Overview

The tmdb-5000-movies dataset is a collection of movie information available on The Movie Database (TMDB). It is often used in machine learning and data analysis to explore patterns and trends in the film industry. It can also used for recommendation systems.

Dataset Details

The original dataset was generated from The Movie Database API. This product uses the TMDb API but is not endorsed or certified by TMDb. The data was collected from TMDB 5000 Movie Dataset, a popular movie database website known for its wealth of information on movies, TV shows, and celebrities. The dataset contains two main tables:

movies_metadata.csv:

Contains general information about the movies, such as title, language, release date, budget, revenue, popularity, and average votes. Each row corresponds to a movie.

credits.csv:

Includes details about the cast and crew of each movie. Each row corresponds to a crew member (actor, director, writer, etc.) for a specific movie.

Dataset Name: tmdb-5000-movies

Language: English Total Size: 4,803 examples Contents The dataset consists of a data frame with 22 columns as follows:

```
id
budget
genres
homepage
keywords
```

In [1]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np
```

In [2]:
```
df = pd.read_csv("tmdb-movies.csv")
df.head()
```

Out[2]:

	id	imdb_id	popularity	budget	revenue	original_title	cast	
0	135397	tt0369610	32.985763	150000000	1513528810	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	
1	76341	tt1392190	28.419936	150000000	378436354	Mad Max: Fury Road	Tom Hardy|Charlize Theron|Hugh Keays-Byrne|Nic...	
2	262500	tt2908446	13.112507	110000000	295238201	Insurgent	Shailene Woodley|Theo James|Kate Winslet|Ansel...	http://ww
3	140607	tt2488496	11.173104	200000000	2068178225	Star Wars: The Force Awakens	Harrison Ford|Mark Hamill|Carrie Fisher|Adam D...	htt
4	168259	tt2820852	9.335014	190000000	1506249360	Furious 7	Vin Diesel|Paul Walker|Jason Statham|Michelle ...	

5 rows × 21 columns

In [3]:
```
df.shape
```

Out[3]:
```
(10866, 21)
```

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

Out[4]:
```
id                      int64
imdb_id                object
popularity            float64
budget                  int64
revenue                 int64
original_title         object
cast                   object
homepage               object
director               object
tagline                object
keywords               object
overview               object
runtime                 int64
genres                 object
production_companies   object
release_date           object
vote_count              int64
vote_average          float64
release_year            int64
budget_adj            float64
revenue_adj           float64
dtype: object
```

In [5]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10866 entries, 0 to 10865
Data columns (total 21 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   id                    10866 non-null  int64  
 1   imdb_id               10856 non-null  object 
 2   popularity            10866 non-null  float64
 3   budget                10866 non-null  int64  
 4   revenue               10866 non-null  int64  
 5   original_title        10866 non-null  object 
 6   cast                  10790 non-null  object 
 7   homepage              2936 non-null   object 
 8   director              10822 non-null  object 
 9   tagline               8042 non-null   object 
 10  keywords              9373 non-null   object 
 11  overview              10862 non-null  object 
 12  runtime               10866 non-null  int64  
 13  genres                10843 non-null  object 
 14  production_companies  9836 non-null   object 
 15  release_date          10866 non-null  object 
 16  vote_count            10866 non-null  int64  
 17  vote_average          10866 non-null  float64
 18  release_year          10866 non-null  int64  
 19  budget_adj            10866 non-null  float64
 20  revenue_adj           10866 non-null  float64
dtypes: float64(4), int64(6), object(11)
memory usage: 1.7+ MB
```

In [6]:
```
df.nunique()
```

Out[6]:
```
id                    10865
imdb_id               10855
popularity            10814
budget                  557
revenue                4702
original_title        10571
cast                  10719
homepage               2896
director               5067
tagline                7997
keywords               8804
overview              10847
runtime                 247
genres                 2039
production_companies   7445
release_date           5909
vote_count             1289
vote_average             72
release_year             56
budget_adj             2614
revenue_adj            4840
dtype: int64
```

In [7]:
```
df.describe()
```

Out[7]:

	id	popularity	budget	revenue	runtime	vote_count	v
count	10866.000000	10866.000000	1.086600e+04	1.086600e+04	10866.000000	10866.000000	1(
mean	66064.177434	0.646441	1.462570e+07	3.982332e+07	102.070863	217.389748	
std	92130.136561	1.000185	3.091321e+07	1.170035e+08	31.381405	575.619058	
min	5.000000	0.000065	0.000000e+00	0.000000e+00	0.000000	10.000000	
25%	10596.250000	0.207583	0.000000e+00	0.000000e+00	90.000000	17.000000	
50%	20669.000000	0.383856	0.000000e+00	0.000000e+00	99.000000	38.000000	
75%	75610.000000	0.713817	1.500000e+07	2.400000e+07	111.000000	145.750000	
max	417859.000000	32.985763	4.250000e+08	2.781506e+09	900.000000	9767.000000	

In [8]:
```
# MISSING VALUES CHECKS
df.isnull().sum()
```

Out[8]:
```
id                         0
imdb_id                   10
popularity                 0
budget                     0
revenue                    0
original_title             0
cast                      76
homepage                7930
director                  44
tagline                 2824
keywords                1493
overview                   4
runtime                    0
genres                    23
production_companies    1030
release_date               0
vote_count                 0
vote_average               0
release_year               0
budget_adj                 0
revenue_adj                0
dtype: int64
```

In [9]:
```
df.isnull().sum().any()
```

Out[9]:
```
True
```

In [10]:
```
## deleting the columns

df.drop(["id","imdb_id","homepage","overview"],axis=1, inplace=True)
```

In [11]:
```
df.columns
```

Out[11]:
```
Index(['popularity', 'budget', 'revenue', 'original_title', 'cast', 'directo
r',
       'tagline', 'keywords', 'runtime', 'genres', 'production_companies',
       'release_date', 'vote_count', 'vote_average', 'release_year',
       'budget_adj', 'revenue_adj'],
      dtype='object')
```

In [12]:
```
len(df.columns)
```

Out[12]:
```
17
```

In [13]:
```
df.shape
```

Out[13]:
```
(10866, 17)
```

In [14]:
```
# Check duplicate records

df.drop_duplicates(inplace=True)
```

In [15]:
```
df.shape
```

Out[15]:
```
(10865, 17)
```

In [16]:
```
df.isnull().sum()
```

Out[16]:
```
popularity                 0
budget                     0
revenue                    0
original_title             0
cast                      76
director                  44
tagline                 2824
keywords                1493
runtime                    0
genres                    23
production_companies    1030
release_date               0
vote_count                 0
vote_average               0
release_year               0
budget_adj                 0
revenue_adj                0
dtype: int64
```

In [17]:
```
## Filling the blank records
df['cast'].fillna('missing',inplace=True)
df['director'].fillna('missing',inplace=True)
df['tagline'].fillna('missing',inplace=True)
df['keywords'].fillna('missing',inplace=True)
df['production_companies'].fillna('missing',inplace=True)
df['genres'].fillna('missing',inplace=True)
```

In [18]:
```
df.isnull().sum()
```

Out[18]:
```
popularity              0
budget                  0
revenue                 0
original_title          0
cast                    0
director                0
tagline                 0
keywords                0
runtime                 0
genres                  0
production_companies    0
release_date            0
vote_count              0
vote_average            0
release_year            0
budget_adj              0
revenue_adj             0
dtype: int64
```

In [19]:
```
df
```

Out[19]:

	popularity	budget	revenue	original_title	cast	director	t
0	32.985763	150000000	1513528810	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	Colin Trevorrow	The
1	28.419936	150000000	378436354	Mad Max: Fury Road	Tom Hardy|Charlize Theron|Hugh Keays-Byrne|Nic...	George Miller	Love
2	13.112507	110000000	295238201	Insurgent	Shailene Woodley|Theo James|Kate Winslet|Ansel...	Robert Schwentke	One Destr
3	11.173104	200000000	2068178225	Star Wars: The Force Awakens	Harrison Ford|Mark Hamill|Carrie Fisher|Adam D...	J.J. Abrams	gen has a
4	9.335014	190000000	1506249360	Furious 7	Vin Diesel|Paul Walker|Jason Statham|Michelle ...	James Wan	Veng Hits
...	...	...	...	...	...	...	
10861	0.080598	0	0	The Endless Summer	Michael Hynson|Robert August|Lord 'Tally Ho' B...	Bruce Brown	n
10862	0.065543	0	0	Grand Prix	James Garner|Eva Marie Saint|Yves Montand|Tosh...	John Frankenheimer	Cin s YOU dra spe
10863	0.065141	0	0	Beregis Avtomobilya	Innokentiy Smoktunovskiy|Oleg Efremov|Georgi Z...	Eldar Ryazanov	n
10864	0.064317	0	0	What's Up, Tiger Lily?	Tatsuya Mihashi|Akiko Wakabayashi|Mie Hama|Joh...	Woody Allen	W A ST
10865	0.035919	19000	0	Manos: The Hands of Fate	Harold P. Warren|Tom Neyman|John Reynolds|Dian...	Harold P. Warren	Sho It's E Imagi

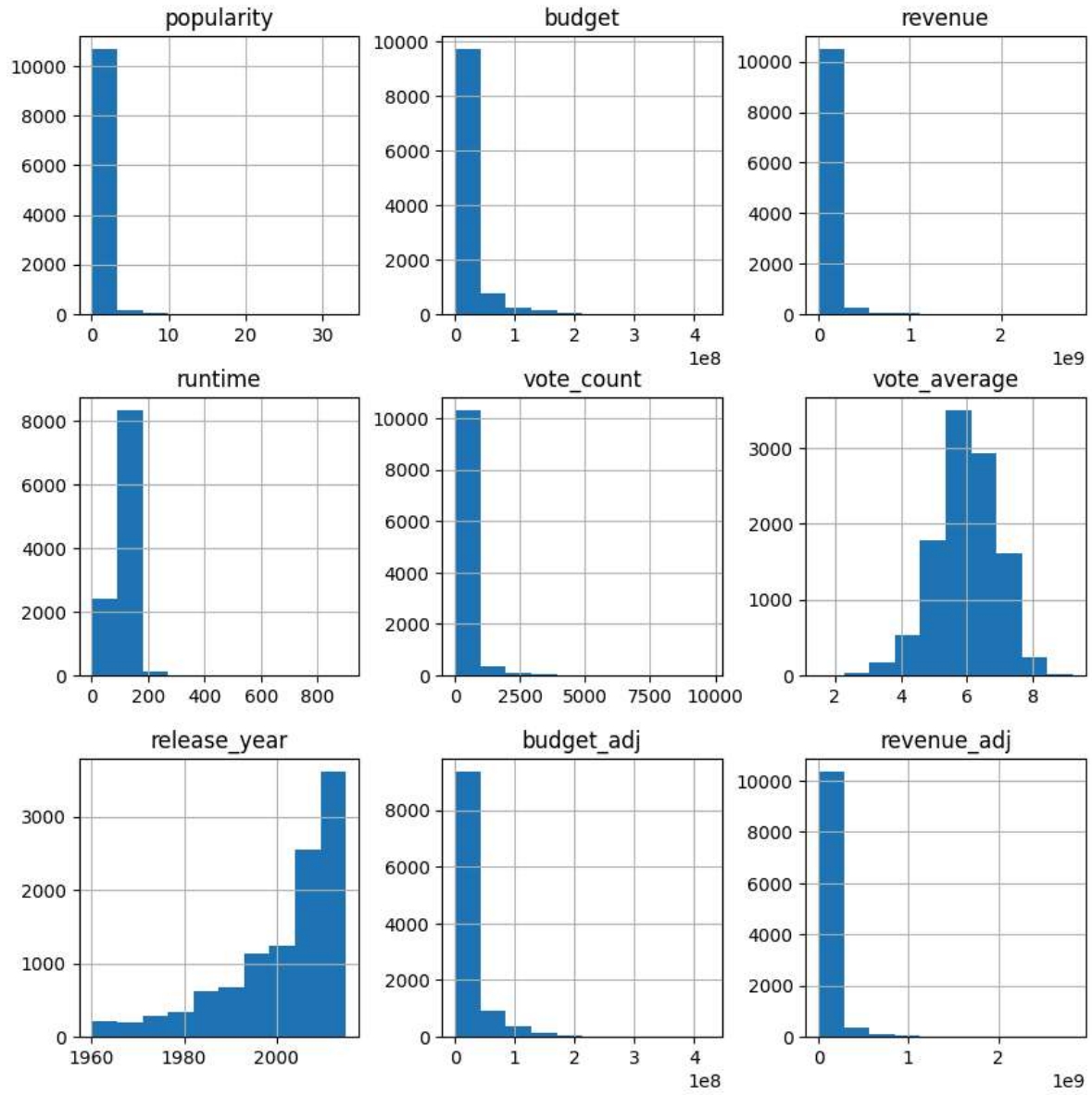
10865 rows × 17 columns

In [20]:
```
# Check duplicate records

df.drop_duplicates().any()
```

Out[20]:
```
popularity              True
budget                  True
revenue                 True
original_title          True
cast                    True
director                True
tagline                 True
keywords                True
runtime                 True
genres                  True
production_companies    True
release_date            True
vote_count              True
vote_average            True
release_year            True
budget_adj              True
revenue_adj             True
dtype: bool
```

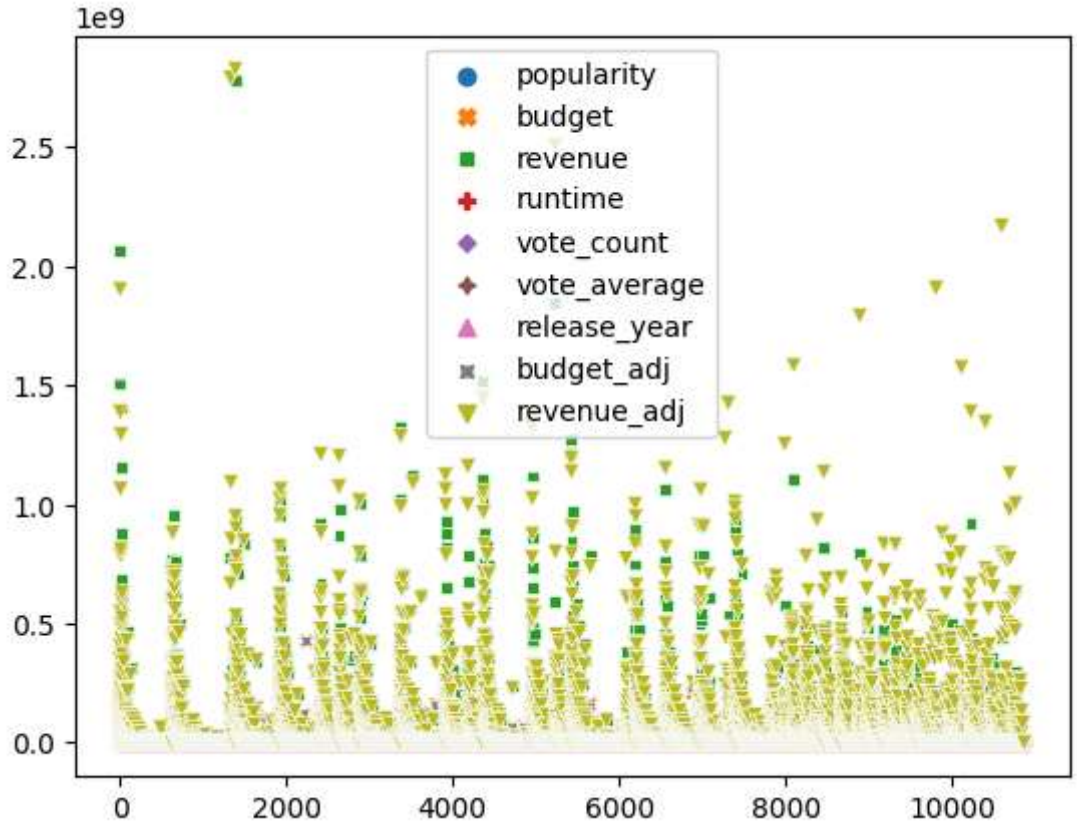
In [21]:
```
## Data variation
df.hist(figsize=(10,10))
plt.show()
```



In [22]:
```
df.to_csv("tmdb_new.csv")
```

In [23]:
```
sns.scatterplot(df)
```

Out[23]: <Axes: >



In [24]:
```
## Q1 Does the higher budget means higher polularities? what is the relation?
```

In [25]:
```
df.query('budget > 10000')
```

Out[25]:

	popularity	budget	revenue	original_title	cast	director	
0	32.985763	150000000	1513528810	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	Colin Trevorrow	The
1	28.419936	150000000	378436354	Mad Max: Fury Road	Tom Hardy|Charlize Theron|Hugh Keays-Byrne|Nic...	George Miller	What a
2	13.112507	110000000	295238201	Insurgent	Shailene Woodley|Theo James|Kate Winslet|Ansel...	Robert Schwentke	One Can
3	11.173104	200000000	2068178225	Star Wars: The Force Awakens	Harrison Ford|Mark Hamill|Carrie Fisher|Adam D...	J.J. Abrams	genera
4	9.335014	190000000	1506249360	Furious 7	Vin Diesel|Paul Walker|Jason Statham|Michelle ...	James Wan	Vengeai
...	...	...	...	...	...	...	
10835	0.299911	12000000	20000000	The Sand Pebbles	Steve McQueen|Richard Attenborough|Richard Cre...	Robert Wise	Th heroic the mei
10841	0.264925	75000	0	The Shooting	Will Hutchins|Millie Perkins|Jack Nicholson|Wa...	Monte Hellman	Susp desert p the "Higl
10848	0.207257	5115000	12000000	Fantastic Voyage	Stephen Boyd|Raquel Welch|Edmond O'Brien|Donal...	Richard Fleischer	A Fanta Spe V Thr
10855	0.141026	700000	0	The Ghost & Mr. Chicken	Don Knotts|Joan Staley|Liam Redmond|Dick Sarge...	Alan Rafkin	GUARAI YOI S UNT
10865	0.035919	19000	0	Manos: The Hands of Fate	Harold P. Warren|Tom Neyman|John Reynolds|Dian...	Harold P. Warren	It's Sh It's Beyo Imag

5099 rows × 17 columns

In [26]:
```
m = df['budget'].mean()
m
```

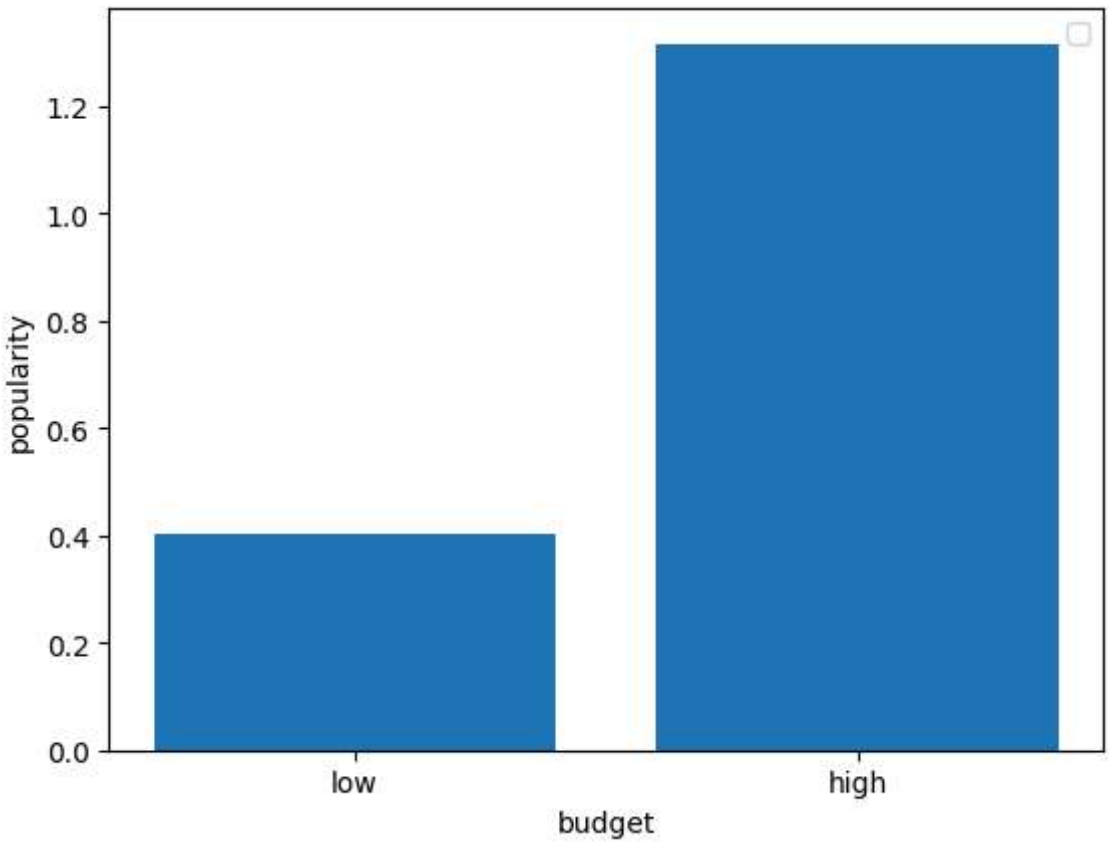
Out[26]:
```
14624286.06433502
```

In [27]:
```
low_bdg= df.query('budget < {}'.format(m))
high_bdg= df.query('budget >= {}'.format(m))
# print(low_bdg)
# print(high_bdg)
```

In [28]:
```
m_popularity_low = low_bdg["popularity"].mean()
m_popularity_high = high_bdg["popularity"].mean()

labels = ["low","high"]
location = [1,2]
values = [m_popularity_low,m_popularity_high]
plt.bar(location,values,tick_label = labels)
plt.legend()
plt.xlabel("budget")
plt.ylabel("popularity")
plt.show()
```

```
No artists with labels found to put in legend.  Note that artists whose label
start with an underscore are ignored when legend() is called with no argumen
t.
```



In [29]:
```
p = (m_popularity_high - m_popularity_low) / m_popularity_high *100
p
```

Out[29]:
```
69.2897746748735
```

Q2 TO identify the highest revenue movies?

In [30]:
```
highest_df = df.nlargest(10,'revenue')
```

In [31]:
```
highest_df
```

Out[31]:

	popularity	budget	revenue	original_title	cast	director	taglin
1386	9.432768	237000000	2781505847	Avatar	Sam Worthington|Zoe Saldana|Sigourney Weaver|S...	James Cameron	Enter th World c Pandora
3	11.173104	200000000	2068178225	Star Wars: The Force Awakens	Harrison Ford|Mark Hamill|Carrie Fisher|Adam D...	J.J. Abrams	Ever generatio has stor
5231	4.355219	200000000	1845034188	Titanic	Kate Winslet|Leonardo DiCaprio|Frances Fisher|...	James Cameron	Nothing o Eart coul com betwee them
4361	7.637767	220000000	1519557910	The Avengers	Robert Downey Jr.|Chris Evans|Mark Ruffalo|Chr...	Joss Whedon	Som assembl required
0	32.985763	150000000	1513528810	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	Colin Trevorrow	The park i oper
4	9.335014	190000000	1506249360	Furious 7	Vin Diesel|Paul Walker|Jason Statham|Michelle ...	James Wan	Vengeanc Hits Hom
14	5.944927	280000000	1405035767	Avengers: Age of Ultron	Robert Downey Jr.|Chris Hemsworth|Mark Ruffalo...	Joss Whedon	A New Ag Has Come
3374	5.711315	125000000	1327817822	Harry Potter and the Deathly Hallows: Part 2	Daniel Radcliffe|Rupert Grint|Emma Watson|Alan...	David Yates	It all end here
5422	6.112766	150000000	1274219009	Frozen	Kristen Bell|Idina Menzel|Jonathan Groff|Josh ...	Chris Buck|Jennifer Lee	Only th act of tru love w thaw frozen h.
5425	4.946136	200000000	1215439994	Iron Man 3	Robert Downey Jr.|Gwyneth Paltrow|Guy Pearce|D...	Shane Black	Unleas the powe behind th armo

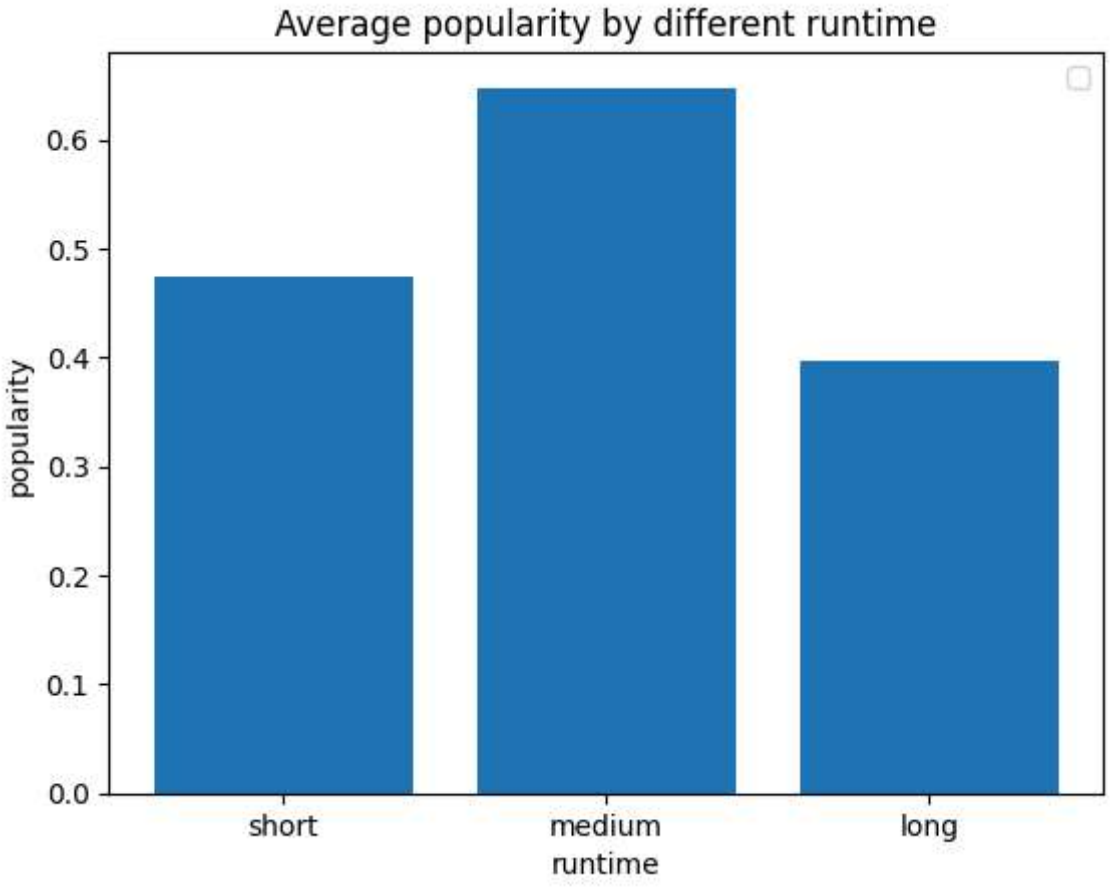
Q3 which type of length of movies will received the high popularities?

In [33]:
```
short = df.query('runtime < {}'.format(100))
medium = df.query('runtime < {}'.format(200))
long = df.query('runtime > {}'.format(200))
```

In [36]:
```
mean_short = short['popularity'].mean()
mean_medium = medium['popularity'].mean()
mean_long = long['popularity'].mean()
```

In [44]:
```
labels = ["short","medium","long"]
location = [1,2,3]
values = [mean_short,mean_medium,mean_long]
plt.bar(location,values,tick_label = labels)
plt.legend()
plt.title("Average popularity by different runtime")
plt.xlabel("runtime")
plt.ylabel("popularity")
plt.show()
```

```
No artists with labels found to put in legend.  Note that artists whose label
start with an underscore are ignored when legend() is called with no argumen
t.
```



In [46]:
```
# Exercise

1 - Find higest 20 records based on Budget? #don't use nlargest function

2- which director movies again highest popularity?

3- how many movies released in 2015?

4- Find out the highest vote_count against highest popularity?

5- Which of the production_companies have released maximum movies 2015?
```

In [ ]:
```

```