In [93]:
```
# import necessary modulus
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
from urllib.request import urlopen
from bs4 import BeautifulSoup
import re

from pylab import rcParams
import seaborn as sns, numpy as np
```

In [94]:
```
from requests import get
url = 'http://www.imdb.com/search/title?release_date=2019&sort=num_votes,desc&pag
response = get(url)
```

In [95]:
```
from bs4 import BeautifulSoup
html_soup = BeautifulSoup(response.text, 'html.parser')
type(html_soup)
```

Out[95]:
```
bs4.BeautifulSoup
```

In [96]:
```
movie_containers = html_soup.find_all('div', class_ = 'lister-item mode-advanced
```

In [97]:
```
headers = {"Accept-Language": "en-US, en;q=0.5"}
```

In [98]:
```
pages = [str(i) for i in range(0,9)]
years_url = [str(i) for i in range(2010,2019)]
```

In [99]:
```
from time import sleep
from random import randint
```

In [100]:
```
from time import time;start_time = time()
from datetime import timedelta
requests = 0
for _ in range(5):
# A request would go here
    requests += 1
    sleep(randint(1,3))
    elapsed_time = time() - start_time
    print('Request: {}; Frequency: {} requests/s'.format(requests, requests/elaps
```

```
Request: 1; Frequency: 0.3320902361699865 requests/s
Request: 2; Frequency: 0.49849401895102663 requests/s
Request: 3; Frequency: 0.4277753270058088 requests/s
Request: 4; Frequency: 0.44366741868167764 requests/s
Request: 5; Frequency: 0.4538833507374269 requests/s
```

In [101]:
```
from IPython.core.display import clear_output
# start_time = time()requests = 0
for _ in range(10):
# Start to reaquest
    requests += 1
    sleep(randint(1,3))
    current_time = time()
    elapsed_time = current_time - start_time
    print('Request: {}; Frequency: {} requests/s'.format(requests, requests/elaps
clear_output(wait = True)
```

```
Request: 6; Frequency: 0.49887318614786424 requests/s
Request: 7; Frequency: 0.46579562312989464 requests/s
Request: 8; Frequency: 0.49912270875110126 requests/s
Request: 9; Frequency: 0.528514663895841 requests/s
Request: 10; Frequency: 0.4992731602477715 requests/s
Request: 11; Frequency: 0.5230794131277997 requests/s
Request: 12; Frequency: 0.5447188552148651 requests/s
Request: 13; Frequency: 0.5409707042566533 requests/s
Request: 14; Frequency: 0.5179116246759505 requests/s
Request: 15; Frequency: 0.49946696820397957 requests/s
```

In [102]:
```
from warnings import warn
warn("Warning Simulation")
```

```
C:\Users\gladies\Anaconda3\lib\site-packages\ipykernel_launcher.py:2: UserWarni
ng: Warning Simulation
```

In [103]:
```
# Given lists for storage
names = []
years = []
imdb_ratings = []
metascores = []
votes = []
grade_class = []
runing_time = []
moviegenre = []

# Start request and check requst response
start_time = time()
requests = 0

# lopping from pages 2010-2019
for year_url in years_url:

    # looping the page
    for page in pages:

        # Ask a request
        response = get('http://www.imdb.com/search/title?release_date=' + year_u
        '&sort=num_votes,desc&page=' + page, headers = headers)

        # Sleep
        sleep(randint(8,15))

        # Check request and monitor request response
        requests += 1
        elapsed_time = time() - start_time
        print('Request:{}; Frequency: {} requests/s'.format(requests, requests/e
        clear_output(wait = True)

        # Thrown warning
        if response.status_code != 200:
            warn('Request: {}; Status code: {}'.format(requests, response.status_

        # Break reqesuts for >100
        if requests > 100:
            warn('Number of requests was greater than expected.')
            break

        # Parse to beautiful stoup
        page_html = BeautifulSoup(response.text, 'html.parser')

        # Find items and put into containers
        mv_containers = page_html.find_all('div', class_ = 'lister-item mode-adv

        # Movie container for each page
        for container in mv_containers:
            # If the movie has a Metascore, then:
            if container.find('div', class_ = 'ratings-metascore') is not None:

                # Scrape the name
                name = container.h3.a.text
                names.append(name)
```

```
                # Scrape the year
                year = container.h3.find('span', class_ = 'lister-item-year').te
                years.append(year)

                # Scrape the IMDB rating
                imdb = float(container.strong.text)
                imdb_ratings.append(imdb)

                # Scrape the Metascore
                m_score = container.find('span', class_ = 'metascore').text
                metascores.append(int(m_score))

                # Scrape the number of votes
                vote = container.find('span', attrs = {'name':'nv'})['data-value
                votes.append(int(vote))

                # Scrape the grade
                grade = container.find('span', class_ = 'certificate').text
                grade_class.append(grade)

                # Scrape the runtime
                runtime = container.find('span', class_ = 'runtime').text
                runing_time.append(runtime)

                # Scrape the genre
                genre = container.find('span', class_ = 'genre').text
                moviegenre.append(genre)
```

```
Request:81; Frequency: 0.07688542618304425 requests/s
```

In [104]:
```
import pandas as pd
movie_ratings = pd.DataFrame({'movie': names,
'year': years,
'imdb': imdb_ratings,
'metascore': metascores,
'votes': votes,
'grade': grade_class,
'runtime': runing_time,
'genre': moviegenre
})
print(movie_ratings.info())
movie_ratings.tail(10)
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 3690 entries, 0 to 3689
Data columns (total 8 columns):
movie        3690 non-null object
year         3690 non-null object
imdb         3690 non-null float64
metascore    3690 non-null int64
votes        3690 non-null int64
grade        3690 non-null object
runtime      3690 non-null object
genre        3690 non-null object
dtypes: float64(1), int64(2), object(5)
memory usage: 230.8+ KB
None
```

Out[104]:

	movie	year	imdb	metascore	votes	grade	runtime	genre
3680	Sicario: Day of the Soldado	(2018)	7.1	61	103786	R	122 min	\nAction, Crime, Drama
3681	Ralph Breaks the Internet	(2018)	7.1	71	103685	PG	112 min	\nAnimation, Adventure, Comedy
3682	The Predator	(2018)	5.4	48	102975	R	107 min	\nAction, Adventure, Sci-Fi
3683	The Nun	(2018)	5.3	46	100165	R	96 min	\nHorror, Mystery, Thriller
3684	A Simple Favor	(2018)	6.8	67	98667	R	117 min	\nComedy, Crime, Drama
3685	Halloween	(I) (2018)	6.6	67	98328	R	106 min	\nHorror, Thriller
3686	The Ballad of Buster Scruggs	(2018)	7.3	79	96315	R	133 min	\nComedy, Drama, Musical
3687	Maze Runner: The Death Cure	(2018)	6.2	50	96196	PG-13	143 min	\nAction, Sci-Fi, Thriller
3688	Pacific Rim: Uprising	(2018)	5.6	44	93526	PG-13	111 min	\nAction, Adventure, Sci-Fi
3689	Tag	(I) (2018)	6.5	56	93459	R	100 min	\nComedy

In [105]:
```
movie_ratings = movie_ratings[['movie', 'year', 'imdb', 'metascore', 'votes', 'g
movie_ratings.head()
```

Out[105]:

	movie	year	imdb	metascore	votes	grade	runtime	genre
0	Inception	(2010)	8.8	74	1884515	PG-13	148 min	\nAction, Adventure, Sci-Fi
1	Shutter Island	(2010)	8.1	63	1031485	R	138 min	\nMystery, Thriller
2	Toy Story 3	(2010)	8.3	92	704131	G	103 min	\nAnimation, Adventure, Comedy
3	Iron Man 2	(2010)	7.0	57	674392	PG-13	124 min	\nAction, Adventure, Sci-Fi
4	Black Swan	(2010)	8.0	79	659640	R	108 min	\nDrama, Thriller

In [106]:
```
movie_ratings['year'].unique()
```

Out[106]:
```
array(['(2010)', '(I) (2010)', '(2011)', '(I) (2011)', '(2012)',
       '(I) (2012)', '(2013)', '(I) (2013)', '(2014)', '(I) (2014)',
       '(II) (2014)', '(2015)', '(I) (2015)', '(II) (2015)', '(2016)',
       '(II) (2016)', '(I) (2016)', '(IX) (2016)', '(2017)', '(I) (2017)',
       '(2018)', '(I) (2018)', '(III) (2018)'], dtype=object)
```

In [107]:
```
movie_ratings.loc[:, 'year'] = movie_ratings['year'].str[-5:-1].astype(int)
```

In [108]:
```
movie_ratings['year'].tail(3)
```

Out[108]:
```
3687    2018
3688    2018
3689    2018
Name: year, dtype: int32
```

In [109]:
```
movie_ratings.describe().loc[['min', 'max'], ['imdb', 'metascore']]
```

Out[109]:

	imdb	metascore
min	4.1	27.0
max	8.8	100.0

In [110]:
```
movie_ratings['n_imdb'] = movie_ratings['imdb'] * 10
movie_ratings.head(3)
```

Out[110]:

	movie	year	imdb	metascore	votes	grade	runtime	genre	n_imdb
0	Inception	2010	8.8	74	1884515	PG-13	148 min	\nAction, Adventure, Sci-Fi	88.0
1	Shutter Island	2010	8.1	63	1031485	R	138 min	\nMystery, Thriller	81.0
2	Toy Story 3	2010	8.3	92	704131	G	103 min	\nAnimation, Adventure, Comedy	83.0

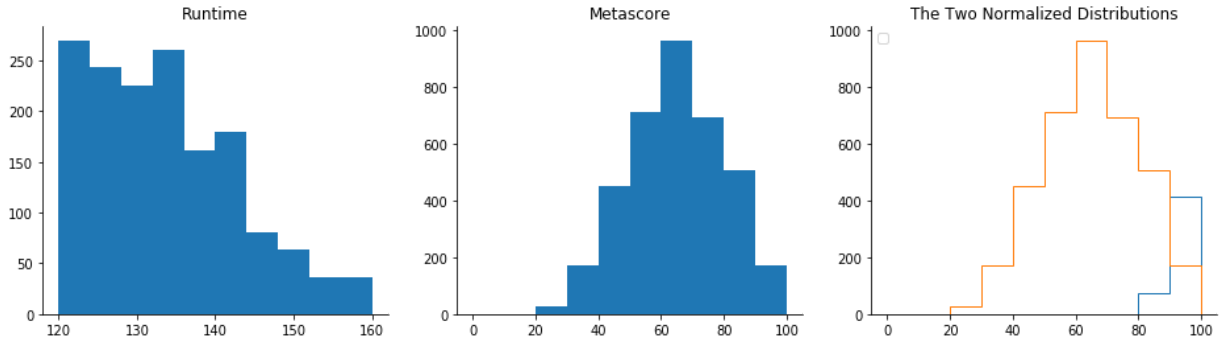
In [111]:
```
#Remove unwanted character in genre
genre_list = movie_ratings['genre'].tolist()
genre_name = []
for i in genre_list:
    name = i.strip("\n")
    genre_name.append(name)
#pass name back to genre_list
movie_ratings['genre'] = genre_name
movie_ratings.head(5)
print(movie_ratings.head(5))
```

```
            movie  year  imdb  metascore    votes  grade  runtime  \
0       Inception  2010   8.8         74  1884515  PG-13  148 min
1  Shutter Island  2010   8.1         63  1031485      R  138 min
2     Toy Story 3  2010   8.3         92   704131      G  103 min
3      Iron Man 2  2010   7.0         57   674392  PG-13  124 min
4      Black Swan  2010   8.0         79   659640      R  108 min

                                  genre  n_imdb
0     Action, Adventure, Sci-Fi             88.0
1              Mystery, Thriller            81.0
2  Animation, Adventure, Comedy             83.0
3     Action, Adventure, Sci-Fi             70.0
4                Drama, Thriller            80.0
```

In [112]:
```
movie_ratings.to_csv('cs5010_movie_ratings.csv')
```

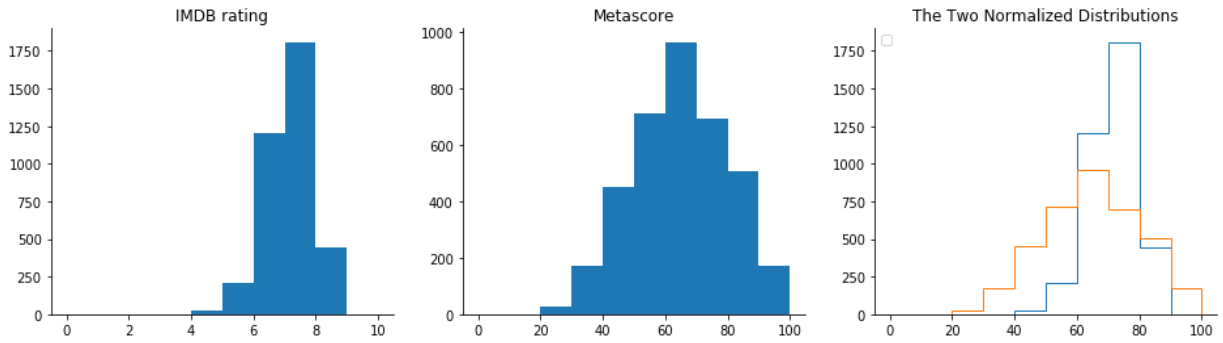
In [125]:
```
import matplotlib.pyplot as plt

fig, axes = plt.subplots(nrows = 1, ncols = 3, figsize = (16,4))
ax1, ax2, ax3 = fig.axes
ax1.hist(movie_ratings['runtime'], bins = 10, range = (120,160)) # bin range = 1
ax1.set_title('Runtime')
ax2.hist(movie_ratings['metascore'], bins = 10, range = (0,100)) # bin range = 1
ax2.set_title('Metascore')
ax3.hist(movie_ratings['runtime'], bins = 10, range = (0,100), histtype = 'step'
ax3.hist(movie_ratings['metascore'], bins = 10, range = (0,100), histtype = 'ste
ax3.legend(loc = 'upper left')
ax3.set_title('The Two Normalized Distributions')
for ax in fig.axes:
    ax.spines['top'].set_visible(False)
    ax.spines['right'].set_visible(False)
plt.show()
```

```
No handles with labels found to put in legend.
```

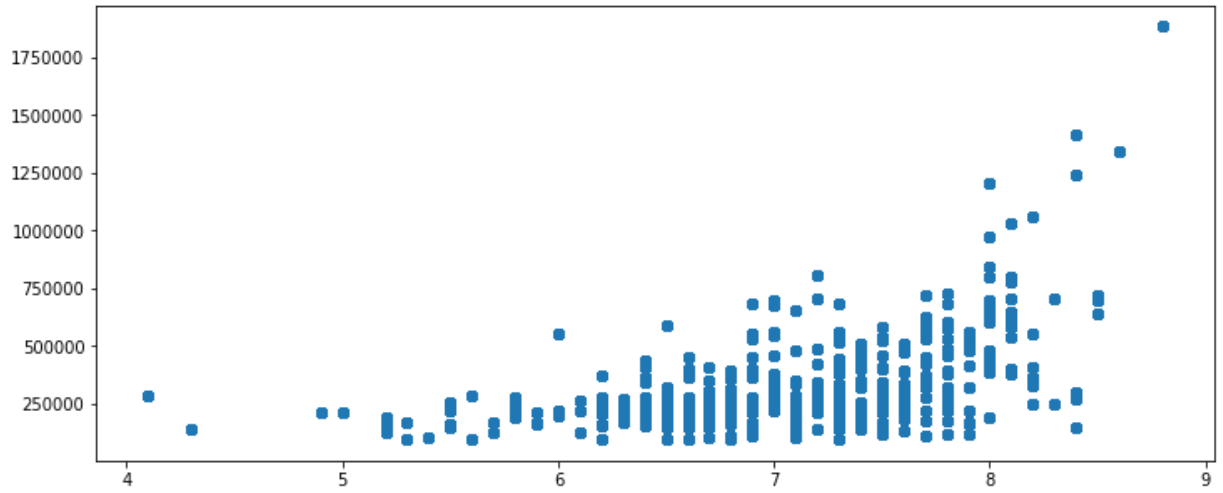


In [114]:
```
import matplotlib.pyplot as plt

fig, axes = plt.subplots(nrows = 1, ncols = 3, figsize = (16,4))
ax1, ax2, ax3 = fig.axes
ax1.hist(movie_ratings['imdb'], bins = 10, range = (0,10)) # bin range = 1
ax1.set_title('IMDB rating')
ax2.hist(movie_ratings['metascore'], bins = 10, range = (0,100)) # bin range = 1
ax2.set_title('Metascore')
ax3.hist(movie_ratings['n_imdb'], bins = 10, range = (0,100), histtype = 'step')
ax3.hist(movie_ratings['metascore'], bins = 10, range = (0,100), histtype = 'step
ax3.legend(loc = 'upper left')
ax3.set_title('The Two Normalized Distributions')
for ax in fig.axes:
    ax.spines['top'].set_visible(False)
    ax.spines['right'].set_visible(False)
plt.show()
```

```
No handles with labels found to put in legend.
```



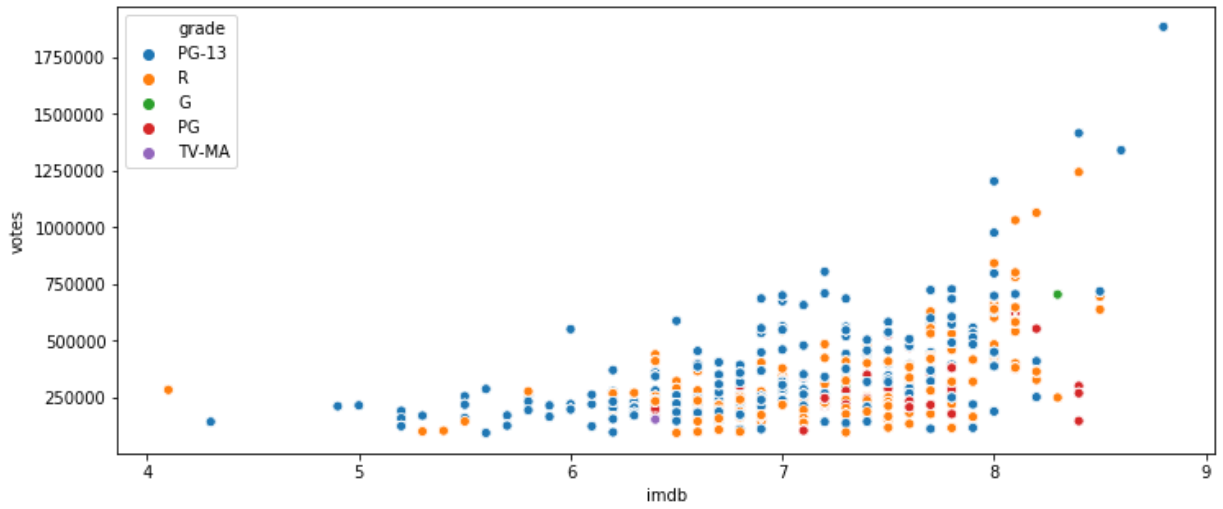
In [115]:
```
#Start to make charts and do statistical analysis
import seaborn as sns, numpy as np
from matplotlib import pyplot as plt
import matplotlib.pyplot as plt
import matplotlib.pyplot as plt
plt.rcParams["figure.figsize"] = (12,5)
plt.scatter(movie_ratings.imdb, movie_ratings.votes)
plt.show()
```



In [116]:
```
df = movie_ratings
print(df['runtime'])
```

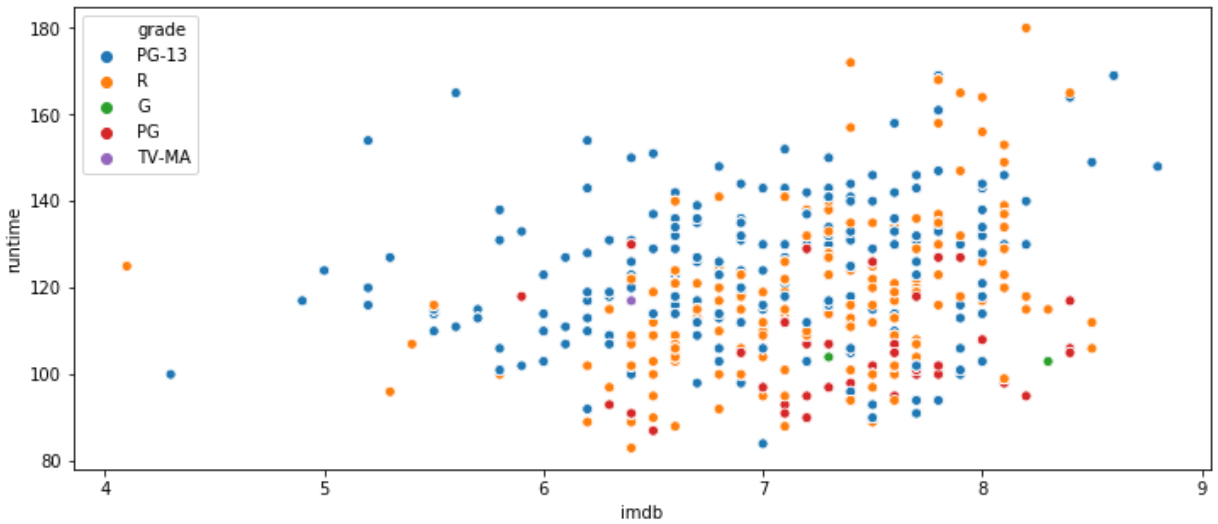
```
0       148 min
1       138 min
2       103 min
3       124 min
4       108 min
         ...
3685    106 min
3686    133 min
3687    143 min
3688    111 min
3689    100 min
Name: runtime, Length: 3690, dtype: object
```

In [117]:
```
ax = sns.scatterplot(x="imdb", y="votes", hue="grade",data=df)
```



In [118]:
```
#Need to change format of Volume from string to numeric
runtime_num_list = df['runtime'].tolist()
runtime_num = []
for i in runtime_num_list:
    if i.endswith('min'):
        num = i.strip("min")
        runtime_num.append(num)
#pass num back to Volume_list
df['runtime'] = runtime_num
df.head(5)
df['runtime'] = pd.to_numeric(df['runtime'])
```

In [119]:
```
ax = sns.scatterplot(x="imdb", y="runtime", hue="grade",data=df)
yticks=np.arange(120,170,5)
```



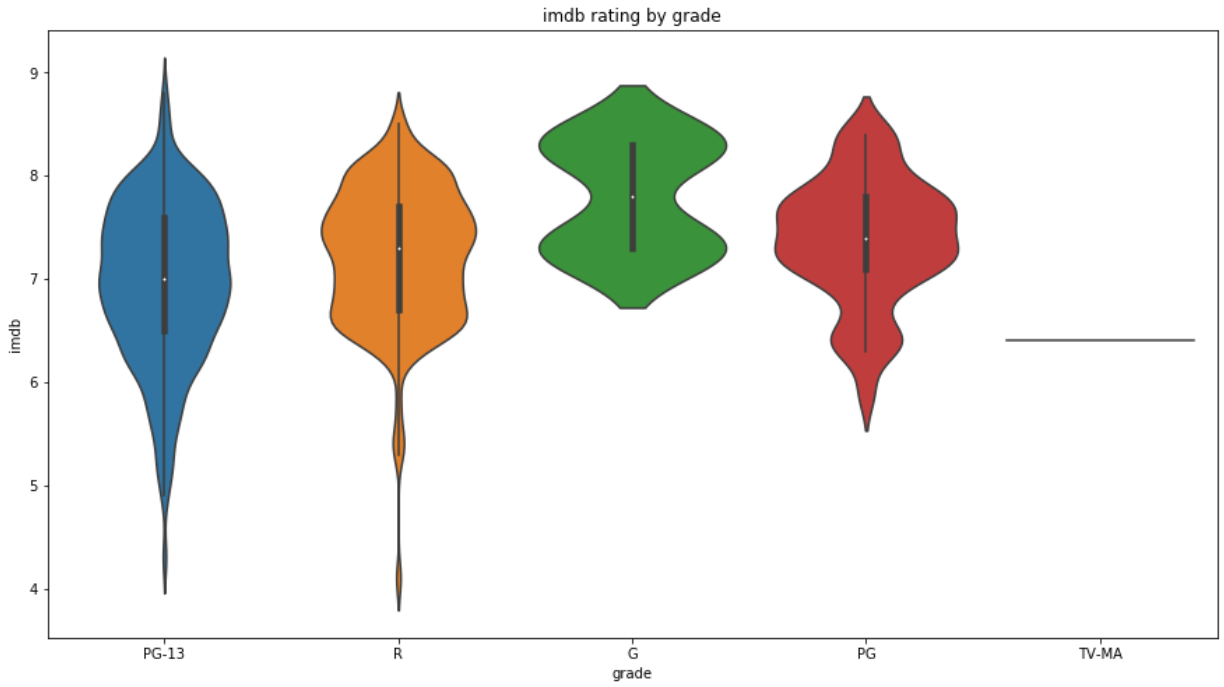
In [120]:
```
df = movie_ratings
df.describe()
```

Out[120]:

	year	imdb	metascore	votes	runtime	n_imdb
count	3690.000000	3690.000000	3690.000000	3.690000e+03	3690.000000	3690.000000
mean	2013.985366	7.107561	64.485366	3.353975e+05	119.797561	71.075610
std	2.591100	0.730896	15.330229	2.102873e+05	17.408287	7.308964
min	2010.000000	4.100000	27.000000	9.345900e+04	83.000000	41.000000
25%	2012.000000	6.600000	53.000000	1.982990e+05	107.000000	66.000000
50%	2014.000000	7.200000	65.000000	2.682660e+05	118.000000	72.000000
75%	2016.000000	7.700000	75.000000	4.093370e+05	131.000000	77.000000
max	2018.000000	8.800000	100.000000	1.884515e+06	180.000000	88.000000

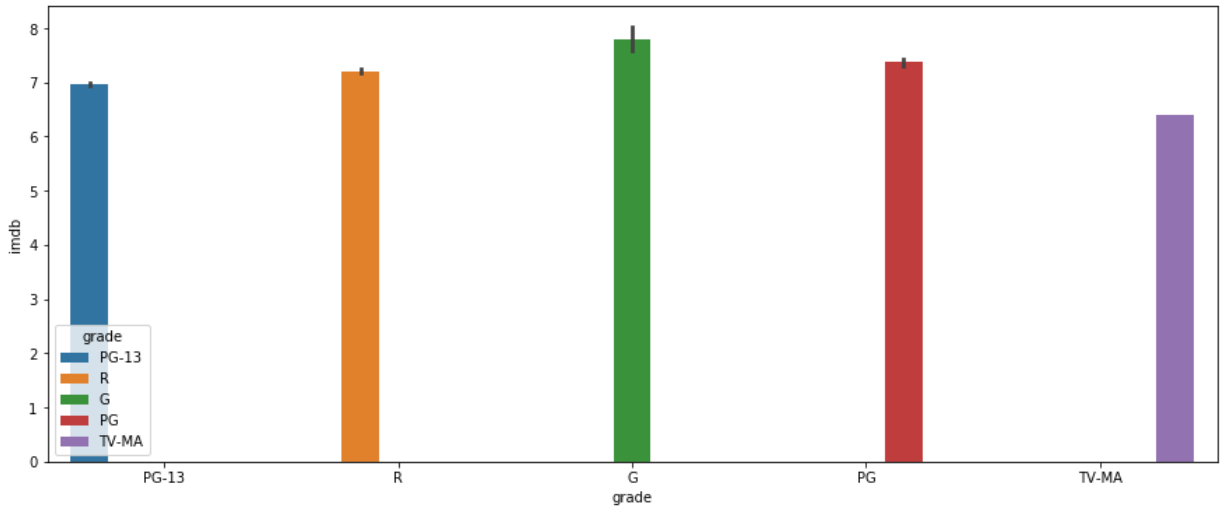
In [121]:
```
import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)
#
import matplotlib.pyplot as plt
import seaborn as sns
plt.figure(figsize=(15, 8))
#using violinplot to showcase density and distribtuion of prices
viz_2=sns.violinplot(data=df, x='grade', y='imdb')
viz_2.set_title('imdb rating by grade')
```

Out[121]: Text(0.5, 1.0, 'imdb rating by grade')



In [122]:
```
df = movie_ratings
plt.figure(figsize=(15, 6))
sns.barplot(x='grade', y='imdb', hue='grade',data=df)
```

Out[122]: <matplotlib.axes._subplots.AxesSubplot at 0x18b69abb3c8>



In [123]:
```
#word cloud
from wordcloud import WordCloud, ImageColorGenerator
text = " ".join(str(each) for each in df.genre)
# Create and generate a word cloud image:
wordcloud = WordCloud(max_words=400).generate(text)
plt.figure(figsize=(15,10))
# Display the generated image:
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis("off")
plt.show()
```

In [124]:
```
import sys
print(sys.executable)
```

```
C:\Users\gladies\Anaconda3\python.exe
```

In [ ]:

In [ ]: