Let's begin by importing pandas. It is conventional to use pd to denote pandas.

Next we will import each of the three tables and assign names to each of the columns:

In [1]:
```
import pandas as pd
import numpy as np

unames = ['user_id', 'gender', 'age', 'occupation', 'zip']
users = pd.read_table('ml-1m/users.dat', sep='::', header=None, names=unames, engine='pyt

rnames = ['user_id', 'movie_id', 'rating', 'timestamp']
ratings = pd.read_table('ml-1m/ratings.dat', sep='::', header=None, names=rnames, engine=

mnames = ['movie_id', 'title', 'genres']
movies = pd.read_table('ml-1m/movies.dat', sep='::', header=None, names=mnames, engine='p

data = pd.merge(pd.merge(ratings, users), movies)

data.head(5)
```

Out[1]:

| | user_id | movie_id | rating | timestamp | gender | age | occupation | zip | title | genres |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 1 | 1193 | 5 | 978300760 | F | 1 | 10 | 48067 | One Flew Over the Cuckoo's Nest (1975) | Drama |
| **1** | 2 | 1193 | 5 | 978298413 | M | 56 | 16 | 70072 | One Flew Over the Cuckoo's Nest (1975) | Drama |
| **2** | 12 | 1193 | 4 | 978220179 | M | 25 | 12 | 32793 | One Flew Over the Cuckoo's Nest (1975) | Drama |
| **3** | 15 | 1193 | 4 | 978199279 | M | 25 | 7 | 22903 | One Flew Over the Cuckoo's Nest (1975) | Drama |
| **4** | 17 | 1193 | 5 | 978158471 | M | 50 | 1 | 95350 | One Flew Over the Cuckoo's Nest (1975) | Drama |

1. An aggregate on the number of rating done for each particular genre, e.g., Action, Adventure, Drama, Science Fiction, ...

In [2]:
```
data2 = data['genres'].str.split('|', expand = True)
data2 = data2.stack()
data2 = data2.reset_index(level = 1, drop = True)
data2.name = 'genres'
data = data.drop(['genres'], axis = 1).join(data2)

ratings_by_genres = data.groupby('genres').size()
ratings_by_genres
```

Out[2]:
```
genres
Action          257457
Adventure       133953
Animation        43293
Children's       72186
Comedy          356580
Crime            79541
Documentary       7910
Drama           354529
Fantasy          36301
Film-Noir        18261
Horror           76386
Musical          41533
Mystery          40178
Romance         147523
Sci-Fi          157294
Thriller        189680
War              68527
Western          20683
dtype: int64
```

In [ ]:
```

```

2. The top 5 ranked genres by women on most number of rating.

In [3]:
```
mean_ratings = data.pivot_table('rating', index='genres', columns='gender', aggfunc='mean')
mean_ratings[:5]
```

Out[3]:

| gender | F | M |
|---|---|---|
| genres | | |
| **Action** | 3.490252 | 3.491386 |
| **Adventure** | 3.512879 | 3.468125 |
| **Animation** | 3.744702 | 3.661335 |
| **Children's** | 3.572548 | 3.358961 |
| **Comedy** | 3.571938 | 3.503667 |

In [4]:
```
top_female_ratings = mean_ratings.sort_values(by='F', ascending=False)
top_female_ratings[:5]
```

Out[4]:

| gender | F | M |
|---|---|---|
| genres | | |
| **Film-Noir** | 4.018087 | 4.092254 |
| **Documentary** | 3.946392 | 3.928811 |
| **War** | 3.893138 | 3.893375 |
| **Musical** | 3.809108 | 3.596332 |
| **Drama** | 3.765662 | 3.766589 |

3. The top 5 ranked genres by men on most number of rating.

In [5]:
```
top_male_ratings = mean_ratings.sort_values(by='M', ascending=False)
top_male_ratings[:5]
```

Out[5]:

| gender | F | M |
|---|---|---|
| genres | | |
| **Film-Noir** | 4.018087 | 4.092254 |
| **Documentary** | 3.946392 | 3.928811 |
| **War** | 3.893138 | 3.893375 |
| **Drama** | 3.765662 | 3.766589 |
| **Crime** | 3.689332 | 3.713720 |

4. Pick a genre of your choice and provide average movie's ratings by the following four time intervals during which the movies were released (a) 1970 to 1979 (b) 1980 to 1989 (c) 1990 to 1999 (d) 2000 to 2009. Also, if you observed any issues with data in any of these ranges, please mention it.

(a) 1970 to 1979

In [6]:
```
year_data = data
year_data['title'] = data['title'].str.slice(-5,-1).astype('int')
year_genre1 = year_data.loc[(year_data["genres"] == "Action") & (year_data["title"] >= 197
year_genre1["rating"].mean()
```

Out[6]: 3.8247589726970754

(b) 1980 to 1989

In [7]:
```
year_genre2 = year_data.loc[(year_data["genres"] == "Action") & (year_data["title"] >= 198
year_genre2["rating"].mean()
```

Out[7]: 3.6652872444011684

(c) 1990 to 1999

In [8]:
```
year_genre3 = year_data.loc[(year_data["genres"] == "Action") & (year_data["title"] >= 199
year_genre3["rating"].mean()
```

Out[8]: 3.3072670670285595

(d) 2000 to 2009

In [9]:
```
year_genre4 = year_data.loc[(year_data["genres"] == "Action") & (year_data["title"] >= 200
year_genre4["rating"].mean()
```

Out[9]: 3.465275486638073

5. A function that given a genre and a rating_range (i.e. [3.5, 4]), returns all the movies of that genre and within that rating range sorted by average rating. Using an example, demonstrate that your function works.

In [10]:
```
def movieFilter(genre, rating_range):
    rating_range = rating_range.lstrip ("[").rstrip ("]")
    movies = data.loc[(data["genres"] == genre) & (data["rating"] >= float(rating_range.sp
    return movies

movieFilter('Action','[3, 3.5]')
```

Out[10]:

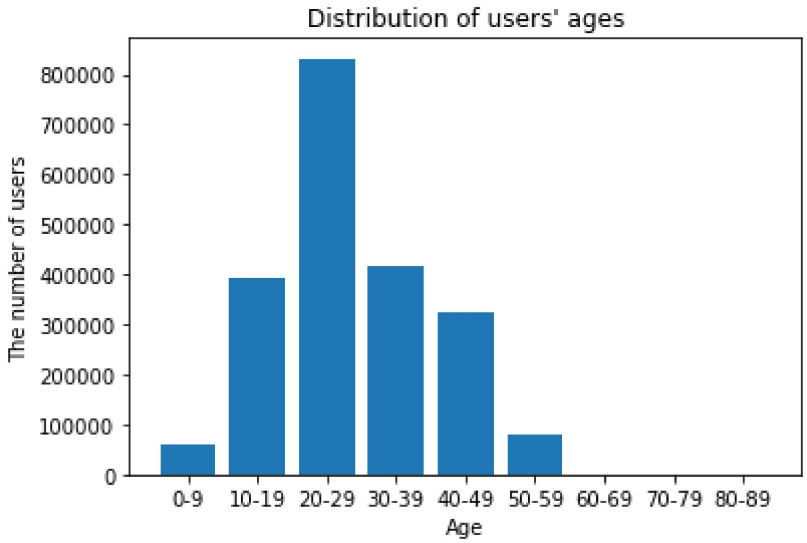
| | user_id | movie_id | rating | timestamp | gender | age | occupation | zip | title | genres |
|---|---|---|---|---|---|---|---|---|---|---|
| **5904** | 1 | 1197 | 3 | 978302268 | F | 1 | 10 | 48067 | 1987 | Action |
| **5911** | 22 | 1197 | 3 | 978134929 | M | 18 | 15 | 53706 | 1987 | Action |
| **5923** | 45 | 1197 | 3 | 977990135 | F | 45 | 16 | 94110 | 1987 | Action |
| **5924** | 48 | 1197 | 3 | 977975030 | M | 25 | 4 | 92107 | 1987 | Action |
| **5931** | 87 | 1197 | 3 | 977694356 | M | 25 | 14 | 48360 | 1987 | Action |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| **999815** | 3579 | 815 | 3 | 966711571 | M | 18 | 0 | 32219 | 1995 | Action |
| **1000049** | 3314 | 3443 | 3 | 967947206 | M | 25 | 7 | 06516 | 1986 | Action |
| **1000050** | 3618 | 3443 | 3 | 966598532 | M | 56 | 17 | 22657 | 1986 | Action |
| **1000193** | 5227 | 591 | 3 | 961475931 | M | 18 | 10 | 64050 | 1995 | Action |
| **1000201** | 5433 | 286 | 3 | 960240881 | F | 35 | 17 | 45014 | 1995 | Action |

70728 rows × 10 columns

6. Present one other statistic, figure, aggregate, or plot that you created using this dataset, along with a short description of what interesting observations you derived from it. This question is meant to give you a freehand to explore and present aspects of the dataset that interests you.

In [11]:
```
from matplotlib import pyplot as plt

age_bins = [0, 10, 20, 30, 40, 50, 60, 70, 80, 90]
data['age_range'] = pd.cut(x = data["age"], bins = age_bins, labels=["0-9","10-19","20-29"
x = ["0-9","10-19","20-29","30-39","40-49","50-59","60-69","70-79","80-89"]
y = [data['age_range'].value_counts()[label] for label in x]
plt.bar(x, y)
plt.title("Distribution of users' ages")
plt.ylabel('The number of users')
plt.xlabel('Age');
plt.show()
```




This is the distribution of users' ages. We can see that there is no data from people who are elder than 60 years old. And the largest amount of users were in the age group 20-29.