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

In [2]:
```
#Import the three datasets
```

In [3]:
```
movies=pd.read_table('movies.dat',sep = '::', header=None,)
users=pd.read_table('users.dat', sep='::', header=None)
ratings=pd.read_table('ratings.dat', sep='::', header=None)
```

```
<ipython-input-3-6dadc5227234>:1: ParserWarning: Falling back to the 'python' e
ngine because the 'c' engine does not support regex separators (separators > 1
char and different from '\s+' are interpreted as regex); you can avoid this war
ning by specifying engine='python'.
  movies=pd.read_table('movies.dat',sep = '::', header=None,)
<ipython-input-3-6dadc5227234>:2: ParserWarning: Falling back to the 'python' e
ngine because the 'c' engine does not support regex separators (separators > 1
char and different from '\s+' are interpreted as regex); you can avoid this war
ning by specifying engine='python'.
  users=pd.read_table('users.dat', sep='::', header=None)
<ipython-input-3-6dadc5227234>:3: ParserWarning: Falling back to the 'python' e
ngine because the 'c' engine does not support regex separators (separators > 1
char and different from '\s+' are interpreted as regex); you can avoid this war
ning by specifying engine='python'.
  ratings=pd.read_table('ratings.dat', sep='::', header=None)
```

In [4]:
```
movies.columns=['MovieID Title Genres'.split()]
movies.head()
```

Out[4]:

	MovieID	Title	Genres
0	1	Toy Story (1995)	Animation|Children's|Comedy
1	2	Jumanji (1995)	Adventure|Children's|Fantasy
2	3	Grumpier Old Men (1995)	Comedy|Romance
3	4	Waiting to Exhale (1995)	Comedy|Drama
4	5	Father of the Bride Part II (1995)	Comedy

In [5]:
```
users.columns=['UserID Gender Age Occupation Zip-code'.split()]
users.head()
```

Out[5]:

	UserID	Gender	Age	Occupation	Zip-code
0	1	F	1	10	48067
1	2	M	56	16	70072
2	3	M	25	15	55117
3	4	M	45	7	02460
4	5	M	25	20	55455

In [6]:
```
ratings.columns=['UserID MovieID Rating Timestamp'.split()]
ratings.head()
```

Out[6]:

	UserID	MovieID	Rating	Timestamp
0	1	1193	5	978300760
1	1	661	3	978302109
2	1	914	3	978301968
3	1	3408	4	978300275
4	1	2355	5	978824291

In [7]:
```
#Create a new dataset [Master_Data] with the following columns MovieID Title User
```

In [8]:
```
data=pd.merge(movies,ratings)
```

In [9]:
```
masterdata=pd.merge(data,users)
```

In [10]:
```
#Explore the datasets using visual representations (graphs or tables)
```

In [11]:
```
masterdata.head()
```

Out[11]:

	MovieID	Title	Genres	UserID	Rating	Timestamp	Gender	A
0	1	Toy Story (1995)	Animation|Children's|Comedy	1	5	978824268	F	
1	48	Pocahontas (1995)	Animation|Children's|Musical|Romance	1	5	978824351	F	
2	150	Apollo 13 (1995)	Drama	1	5	978301777	F	
3	260	Star Wars: Episode IV - A New Hope (1977)	Action|Adventure|Fantasy|Sci-Fi	1	4	978300760	F	
4	527	Schindler's List (1993)	Drama|War	1	5	978824195	F	

In [12]:
```
masterdata1=pd.DataFrame(masterdata)
```

In [13]:
```
masterdata1.columns=('MovieID','Title','Genres','UserID','Rating','Timestamp','Ge
```

In [14]:
```
masterdata1.columns
```

Out[14]:
```
Index(['MovieID', 'Title', 'Genres', 'UserID', 'Rating', 'Timestamp', 'Gender',
       'Age', 'Occupation', 'Zip-code'],
      dtype='object')
```

In [15]:
```
masterdata1.describe()
```

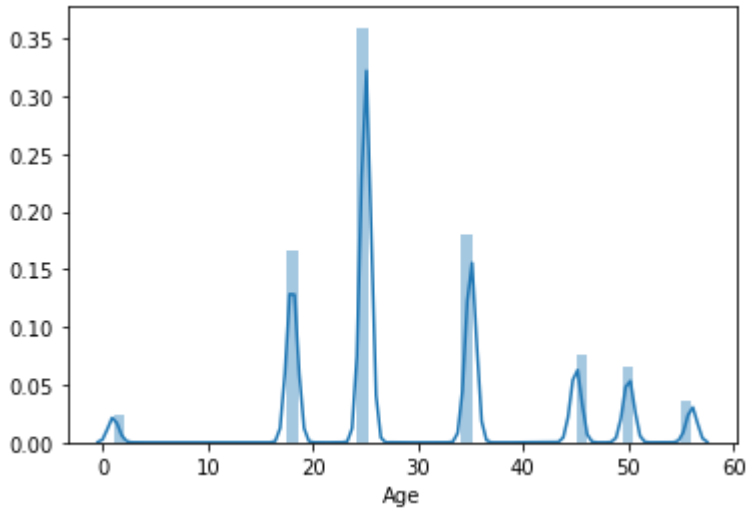
Out[15]:

	MovieID	UserID	Rating	Timestamp	Age	Occupation
count	1.000209e+06	1.000209e+06	1.000209e+06	1.000209e+06	1.000209e+06	1.000209e+06
mean	1.865540e+03	3.024512e+03	3.581564e+00	9.722437e+08	2.973831e+01	8.036138e+00
std	1.096041e+03	1.728413e+03	1.117102e+00	1.215256e+07	1.175198e+01	6.531336e+00
min	1.000000e+00	1.000000e+00	1.000000e+00	9.567039e+08	1.000000e+00	0.000000e+00
25%	1.030000e+03	1.506000e+03	3.000000e+00	9.653026e+08	2.500000e+01	2.000000e+00
50%	1.835000e+03	3.070000e+03	4.000000e+00	9.730180e+08	2.500000e+01	7.000000e+00
75%	2.770000e+03	4.476000e+03	4.000000e+00	9.752209e+08	3.500000e+01	1.400000e+01
max	3.952000e+03	6.040000e+03	5.000000e+00	1.046455e+09	5.600000e+01	2.000000e+01

In [16]:
```
#User Age Distribution
```

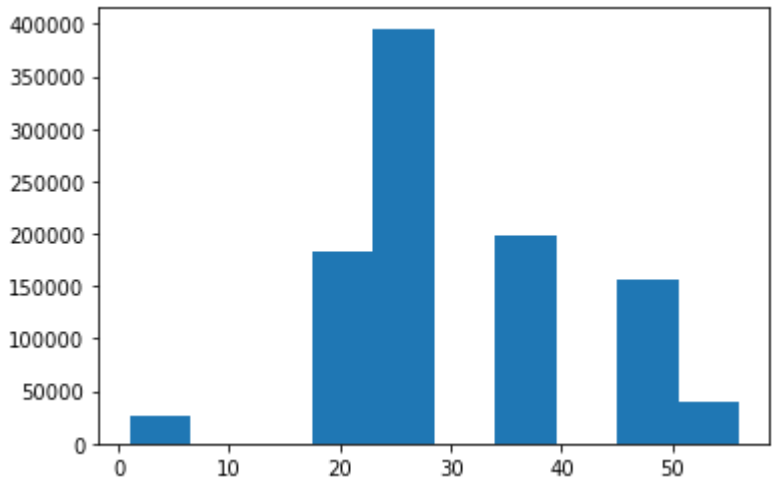
In [17]:
```
sns.distplot(masterdata1['Age'])
```

Out[17]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x2dcbecfe490>
```



In [18]:
```
plt.hist(masterdata1['Age'])
```

Out[18]:
```
(array([ 27211.,      0.,      0., 183536., 395556.,      0., 199003.,
             0., 156123.,  38780.]),
 array([ 1. ,  6.5, 12. , 17.5, 23. , 28.5, 34. , 39.5, 45. , 50.5, 56. ]),
 <a list of 10 Patch objects>)
```



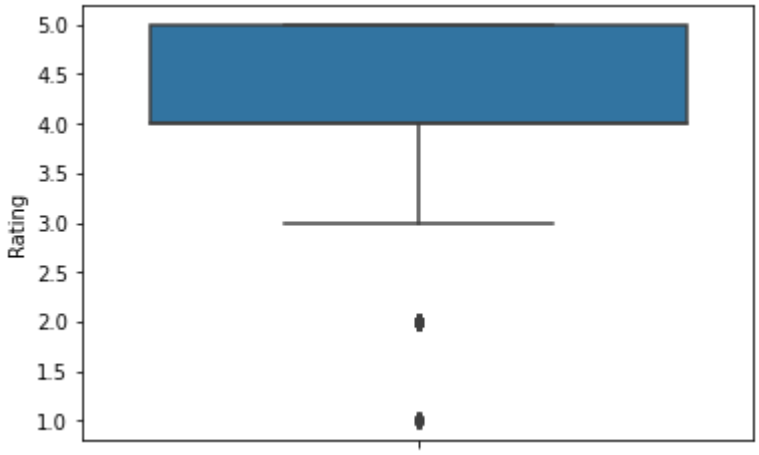
In [19]:
```
#User rating of the movie “Toy Story”
```

In [20]:
```
masterdata1['Rating'][masterdata1['Title']=='Toy Story (1995)']
```

Out[20]:
```
0         5
53        4
124       4
263       5
369       5
         ..
575166    5
575214    5
575485    4
575589    4
575869    3
Name: Rating, Length: 2077, dtype: int64
```

In [21]:
```
sns.boxplot(y=masterdata1['Rating'][masterdata1['Title']=='Toy Story (1995)'])
```

Out[21]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x2dcb20bf1c0>
```



In [22]:
```
#Top 25 movies by viewership rating
```

In [23]:
```
x=masterdata1.groupby(['Title']).mean()
```

In [24]:
```
x['Rating'].sort_values(ascending=False).head(25)
```

Out[24]:
```
Title
Gate of Heavenly Peace, The (1995)                                   5.000000
Lured (1947)                                                         5.000000
Ulysses (Ulisse) (1954)                                              5.000000
Smashing Time (1967)                                                 5.000000
Follow the Bitch (1998)                                              5.000000
Song of Freedom (1936)                                               5.000000
Bittersweet Motel (2000)                                             5.000000
Baby, The (1973)                                                     5.000000
One Little Indian (1973)                                             5.000000
Schlafes Bruder (Brother of Sleep) (1995)                            5.000000
I Am Cuba (Soy Cuba/Ya Kuba) (1964)                                  4.800000
Lamerica (1994)                                                      4.750000
Apple, The (Sib) (1998)                                              4.666667
Sanjuro (1962)                                                       4.608696
Seven Samurai (The Magnificent Seven) (Shichinin no samurai) (1954)  4.560510
Shawshank Redemption, The (1994)                                     4.554558
Godfather, The (1972)                                                4.524966
Close Shave, A (1995)                                                4.520548
Usual Suspects, The (1995)                                           4.517106
Schindler's List (1993)                                              4.510417
Wrong Trousers, The (1993)                                           4.507937
Dangerous Game (1993)                                                4.500000
Mamma Roma (1962)                                                    4.500000
Inheritors, The (Die Siebtelbauern) (1998)                           4.500000
Hour of the Pig, The (1993)                                          4.500000
Name: Rating, dtype: float64
```

In [25]:
```
#Find the ratings for all the movies reviewed by for a particular user of user id
```

In [26]:
```
masterdata1['Title'][masterdata1['UserID']==2696]
```

Out[26]:
```
991035                                Client, The (1994)
991036                                  Lone Star (1996)
991037                              Basic Instinct (1992)
991038                  E.T. the Extra-Terrestrial (1982)
991039                                Shining, The (1980)
991040                           Back to the Future (1985)
991041                                    Cop Land (1997)
991042                            L.A. Confidential (1997)
991043                                  Game, The (1997)
991044             I Know What You Did Last Summer (1997)
991045                          Devil's Advocate, The (1997)
991046    Midnight in the Garden of Good and Evil (1997)
991047                                   Palmetto (1998)
991048                                 Wild Things (1998)
991049                               Perfect Murder, A (1998)
991050      I Still Know What You Did Last Summer (1998)
991051                                      Psycho (1998)
991052                                 Lake Placid (1999)
991053                    Talented Mr. Ripley, The (1999)
991054                                         JFK (1991)
Name: Title, dtype: object
```

In [27]:
```
#Feature Engineering:
            #Use column genres:
```

In [28]:
```
#Find out all the unique genres
```

In [29]:
```
genres=pd.Series(masterdata1['Genres']).str.split(r"|", expand=True)
```

In [30]:
```
genres.head()
```

Out[30]:

	0	1	2	3	4	5
0	Animation	Children's	Comedy	None	None	None
1	Animation	Children's	Musical	Romance	None	None
2	Drama	None	None	None	None	None
3	Action	Adventure	Fantasy	Sci-Fi	None	None
4	Drama	War	None	None	None	None

In [31]:
```
genres=genres.fillna(value=0)
```

In [32]:
```
result = pd.DataFrame(data=pd.concat([genres[0],genres[1],genres[2],genres[3],ger
```

In [33]:
```
result
```

Out[33]:

	0
0	Animation
1	Animation
2	Drama
3	Action
4	Drama
...	...
1000204	0
1000205	0
1000206	0
1000207	0
1000208	0

6001254 rows × 1 columns

In [34]:
```
result[0].unique()
```

Out[34]:
```
array(['Animation', 'Drama', 'Action', "Children's", 'Crime', 'Musical',
       'Adventure', 'Comedy', 'Romance', 'Thriller', 'Western',
       'Documentary', 'Sci-Fi', 'Horror', 'Film-Noir', 'Mystery', 'War',
       'Fantasy', 0], dtype=object)
```

In [35]:
```
ate a separate column for each genre category with a one-hot encoding ( 1 and 0) i
```

In [36]:
```
.DataFrame([genres[0].unique(),genres[1].unique(),genres[2].unique(),genres[3].un
```

Out[36]:

	0	1	2	3	4	5
0	Animation	Children's	Comedy	0	0	0
1	Drama	0	Musical	Romance	Musical	War
2	Action	Adventure	0	Sci-Fi	War	None
3	Children's	War	Fantasy	Musical	Romance	None
4	Crime	Drama	Thriller	Comedy	Sci-Fi	None
5	Musical	Comedy	Drama	Western	Thriller	None
6	Adventure	Romance	Children's	Thriller	Fantasy	None
7	Comedy	Sci-Fi	War	War	None	None
8	Romance	Animation	Romance	Mystery	None	None
9	Thriller	Crime	Western	Crime	None	None
10	Western	Fantasy	Sci-Fi	Drama	None	None
11	Documentary	Musical	Mystery	Fantasy	None	None
12	Sci-Fi	Thriller	Crime	Horror	None	None
13	Horror	Horror	Horror	Children's	None	None
14	Film-Noir	Mystery	Film-Noir	None	None	None
15	Mystery	Film-Noir	Animation	None	None	None
16	War	Western	None	None	None	None
17	Fantasy	Documentary	None	None	None	None

In [37]:
```
y=pd.get_dummies(genres[0])
y1=pd.get_dummies(genres[1])
y2=pd.get_dummies(genres[2])
y3=pd.get_dummies(genres[3])
y4=pd.get_dummies(genres[4])
y5=pd.get_dummies(genres[5])
```

In [38]:
```
y1=y1.assign(Action=0)
y2=y2.assign(Action=0,Adventure=0,Documentary=0)
y3['Film-Noir']=0
y3=y3.assign(Animation=0,Action=0,Adventure=0,Documentary=0,)
y4["Children's"]=0
y4['Film-Noir']=0
y4=y4.assign(Animation=0,Drama=0,Action=0,Crime=0,Adventure=0,Comedy=0,Western=0,
y5["Children's"]=0
y5['Sci-Fi']=0
y5['Film-Noir']=0
y5=y5.assign(Animation=0, Drama=0,Action=0,Crime=0,Musical=0,Adventure=0,Comedy=0
```

In [39]:
```
one_hot_encoded=y+y2+y1+y3+y4+y5
```

In [40]:
```
one_hot_encoded.drop(columns=0, inplace=True)
```

In [41]:
```
one_hot_encoded.head()
```

Out[41]:

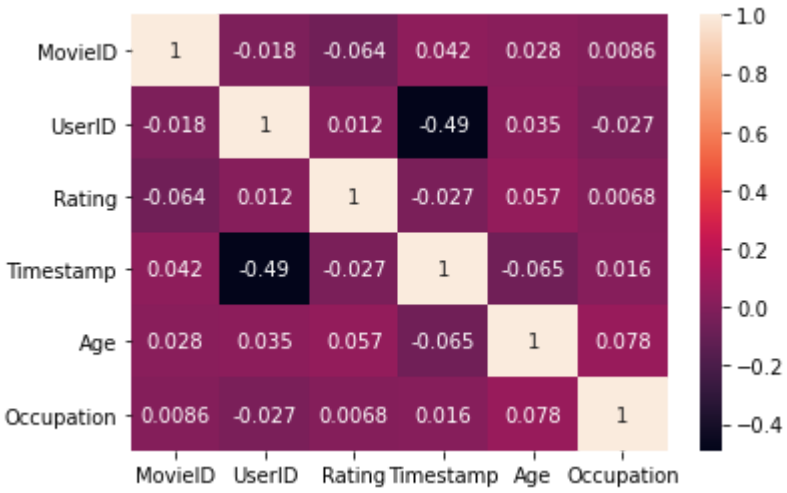
	Action	Adventure	Animation	Children's	Comedy	Crime	Documentary	Drama	Fantasy	Film-Noir
0	0	0	1	1	1	0	0	0	0	0
1	0	0	1	1	0	0	0	0	0	0
2	0	0	0	0	0	0	0	1	0	0
3	1	1	0	0	0	0	0	0	1	0
4	0	0	0	0	0	0	0	1	0	0

In [42]:
```
masterdata=masterdata1.merge(one_hot_encoded,how="outer", left_index=True, right_
```

In [43]:
```
#Determine the features affecting the ratings of any particular movie.
```

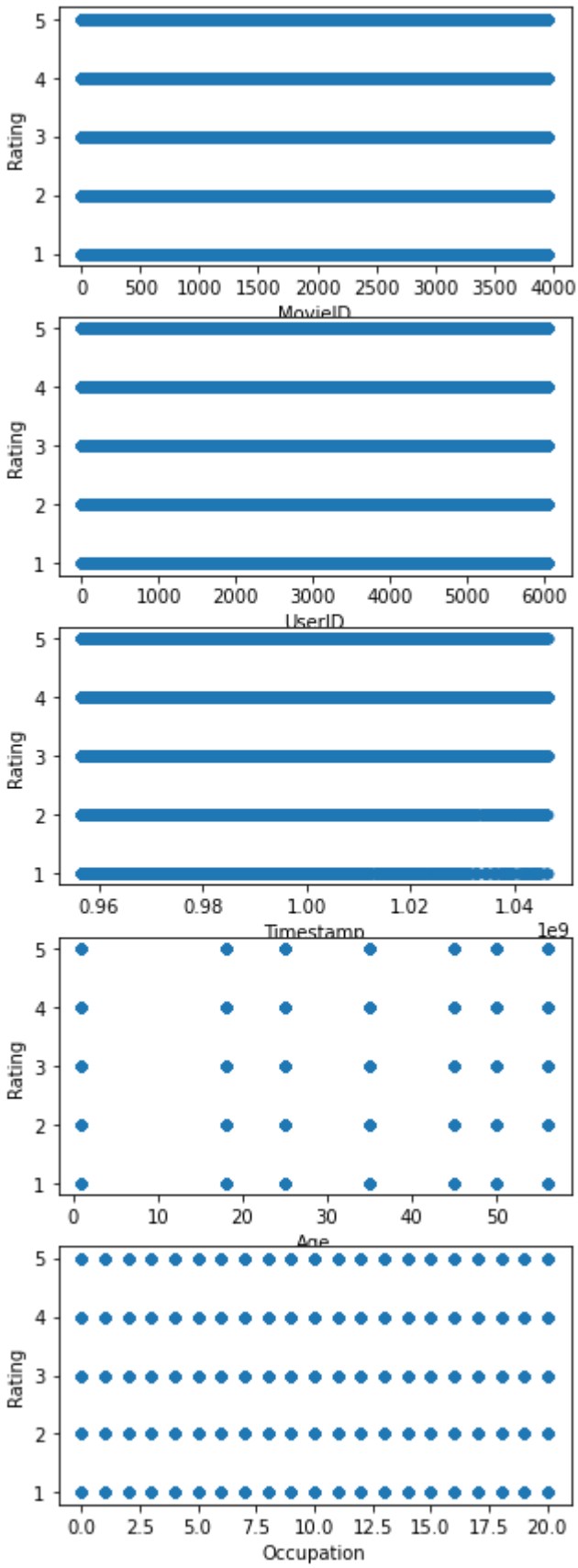
In [44]:
```
sns.heatmap(masterdata1.corr(),annot=True)
```

Out[44]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x2dcd0458d90>
```



In [45]:
```
fig,axs=plt.subplots(5,1 , sharey=True)
masterdata1.plot(kind='scatter', x='MovieID',y='Rating', ax=axs[0], figsize=(5,15
masterdata1.plot(kind='scatter', x='UserID',y='Rating', ax=axs[1], figsize=(5,15)
masterdata1.plot(kind='scatter', x='Timestamp',y='Rating', ax=axs[2], figsize=(5,
masterdata1.plot(kind='scatter', x='Age',y='Rating', ax=axs[3], figsize=(5,15))
masterdata1.plot(kind='scatter', x='Occupation',y='Rating', ax=axs[4], figsize=(5
```

Out[45]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x2dcce381280>
```



In [46]:
```
#Develop an appropriate model to predict the movie ratings
```

In [47]:
```
above problem as it is an machine leaning part and not to be included with data s
```

In [48]:
```
fc=['MovieID','UserID','Timestamp','Age','Occupation']
x=masterdata1[fc]
y=masterdata1.Rating
```

In [49]:
```
x.shape
```

Out[49]:
```
(1000209, 5)
```

In [50]:
```
y.shape
```

Out[50]:
```
(1000209,)
```

In [51]:
```
from sklearn.model_selection import train_test_split
```

In [52]:
```
x_train, x_test,y_train,y_test=train_test_split(x,y, test_size=0.3)
```

In [53]:
```
from sklearn.linear_model import LinearRegression
```

In [54]:
```
lm=LinearRegression()
```

In [55]:
```
lm.fit(x_train,y_train)
```

Out[55]:
```
LinearRegression()
```

In [56]:
```
lm.coef_
```

Out[56]:
```
array([-6.59037814e-05, -5.26869424e-07, -1.85847093e-09,  5.36990972e-03,
        5.56399658e-04])
```

In [57]:
```
lm.intercept_
```

Out[57]:
```
5.34911446567329
```

In [58]:
```
y_pred=lm.predict(x_test)
```

In [59]:
```
from sklearn.metrics import r2_score
```

In [60]:
```
r2_score(y_test,y_pred)
```

Out[60]:
```
0.008250694153402183
```