In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
```

In [2]:

```
movies = pd.read_csv('movies.dat',sep=r'\s{2,}', engine='python',header=None)
movies.columns=['Movie']
def parseMovieDataSet(movie):
    m = movie.split("::")
    x = m[1].split("(")
    title = x[0].rstrip()
    year = x[1][:-1]
    return {'MovieID':m[0],'title':title,'year':year,'Genres':m[2]}
df_movie=pd.DataFrame(columns=['MovieID','Title','Genres'])
data = map(parseMovieDataSet,movies['Movie'])
df_movie=pd.DataFrame(data)
```

In [3]:

```
user = pd.read_csv('users.dat',sep=r'\s{2,}', engine='python',header=None)
user.columns=['user']
def parseUserData(user):
    u = user.split("::")
    return {'UserID':u[0],'Gender':u[1],'Age':u[2],'Occupation':u[3],'Zip-code':u[4]}
data = map(parseUserData,user['user'])
df_user=pd.DataFrame(data)
```

In [4]:

```
rating = pd.read_csv('ratings.dat',sep=r'\s{2,}', engine='python',header=None)
rating.columns=['rating']
def parseRatingData(rate):
    r= rate.split("::")
    return {'UserID':r[0],'MovieID':r[1],'Rating':r[2],'TimeStamp':r[3]}
data= map(parseRatingData,rating['rating'])
df_rating = pd.DataFrame(data)
```

In [5]:

```
df_rating.head()
```

Out[5]:

| | MovieID | Rating | TimeStamp | UserID |
|---|---|---|---|---|
| **0** | 1193 | 5 | 978300760 | 1 |
| **1** | 661 | 3 | 978302109 | 1 |
| **2** | 914 | 3 | 978301968 | 1 |
| **3** | 3408 | 4 | 978300275 | 1 |
| **4** | 2355 | 5 | 978824291 | 1 |

In [6]:

```
df_user.head()
```

Out[6]:

| | Age | Gender | Occupation | UserID | Zip-code |
|---|---|---|---|---|---|
| **0** | 1 | F | 10 | 1 | 48067 |

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

In [7]:

```
df_movie.head()
```

Out[7]:

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

### *Merging the data*

In [8]:

```
rating_and_user = pd.merge(df_rating,df_user,on='UserID')
```

In [9]:

```
df = pd.merge(rating_and_user,df_movie,on='MovieID')
```

In [10]:

```
df.head()
```

Out[10]:

|  | MovieID | Rating | TimeStamp | UserID | Age | Gender | Occupation | Zip-code | Genres | title | year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1193 | 5 | 978300760 | 1 | 1 | F | 10 | 48067 | Drama | One Flew Over the Cuckoo's Nest | 1975 |
| 1 | 1193 | 5 | 978298413 | 2 | 56 | M | 16 | 70072 | Drama | One Flew Over the Cuckoo's Nest | 1975 |
| 2 | 1193 | 4 | 978220179 | 12 | 25 | M | 12 | 32793 | Drama | One Flew Over the Cuckoo's Nest | 1975 |
| 3 | 1193 | 4 | 978199279 | 15 | 25 | M | 7 | 22903 | Drama | One Flew Over the Cuckoo's Nest | 1975 |
| 4 | 1193 | 5 | 978158471 | 17 | 50 | M | 1 | 95350 | Drama | One Flew Over the Cuckoo's Nest | 1975 |

In [11]:

```
df.shape
```

Out[11]:

```
(1000209, 11)
```

In [12]:

```
df = df.drop(['TimeStamp','Zip-code'],axis=1)
```

In [13]:

```
df.head()
```

Out[13]:

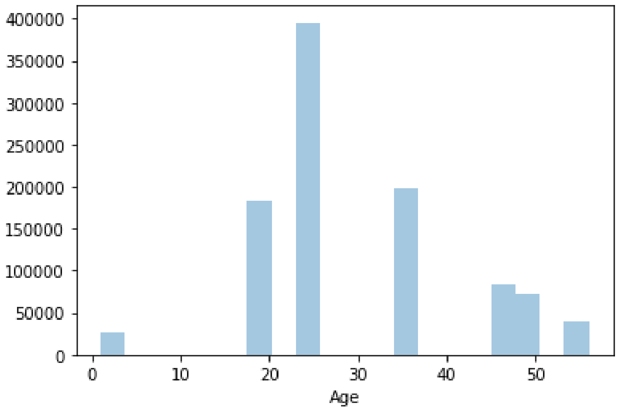
| | MovieID | Rating | UserID | Age | Gender | Occupation | Genres | title | year |
|---|---|---|---|---|---|---|---|---|---|
| **0** | 1193 | 5 | 1 | 1 | F | 10 | Drama | One Flew Over the Cuckoo's Nest | 1975 |
| **1** | 1193 | 5 | 2 | 56 | M | 16 | Drama | One Flew Over the Cuckoo's Nest | 1975 |
| **2** | 1193 | 4 | 12 | 25 | M | 12 | Drama | One Flew Over the Cuckoo's Nest | 1975 |
| **3** | 1193 | 4 | 15 | 25 | M | 7 | Drama | One Flew Over the Cuckoo's Nest | 1975 |
| **4** | 1193 | 5 | 17 | 50 | M | 1 | Drama | One Flew Over the Cuckoo's Nest | 1975 |

In [14]:

```
sns.distplot(df['Age'],kde=False,bins=20)
```

Out[14]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x11895350>
```



## the above histogram shows that the most of the user are of the age group of 25 -34 and the less are of the age group of under 18

In [15]:

```
toy_story = df[df['title']=='Toy Story']
```

In [16]:

```
toy_story.head()
```

Out[16]:

| | MovieID | Rating | UserID | Age | Gender | Occupation | Genres | title | year |
|---|---|---|---|---|---|---|---|---|---|
| **41626** | 1 | 5 | 1 | 1 | F | 10 | Animation\|Children's\|Comedy | Toy Story | 1995 |
| **41627** | 1 | 4 | 6 | 50 | F | 9 | Animation\|Children's\|Comedy | Toy Story | 1995 |
| **41628** | 1 | 4 | 8 | 25 | M | 12 | Animation\|Children's\|Comedy | Toy Story | 1995 |
| **41629** | 1 | 5 | 9 | 25 | M | 17 | Animation\|Children's\|Comedy | Toy Story | 1995 |
| **41630** | 1 | 5 | 10 | 35 | F | 1 | Animation\|Children's\|Comedy | Toy Story | 1995 |

In [17]:

```
toy_story.shape
toy_story.shape
```

Out[17]:

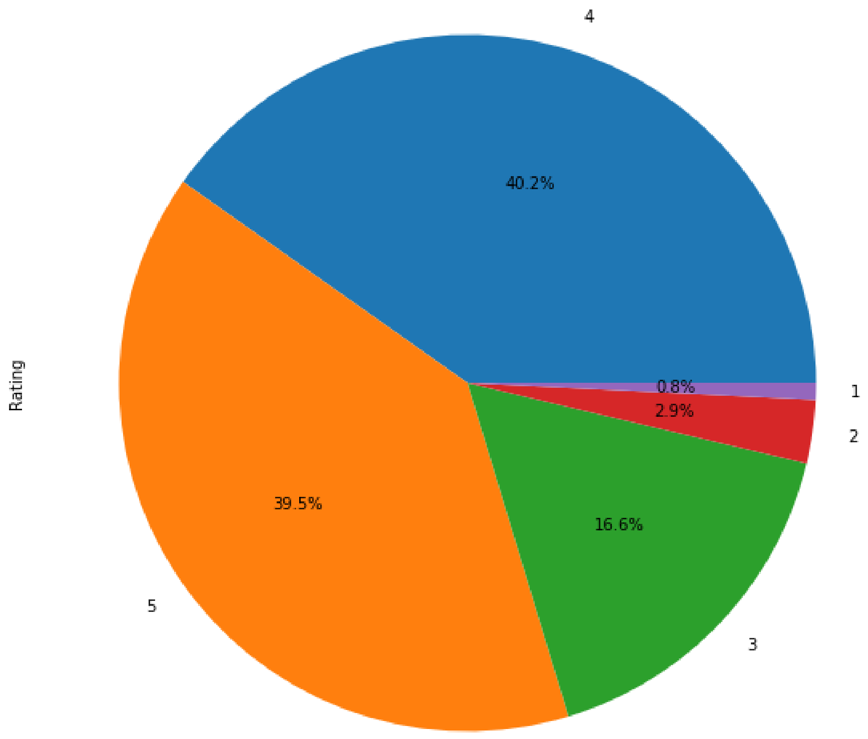
```
(2077, 9)
```

In [18]:

```
toy_story['Rating'].value_counts().plot(kind='pie',autopct='%1.1f%%',figsize=(15,10))
```

Out[18]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x149be190>
```



***According to the the above pie chart the toy rating get the 4 rating most (i.e more that 40% ) of total rating similary it get the 5 rating in higher number i.e 39.5% of rating***

In [19]:

```
df['Rating']=pd.to_numeric(df['Rating'])
```

In [20]:

```
rate_count_of_movies=pd.DataFrame(df.groupby('title').Rating.mean()).sort_values(by='Rating',ascending=False)
```

In [21]:

```
rate_count_of_movies.head(25)
```

Out[21]:

|  | Rating |
|---|---|
| **title** |  |
| **Schlafes Bruder** | 5.000000 |
| **Smashing Time** | 5.000000 |

| title | Rating |
|---|---|
| Gate of Heavenly Peace, The | 5.000000 |
| Follow the Bitch | 5.000000 |
| Song of Freedom | 5.000000 |
| Baby, The | 5.000000 |
| Lured | 5.000000 |
| One Little Indian | 5.000000 |
| Bittersweet Motel | 5.000000 |
| Ulysses | 5.000000 |
| I Am Cuba | 4.800000 |
| Lamerica | 4.750000 |
| Apple, The | 4.666667 |
| Sanjuro | 4.608696 |
| Seven Samurai | 4.560510 |
| Shawshank Redemption, The | 4.554558 |
| Godfather, The | 4.524966 |
| Close Shave, A | 4.520548 |
| Usual Suspects, The | 4.517106 |
| Schindler's List | 4.510417 |
| Wrong Trousers, The | 4.507937 |
| Callejón de los milagros, El | 4.500000 |
| Inheritors, The | 4.500000 |
| Dangerous Game | 4.500000 |
| Bells, The | 4.500000 |

***Here we first group the dataset according to the title of the movie and calculate the average rating of the movies and ascending them***

In [22]:

```
df['UserID'] = pd.to_numeric(df['UserID'])
```

In [23]:

```
rate_by_2696 = df[df['UserID']==2696]
```

In [24]:

```
rate_by_2696 = rate_by_2696[['title','Rating']]
```

In [25]:

```
rate_by_2696
```

Out[25]:

|  | title | Rating |
|---|---|---|
| 24345 | Back to the Future | 2 |
| 29848 | E.T. the Extra-Terrestrial | 3 |
| 244232 | L.A. Confidential | 4 |
| 250014 | Lone Star | 5 |
| 273633 | JFK | 1 |
| 277808 | Talented Mr. Ripley, The | 4 |
| 371178 | Midnight in the Garden of Good and Evil | 4 |

|  | title | Rating |
|---|---|---|
| **377250** | Cop Land | 3 |
| **598042** | Palmetto | 4 |
| **603189** | Perfect Murder, A | 4 |
| **609204** | Game, The | 4 |
| **611956** | I Know What You Did Last Summer | 2 |
| **612552** | Devil's Advocate, The | 4 |
| **613486** | Psycho | 4 |
| **616546** | Wild Things | 4 |
| **618708** | Basic Instinct | 4 |
| **621101** | Lake Placid | 1 |
| **689379** | Shining, The | 4 |
| **697451** | I Still Know What You Did Last Summer | 2 |
| **777089** | Client, The | 3 |

In [26]:

```
### UNIQUE GENERES
```

In [27]:

```
all_genere = list(set([g for genere in df['Genres'].unique() for g in genere.split("|")]))
```

In [28]:

```
all_genere
```

Out[28]:

```
['Action',
 'Western',
 'Horror',
 'Romance',
 'Animation',
 'Musical',
 'Crime',
 'Mystery',
 'Adventure',
 'Comedy',
 'Sci-Fi',
 'Film-Noir',
 'Thriller',
 'War',
 'Drama',
 'Documentary',
 'Fantasy',
 "Children's"]
```

In [29]:

```
def moviegenereencoder(movie):
    x = movie[1].split("|")
    d = {'MovieID':movie[0]}
    for u in all_genere:
        if u in x:
            d.update({u:1})
        else:
            d.update({u:0})
    return d
```

In [30]:

```
encoded_data = list(map(moviegenereencoder,df[['MovieID','Genres']].values))
```

In [31]:

```
df.columns
```

Out[31]:

```
Index(['MovieID', 'Rating', 'UserID', 'Age', 'Gender', 'Occupation', 'Genres',
       'title', 'year'],
      dtype='object')
```

***the above encoded_list directly can not convert to the dataframe due to the memory problem of the system so i will divide the data***

**into chunk**

In [32]:

```
del rate_count_of_movies,rate_by_2696,movies,user,rating,df_movie,df_rating,df_user,rating_and_user,toy_story
```

In [33]:

```
c1 = pd.DataFrame(encoded_data[0:333403])
c2 = pd.DataFrame(encoded_data[333404:666806])
c3 =pd.DataFrame(encoded_data[666806:len(encoded_data)-1])
```

In [34]:

```
cx = pd.concat([c1,c2],ignore_index=True)
```

In [35]:

```
final_encoded = pd.concat([cx,c3],ignore_index=True)
```

In [36]:

```
final_encoded.head()
```

Out[36]:

| | Action | Adventure | Animation | Children's | Comedy | Crime | Documentary | Drama | Fantasy | Film-Noir | Horror | MovieID | Musical | Mystery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1193 | 0 | 0 |
| **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1193 | 0 | 0 |
| **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1193 | 0 | 0 |
| **3** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1193 | 0 | 0 |
| **4** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1193 | 0 | 0 |

In [37]:

```
del c1,c2,c3,cx,encoded_data
```

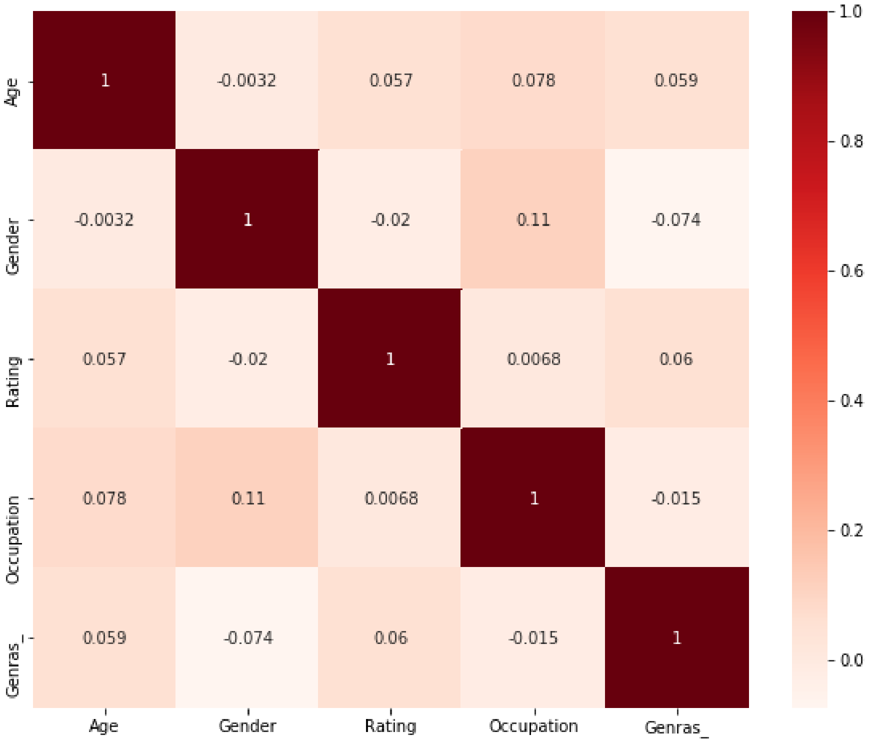
In [43]:

```
from sklearn.preprocessing import LabelEncoder
lm = LabelEncoder()
df['Gender']=lm.fit_transform(df['Gender'])
df['Genras_'] = lm.fit_transform(df['Genres'])
df['Age']=pd.to_numeric(df['Age'])
df['Occupation']=pd.to_numeric(df['Occupation'])
```

In [47]:

```
plt.figure(figsize=(10,8))
```

```
cor = df[['Age','Gender','Rating','Occupation','Genras_']].corr()
sns.heatmap(cor,annot=True,cmap=plt.cm.Reds)
plt.show()
```



### the rating of the movie is highly affected by the genres,age group and gender

In [60]:

```
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import r2_score,mean_squared_error
from math import sqrt
```

In [53]:

```
X = df[['Age','Genras_','Gender']].values
```

In [55]:

```
Y = df['Rating']
```

In [57]:

```
from sklearn.model_selection import train_test_split
```

In [58]:

```
x_train,x_test,y_train,y_test = train_test_split(X,Y,test_size=0.30)
```

In [61]:

```
logisticRegression = LogisticRegression()
```

In [62]:

```
logisticRegression.fit(x_train,y_train)
```

```
c:\users\dipendra\appdata\local\programs\python\python37-32\lib\site-packages\sklearn\linear_model\logistic.py:432: FutureWarning:
Default solver will be changed to 'lbfgs' in 0.22. Specify a solver to silence this warning.
  FutureWarning)
  FutureWarning)
c:\users\dipendra\appdata\local\programs\python\python37-32\lib\site-packages\sklearn\linear_model\logistic.py:469: FutureWarning: Default multi_class will be changed to 'auto' in 0.22. Specify the multi_class option to silence this warning.
  "this warning.", FutureWarning)
```

Out[62]:

```
LogisticRegression(C=1.0, class_weight=None, dual=False, fit_intercept=True,
                   intercept_scaling=1, l1_ratio=None, max_iter=100,
                   multi_class='warn', n_jobs=None, penalty='l2',
                   random_state=None, solver='warn', tol=0.0001, verbose=0,
                   warm_start=False)
```

In [63]:

```
logisticRegression.intercept_
```

Out[63]:

```
array([-2.163284  , -1.70919492, -0.93572484, -0.80554652, -1.49653867])
```

In [64]:

```
logisticRegression.coef_
```

Out[64]:

```
array([[-0.01807898, -0.00098118,  0.03419432],
       [-0.00914055, -0.00107787,  0.05909357],
       [ 0.00019835, -0.00074942,  0.0238582 ],
       [ 0.00462869,  0.00033697, -0.01937225],
       [ 0.00354658,  0.00126053, -0.07910019]])
```

In [65]:

```
logisticRegression.predict(x_test)
```

Out[65]:

```
array([4, 4, 4, ..., 4, 4, 4], dtype=int64)
```

In [68]:

```
sqrt(mean_squared_error(y_test,logisticRegression.predict(x_test)))
```

Out[68]:

```
1.192556640088276
```

In [ ]:

```

```