

In [1]: 1 **import** pandas **as** pd

In [2]: 1 book\_data = pd.read\_csv('book.csv')  
2 book\_data

Out[2]:

	Unnamed: 0	User.ID	Book.Title	Book.Rating
0	1	276726	Classical Mythology	5
1	2	276729	Clara Callan	3
2	3	276729	Decision in Normandy	6
3	4	276736	Flu: The Story of the Great Influenza Pandemic...	8
4	5	276737	The Mummies of Urumchi	6
...	...	...	...	...
9995	9996	162121	American Fried: Adventures of a Happy Eater.	7
9996	9997	162121	Cannibal In Manhattan	9
9997	9998	162121	How to Flirt: A Practical Guide	7
9998	9999	162121	Twilight	8
9999	10000	162129	Kids Say the Darndest Things	6

10000 rows × 4 columns

In [3]: 1 book\_data.shape

Out[3]: (10000, 4)

```
In [4]: 1 book_data.isna().sum()
```

```
Out[4]: Unnamed: 0      0
        User.ID      0
        Book.Title    0
        Book.Rating   0
        dtype: int64
```

```
In [5]: 1 book_data.dtypes
```

```
Out[5]: Unnamed: 0      int64
        User.ID      int64
        Book.Title    object
        Book.Rating   int64
        dtype: object
```

```
In [8]: 1 book_data['User.ID'].nunique()
```

```
Out[8]: 2182
```

```
In [9]: 1 book_data['Book.Title'].nunique()
```

```
Out[9]: 9659
```

```
In [10]: 1 print(book_data['Book.Title'].unique())
```

```
['Classical Mythology' 'Clara Callan' 'Decision in Normandy' ...
 'How to Flirt: A Practical Guide' 'Twilight'
 'Kids Say the Darndest Things']
```

```
In [11]: 1 book_data['User.ID'].unique()
```

```
Out[11]: array([276726, 276729, 276736, ..., 162113, 162121, 162129], dtype=int64)
```

## Using UBCF

**1. by using Correlation Matrix**

```
In [12]: 1 corr_pivot_table = pd.pivot_table(data=book_data,values='Book.Rating',index='Book.Title',columns='User.ID')
          2 corr_pivot_table
```

Out[12]:

	User.ID	8	9	10	12	14	16	17	19	22	26	...	278831	278832	278836	278843	278844	278846	27884
Book.Title																			
Jason, Madison &amp;		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.
Other																			
Stories;Merril;1985;McClelland &amp;		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.
Repairing PC Drives &amp;		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.
'48		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.
'O Au No Keia: Voices from Hawai'i's Mahu and Transgender Communities		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.
...		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.
\Surely You're Joking, Mr. Feynman!/: Adventures of a Curious Character		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.
\Well, there's your problem!/: Cartoons		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.
il Paradiso Degli Orchi		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.
stardust		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.
💎?💎?bermorgen.		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.

9659 rows × 2182 columns



```
In [13]: 1 corr_pivot_table.columns = book_data['User.ID'].unique()
        2 corr_pivot_table
```

Out[13]:

	276726	276729	276736	276737	276744	276745	276747	276748	276751	276754	...	162085	162091	1
Book.Title														
Jason, Madison &amp;	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	
Other Stories;Merril;1985;McClelland &amp;	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	
Repairing PC Drives &amp;	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	
'48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	
'O Au No Keia: Voices from Hawai'i's Mahu and Transgender Communities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	
\Surely You're Joking, Mr. Feynman!/: Adventures of a Curious Character	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	
\Well, there's your problem!/: Cartoons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	
il Paradiso Degli Orchi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	
stardust	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	
◆?◆?bermorgen.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	

9659 rows × 2182 columns



In [14]: 1 corr\_pivot\_table.corr().round(2)

Out[14]:

	276726	276729	276736	276737	276744	276745	276747	276748	276751	276754	...	162085	162091	162092	162095	162107
276726	1.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	...	-0.0	-0.0	-0.0	-0.0	-0.0
276729	-0.0	1.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	...	-0.0	-0.0	-0.0	-0.0	-0.0
276736	-0.0	-0.0	1.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	...	-0.0	-0.0	-0.0	-0.0	-0.0
276737	-0.0	-0.0	-0.0	1.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	...	-0.0	-0.0	-0.0	-0.0	-0.0
276744	-0.0	-0.0	-0.0	-0.0	1.0	-0.0	-0.0	-0.0	-0.0	-0.0	...	-0.0	-0.0	-0.0	-0.0	-0.0
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
162107	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	...	-0.0	-0.0	-0.0	-0.0	-0.0
162109	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	...	-0.0	-0.0	-0.0	-0.0	-0.0
162113	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	...	-0.0	-0.0	-0.0	-0.0	-0.0
162121	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	...	-0.0	-0.0	-0.0	-0.0	-0.0
162129	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	...	-0.0	-0.0	-0.0	-0.0	-0.0

2182 rows × 2182 columns



## 2. using Euclidian Distance as a metric for UBCF

In [15]: 1 book\_data.columns

Out[15]: Index(['Unnamed: 0', 'User.ID', 'Book.Title', 'Book.Rating'], dtype='object')

In [20]: 1 book\_data\_1 = book\_data.drop(columns=['Unnamed: 0'])

In [21]: 1 book\_data\_1

Out[21]:

	User.ID	Book.Title	Book.Rating
0	276726	Classical Mythology	5
1	276729	Clara Callan	3
2	276729	Decision in Normandy	6
3	276736	Flu: The Story of the Great Influenza Pandemic...	8
4	276737	The Mummies of Urumchi	6
...	...	...	...
9995	162121	American Fried: Adventures of a Happy Eater.	7
9996	162121	Cannibal In Manhattan	9
9997	162121	How to Flirt: A Practical Guide	7
9998	162121	Twilight	8
9999	162129	Kids Say the Darndest Things	6

10000 rows × 3 columns

In [22]: 1 from sklearn.metrics import pairwise\_distances

```
In [23]: 1 euclidean_pivot_table = pd.pivot_table(data=book_data_1, values='Book.Rating', index='User.ID', columns='Book.Title',
2 euclidean_pivot_table
```

Out[23]:

Book.Title	Jason, Madison &	Stories; Merril; 1985; McClelland &	Other	Repairing PC Drives &	'48	'O Au No Keia: Voices from Hawai'i's Mahu and Transgender Communities	...AND THE HORSE HE RODE IN ON : THE PEOPLE V. KENNETH STARR	01-01-00: A Novel of the Millennium	1,401 More Things That P*Ss Me Off	10 Commandments Of Dating	100 Great Fantasy Short Stories
User.ID											
8	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
...	...		...	...	...	...	...	...	...	...	...
278846	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
278849	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
278851	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
278852	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
278854	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2182 rows × 9659 columns

```
In [24]: 1 book_data_1['User.ID'].unique()
```

```
Out[24]: array([276726, 276729, 276736, ..., 162113, 162121, 162129], dtype=int64)
```

```
In [25]: 1 euclidean_pivot_table.index =book_data_1['User.ID'].unique()
        2 euclidean_pivot_table
```

```
Out[25]:
```

Book.Title	Jason, Madison &amp;	Stories;Merril;1985;McClelland &amp;	Other	Repairing PC Drives &amp;	'48	'O Au No Keia: Voices from Hawaii's Mahu and Transgender Communities	...AND THE HORSE HE RODE IN ON : THE PEOPLE V. KENNETH STARR	01-01-00: A Novel of the Millennium	1,401 More Things That P*Ss Me Off	10 Commandments Of Dating	100 Great Fantasy Short Short Stories
276726	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
276729	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
276736	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
276737	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
276744	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
...	...		...	...	...	...	...	...	...	...	...
162107	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
162109	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
162113	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
162121	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
162129	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2182 rows × 9659 columns





```
In [26]: 1 euclidean_pivot_table.values
```

```
Out[26]: array([[0., 0., 0., ..., 0., 0., 0.],
               [0., 0., 0., ..., 0., 0., 0.],
               [0., 0., 0., ..., 0., 0., 0.],
               ...,
               [0., 0., 0., ..., 7., 0., 0.],
               [0., 0., 0., ..., 0., 0., 0.],
               [0., 0., 0., ..., 0., 0., 0.]])
```

```
In [27]: 1 euclidean_ubcf = pairwise_distances(X=euclidean_pivot_table.values,metric='euclidean')
        2 euclidean_ubcf
```

```
Out[27]: array([[ 0.          , 16.03121954, 16.03121954, ..., 29.05167809,
                  16.88194302, 22.737634  ],
               [16.03121954,  0.          ,  8.48528137, ..., 25.67099531,
                  10.          , 18.22086716],
               [16.03121954,  8.48528137,  0.          , ..., 25.67099531,
                  10.          , 18.22086716],
               ...,
               [29.05167809, 25.67099531, 25.67099531, ...,  0.          ,
                  26.21068484, 30.31501278],
               [16.88194302, 10.          , 10.          , ..., 26.21068484,
                  0.          , 18.97366596],
               [22.737634  , 18.22086716, 18.22086716, ..., 30.31501278,
                  18.97366596,  0.          ]])
```

```
In [28]: 1 book_data_1['User.ID'].unique()
```

```
Out[28]: array([276726, 276729, 276736, ..., 162113, 162121, 162129], dtype=int64)
```

In [29]:

```

1 ubcf_euclidean_metric = pd.DataFrame(data=euclidean_ubcf)
2 ubcf_euclidean_metric.index = book_data_1['User.ID'].unique()
3 ubcf_euclidean_metric.columns=book_data_1['User.ID'].unique()
4 ubcf_euclidean_metric.round(2)

```

Out[29]:

	276726	276729	276736	276737	276744	276745	276747	276748	276751	276754	...	162085	162091	162092	162095	162107
276726	0.00	16.03	16.03	17.92	17.52	17.38	18.44	16.43	16.43	20.05	...	17.92	22.83	16.88	37.85	18.44
276729	16.03	0.00	8.49	11.66	11.05	10.82	12.45	9.22	9.22	14.73	...	11.66	18.33	10.00	35.33	12.50
276736	16.03	8.49	0.00	11.66	11.05	10.82	12.45	9.22	9.22	14.73	...	11.66	18.33	10.00	35.33	12.50
276737	17.92	11.66	11.66	0.00	13.64	13.45	14.80	12.21	12.21	16.76	...	14.14	20.00	12.81	36.22	14.80
276744	17.52	11.05	11.05	13.64	0.00	12.92	14.32	11.62	11.62	16.34	...	13.64	19.65	12.25	36.03	14.30
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
162107	16.88	10.00	10.00	12.81	12.25	12.04	13.53	10.63	10.63	15.65	...	12.81	19.08	11.31	35.72	13.60
162109	17.38	10.82	10.82	13.45	12.92	12.73	14.14	11.40	11.40	16.19	...	13.45	19.52	12.04	35.96	14.20
162113	29.05	25.67	25.67	26.89	26.63	26.53	27.24	25.92	25.92	28.35	...	26.89	30.38	26.21	42.84	27.20
162121	16.88	10.00	10.00	12.81	12.25	12.04	13.53	10.63	10.63	15.65	...	12.81	19.08	11.31	35.72	13.60
162129	22.74	18.22	18.22	19.90	19.54	19.42	20.37	18.57	18.57	21.84	...	19.90	24.41	18.97	38.83	20.40

2182 rows × 2182 columns



### 3. Using Cosine as a metric for UBCF

In [30]:

1 cosine\_pivot\_table = pd.pivot\_table(data=book\_data\_1,values='Book.Rating',index='User.ID',columns='Book.Title')

2 cosine\_pivot\_table

Out[30]:

Book.Title	Jason, Madison &amp;	Stories;Merril;1985;McClelland &amp;	Other	Repairing PC Drives &amp;	'48	'O Au No Keia: Voices from Hawai'i's Mahu and Transgender Communities	...AND THE HORSE HE RODE IN ON : THE PEOPLE V. KENNETH STARR	01-01-00: A Novel of the Millennium	1,401 More Things That P*Ss Me Off	10 Commandments Of Dating	100 Great Fantasy Short Short Stories
User.ID											
8	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
...	...		...	...	...	...	...	...	...	...	...
278846	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
278849	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
278851	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
278852	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
278854	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2182 rows × 9659 columns



In [31]:

```
1 cosine_pivot_table.index = book_data_1['User.ID'].unique()
2 cosine_pivot_table
```

Out[31]:

Book.Title	Jason, Madison &amp;	Stories;Merril;1985;McClelland &amp;	Other	Repairing PC Drives &amp;	'48	'O Au No Keia: Voices from Hawai'I's Mahu and Transgender Communities	...AND THE HORSE HE RODE IN ON : THE PEOPLE V. KENNETH STARR	01-01-00: A Novel of the Millennium	1,401 More Things That P*Ss Me Off	10 Commandments Of Dating	100 Great Fantasy Short Short Stories
276726	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
276729	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
276736	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
276737	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
276744	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
...	...		...	...	...	...	...	...	...	...	...
162107	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
162109	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
162113	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
162121	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
162129	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2182 rows × 9659 columns

```
In [32]: 1 cosine_pivot_table.values
```

```
Out[32]: array([[0., 0., 0., ..., 0., 0., 0.],
               [0., 0., 0., ..., 0., 0., 0.],
               [0., 0., 0., ..., 0., 0., 0.],
               ...,
               [0., 0., 0., ..., 7., 0., 0.],
               [0., 0., 0., ..., 0., 0., 0.],
               [0., 0., 0., ..., 0., 0., 0.]])
```

```
In [33]: 1 cosine_ubcf = 1-pairwise_distances(X=cosine_pivot_table.values,metric='cosine')
         2 cosine_ubcf
```

```
Out[33]: array([[1., 0., 0., ..., 0., 0., 0.],
               [0., 1., 0., ..., 0., 0., 0.],
               [0., 0., 1., ..., 0., 0., 0.],
               ...,
               [0., 0., 0., ..., 1., 0., 0.],
               [0., 0., 0., ..., 0., 1., 0.],
               [0., 0., 0., ..., 0., 0., 1.]])
```

```
In [34]: 1 book_data_1['User.ID'].unique()
```

```
Out[34]: array([276726, 276729, 276736, ..., 162113, 162121, 162129], dtype=int64)
```

```
In [35]: 1 cosine_ubcf_df = pd.DataFrame(data=cosine_ubcf)
2 cosine_ubcf_df.index = book_data_1['User.ID'].unique()
3 cosine_ubcf_df.columns = book_data_1['User.ID'].unique()
4 cosine_ubcf_df.round(2)
```

Out[35]:

	276726	276729	276736	276737	276744	276745	276747	276748	276751	276754	...	162085	162091	162092	162095	162107
276726	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276729	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276736	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276737	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276744	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
162107	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
162109	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
162113	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
162121	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
162129	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0

2182 rows × 2182 columns



**Filtering top 50 data**

```
In [36]: 1 first_50_user = cosine_ubcf_df.iloc[:50,:50]
        2 first_50_user
```

Out[36]:

	276726	276729	276736	276737	276744	276745	276747	276748	276751	276754	...	276853	276854	276857	276859	27686
276726	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276729	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276736	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276737	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276744	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276745	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276747	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276748	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276751	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276754	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	...	0.0	0.0	0.0	0.0	0.0
276755	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276760	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276762	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276768	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276772	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276774	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276780	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276786	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276788	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276796	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276798	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276804	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276808	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0

	276726	276729	276736	276737	276744	276745	276747	276748	276751	276754	...	276853	276854	276857	276859	27686
276811	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276812	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276813	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276814	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276820	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276822	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276827	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276828	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276830	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276832	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276835	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276837	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276842	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276847	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276848	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276850	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276853	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	1.0	0.0	0.0	0.0	0.0
276854	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	1.0	0.0	0.0	0.0
276857	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	1.0	0.0	0.0
276859	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	1.0	0.0
276861	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	1.0
276862	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276863	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276866	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276870	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
276872	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0

50 rows × 50 columns





```
In [37]: 1 first_50_user.idxmax()  
        2 #return index of first occurence of maximum over requested axis
```

```
Out[37]: 276726    276726  
        276729    276729  
        276736    276736  
        276737    276737  
        276744    276744  
        276745    276745  
        276747    276747  
        276748    276748  
        276751    276751  
        276754    276754  
        276755    276755  
        276760    276760  
        276762    276762  
        276768    276768  
        276772    276772  
        276774    276774  
        276780    276780  
        276786    276786  
        276788    276788  
        276796    276796  
        276798    276798  
        276800    276800  
        276804    276804  
        276808    276808  
        276811    276811  
        276812    276812  
        276813    276813  
        276814    276814  
        276820    276820  
        276822    276822  
        276827    276827  
        276828    276828  
        276830    276830  
        276832    276832  
        276835    276835  
        276837    276837  
        276842    276842  
        276847    276847  
        276848    276848
```

```
276850    276850
276853    276853
276854    276854
276857    276857
276859    276859
276861    276861
276862    276862
276863    276863
276866    276866
276870    276870
276872    276872
dtype: int64
```

In [ ]:

1