Exercise 4

```
%matplotlib inline
import pandas as pd

titles = pd.read_csv('/content/titles.csv')
titles.head()

cast = pd.read_csv('/content/cast.csv', index_col=None)
cast.head()
```

	title	year	name	type	character	n
0	Closet Monster	2015	Buffy #1	actor	Buffy 4	31.0
1	Suuri illusioni	1985	Homo $	actor	Guests	22.0
2	Battle of the Sexes	2017	$hutter	actor	Bobby Riggs Fan	10.0
3	Secret in Their Eyes	2015	$hutter	actor	2002 Dodger Fan	NaN
4	Steve Jobs	2015	$hutter	actor	1988 Opera House Patron	NaN

Define a year as a "Superman year" whose films feature more Superman characters than Batman. How many years in film history have been Superman years?

```
both = cast[(cast.character=='Superman') | (cast.character == 'Batman')].groupby(['year','
diff = both.Superman - both.Batman
print("Superman: " + str(len(diff[diff>0])))
```

```
Superman: 5
```

How many years have been "Batman years", with more Batman characters than Superman characters?

```
both = cast[(cast.character=='Superman') | (cast.character == 'Batman')].groupby(['year','
diff = both.Batman - both.Superman
```

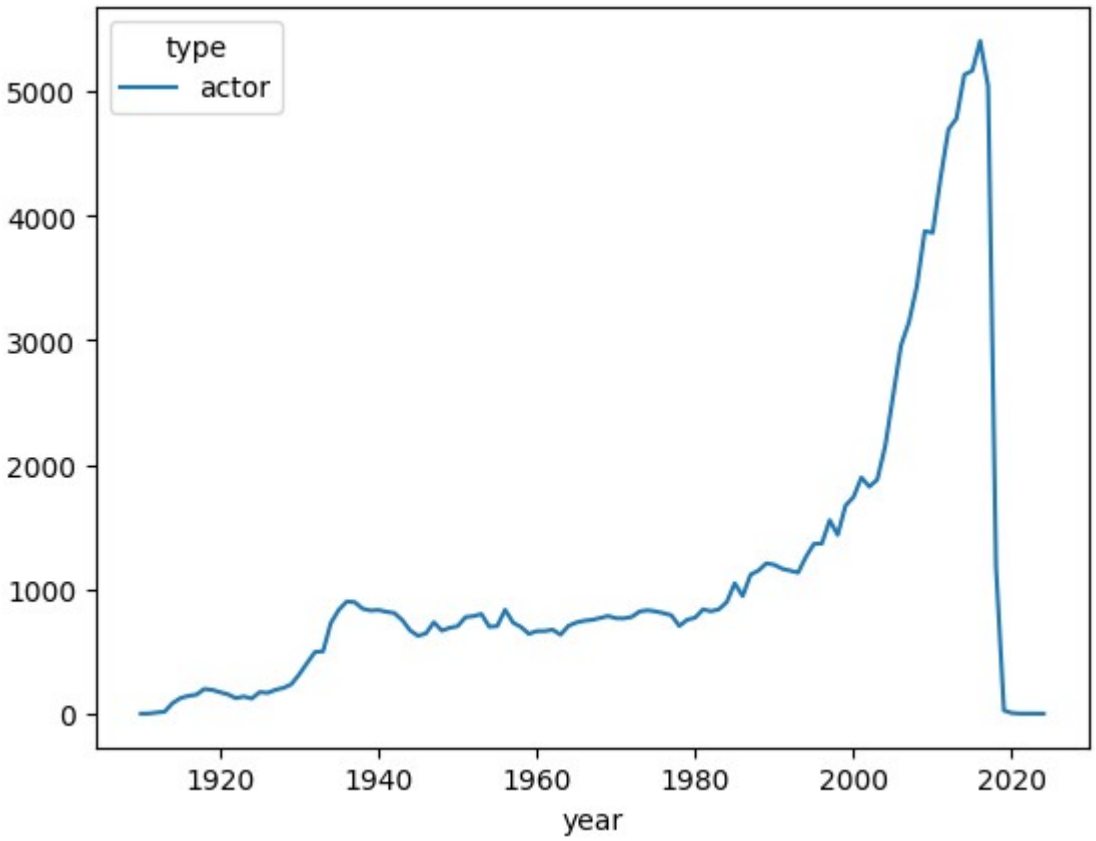
```
print("Batman: " + str(len(diff[diff>0])))
```

```
Batman: 7
```

Plot the number of actor roles each year and the number of actress roles each year over the history of film.

```
cast.groupby(['year','type']).size().unstack().plot()
```

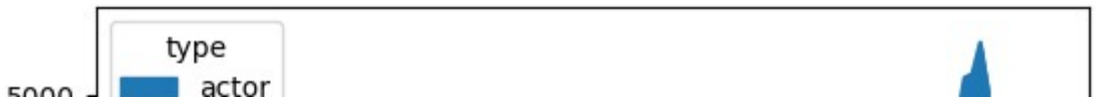
```
<Axes: xlabel='year'>
```

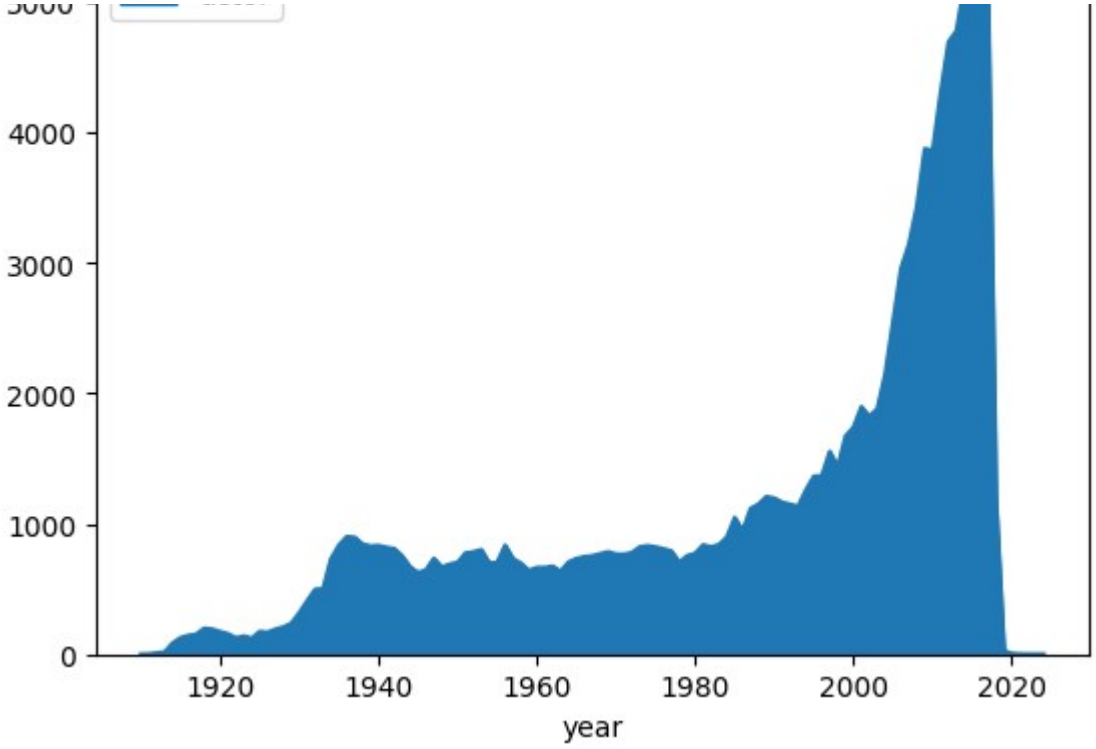


Plot the number of actor roles each year and the number of actress roles each year, but this time as a kind='area' plot.

```
cast.groupby(['year','type']).size().unstack().plot(kind='area')
```

```
<Axes: xlabel='year'>
```





Plot the difference between the number of actor roles each year and the number of actress roles each year over the history of film.

```
c = cast
c = c.groupby(['year', 'type']).size()
c = c.unstack('type')
print(c)
```

```
type  actor
year
1908      1
1910      3
1911      7
1912     15
1913     37
...     ...
2018   1831
2019     49
2020      9
2021      2
2024      1

[114 rows x 1 columns]
```

Plot the fraction of roles that have been 'actor' roles each year in the hitsory of film.

```
c = cast
c = c.groupby(['year', 'type']).size()
c = c.unstack('type')
print(c)
```

```
      type  actor
      year
      1908      1
      1910      3
      1911      7
      1912     15
      1913     37
      ...     ...
      2018   1831
      2019     49
      2020      9
      2021      2
      2024      1

      [114 rows x 1 columns]
```

Plot the fraction of supporting (n=2) roles that have been 'actor' roles each year in the history of film.

```
c = cast
c = c[c.n == 2]
c = c.groupby(['year', 'type']).size()
c = c.unstack('type')
print(c)
```

```
      type  actor
      year
      1910      1
      1912      1
      1913      2
      1914      9
      1915     17
```

```
...     ...
2015    178
2016    180
2017    161
2018     27
2019      1

[109 rows x 1 columns]
```

Build a plot with a line for each rank n=1 through n=3, where the line shows what fraction of that rank's roles were 'actor' roles for each year in the history of film.

```
c = cast
c = c[c.n <= 3]
c = c.groupby(['year', 'type', 'n']).size()
c = c.unstack('type').fillna(0)
print(c)
```

```
type      actor
year n
1908 1.0      1
1910 2.0      1
1911 3.0      2
1912 1.0      2
     2.0      1
...         ...
2017 3.0    158
2018 1.0     32
     2.0     27
     3.0     22
2019 2.0      1

[324 rows x 1 columns]
```