richard_Grayson_(New_Earth)	Secret Identity	Good Characters	Blue Eyes	Black Hair	Ma Characte

In [4]:
```
data.dtypes
```

Out[4]:
```
page_id              int64
name                object
urlslug             object
ID                  object
ALIGN               object
EYE                 object
HAIR                object
SEX                 object
GSM                 object
ALIVE               object
APPEARANCES        float64
FIRST APPEARANCE    object
YEAR               float64
dtype: object
```

In [5]:
```
data.isnull().sum()
# проверим есть ли пропущенные значения
```

Out[5]:
```
page_id             0
name                0
urlslug             0
ID                  0
ALIGN               0
EYE                 0
HAIR                0
SEX                 0
GSM                 0
ALIVE               0
APPEARANCES         0
FIRST APPEARANCE    0
YEAR                0
dtype: int64
```

In [6]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 6896 entries, 0 to 6895
Data columns (total 13 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   page_id           6896 non-null   int64
 1   name              6896 non-null   object
 2   urlslug           6896 non-null   object
 3   ID                6896 non-null   object
 4   ALIGN             6896 non-null   object
 5   EYE               6896 non-null   object
 6   HAIR              6896 non-null   object
 7   SEX               6896 non-null   object
 8   GSM               6896 non-null   object
 9   ALIVE             6896 non-null   object
 10  APPEARANCES       6896 non-null   float64
 11  FIRST APPEARANCE  6896 non-null   object
 12  YEAR              6896 non-null   float64
dtypes: float64(2), int64(1), object(10)
memory usage: 700.5+ KB
```

In [7]:
```
data.head()
```

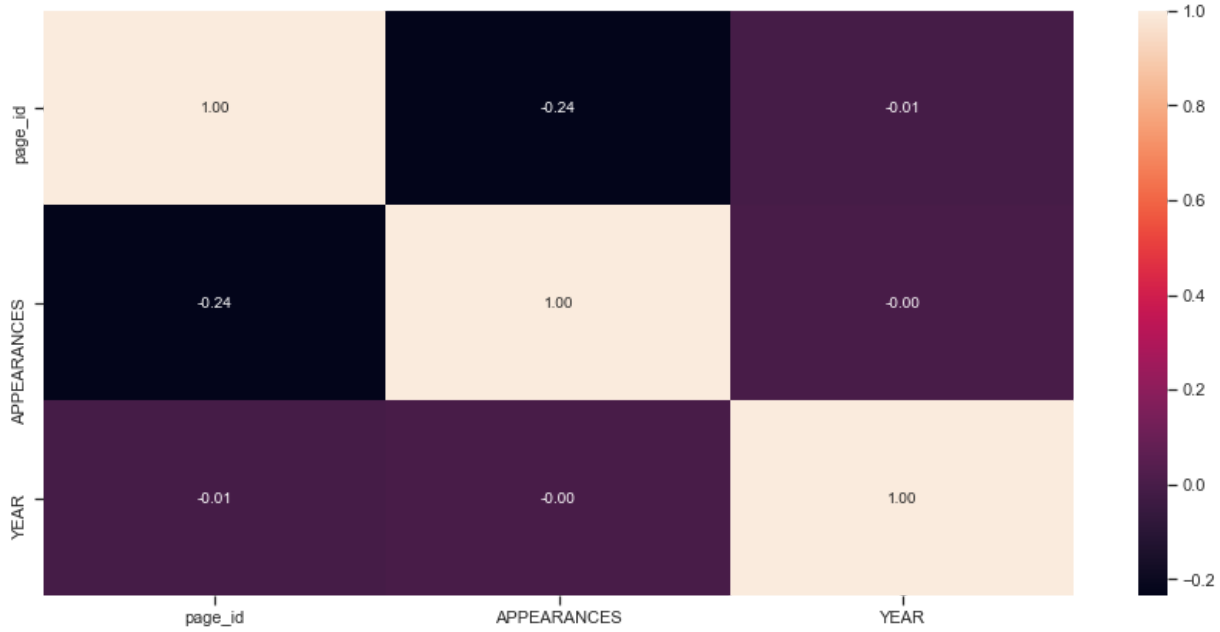
Out[7]:

	page_id	name	urlslug	ID	ALIGN	EYE	HAIR	Sl
0	1422	Batman (Bruce Wayne)	\/wiki\/Batman_(Bruce_Wayne)	Secret Identity	Good Characters	Blue Eyes	Black Hair	Ma Characte
1	23387	Superman (Clark Kent)	\/wiki\/Superman_(Clark_Kent)	Secret Identity	Good Characters	Blue Eyes	Black Hair	Ma Characte

	page_id	name	urlslug	ID	ALIGN	EYE	HAIR	SI
2	1458	Green Lantern (Hal Jordan)	\/wiki\/Green_Lantern_(Hal_Jordan)	Secret Identity	Good Characters	Brown Eyes	Brown Hair	Ma Characte
3	1659	James Gordon (New Earth)	\/wiki\/James_Gordon_(New_Earth)	Public Identity	Good Characters	Brown Eyes	White Hair	Ma Characte
4	1576	Richard Grayson (New Earth)	\/wiki\/Richard_Grayson_(New_Earth)	Secret Identity	Good Characters	Blue Eyes	Black Hair	Ma Characte

In [8]:
```
#Построим корреляционную матрицу
fig, ax = plt.subplots(figsize=(15,7))
sns.heatmap(data.corr(method='pearson'), ax=ax, annot=True, fmt='.2f')
```

Out[8]: <AxesSubplot:>



In [9]:
```
X = data.drop(['name','urlslug','ID','ALIGN','EYE','HAIR','SEX','GSM', 'ALIVE','FIRS
Y = data.APPEARANCES
print('Входные данные:\n\n', X.head(), '\n\nВыходные данные:\n\n', Y.head())
```

```
Входные данные:

    page_id    YEAR
0     1422  1939.0
1    23387  1986.0
2     1458  1959.0
3     1659  1987.0
4     1576  1940.0

Выходные данные:

 0    3093.0
1    2496.0
2    1565.0
```

```
3    1316.0
4    1237.0
Name: APPEARANCES, dtype: float64
```

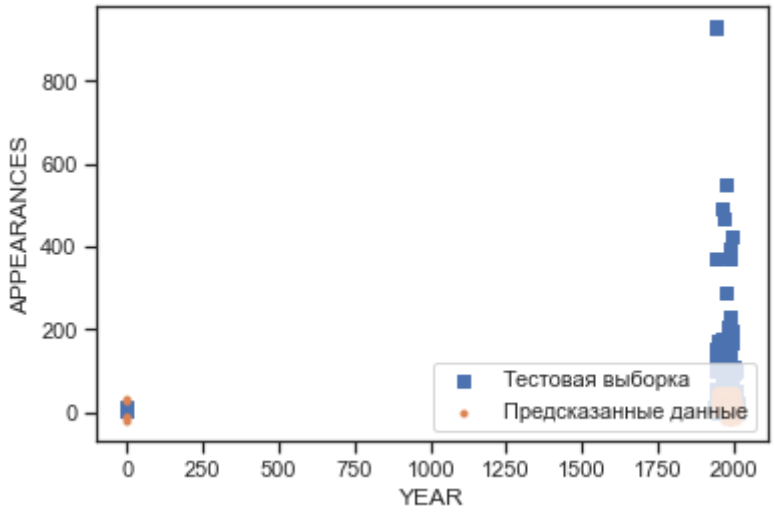
In [10]:
```
X_train,  X_test,  Y_train,  Y_test = train_test_split(X,  Y, random_state = 0, test
print('Входные параметры обучающей выборки:\n\n',X_train.head(), \
      '\n\nВходные параметры тестовой выборки:\n\n', X_test.head(), \
      '\n\nВыходные параметры обучающей выборки:\n\n', Y_train.head(), \
      '\n\nВыходные параметры тестовой выборки:\n\n', Y_test.head())
```

```
Входные параметры обучающей выборки:

       page_id    YEAR
6753   253163  1991.0
1189     4885  2004.0
4938    66363  2008.0
4752   351687  1983.0
214      3610  1963.0

Входные параметры тестовой выборки:

       page_id    YEAR
2975    90166  1994.0
4310   101554  1960.0
2303    18540  1997.0
2625   100831  2007.0
2764   116784  1988.0

Выходные параметры обучающей выборки:

 6753      0.0
1189     22.0
4938      2.0
4752      3.0
214     131.0
Name: APPEARANCES, dtype: float64

Выходные параметры тестовой выборки:

 2975     7.0
4310     4.0
2303    10.0
2625     8.0
2764     8.0
Name: APPEARANCES, dtype: float64
```

In [11]:
```
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_absolute_error, mean_squared_error,  median_absolut
```

In [12]:
```
Lin_Reg = LinearRegression().fit(X_train, Y_train)

lr_y_pred = Lin_Reg.predict(X_test)
```

In [13]:
```
plt.scatter(X_test.YEAR, Y_test,    marker = 's', label = 'Тестовая выборка')
plt.scatter(X_test.YEAR, lr_y_pred, marker = '.', label = 'Предсказанные данные')
plt.legend (loc = 'lower right')
plt.xlabel ('YEAR')
plt.ylabel ('APPEARANCES')
plt.show()
```



In [14]:
```
from sklearn.ensemble import RandomForestRegressor
```

In [15]:
```
forest_1 = RandomForestRegressor(n_estimators=5, oob_score=True, random_state=10)
forest_1.fit(X, Y)
```

Out[15]:
```
RandomForestRegressor(n_estimators=5, oob_score=True, random_state=10)
```

In [16]:
```
Y_predict = forest_1.predict(X_test)
```

In [17]:
```
plt.scatter(X_test.YEAR, Y_test,    marker = 'o', label = 'Тестовая выборка')
plt.scatter(X_test.YEAR, Y_predict, marker = '.', label = 'Предсказанные данные')
plt.legend(loc = 'lower right')
plt.xlabel('YEAR')
plt.ylabel('APPEARANCES')
plt.show()
```