

# Expert Systems Project

Book Recommendation System

## Instructor

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# Introduction

This expert system takes the books the user likes as an input and recommends similar books. The results are obtained using the genres and the author of the chosen books and return the most highly rated books in the data set that have the same genres or authors.

The data set contains 30 thousands books obtained from Goodreads site by scraping. If the user couldn't find the desired book in the data set, he/she can enter Goodreads id to obtain it. But the recommendations are always limited by the books in the dataset.

As we see in the picture below the data set is made from the following column: Book id, book title, publish year, genres of the book, number of the people rated the book, number of the book reviews, average rating, description of the book, and a link to the book img.

In [10]:

```
data.head()  
#sample from the data
```

Out[10]:

	book_id	book_title	year_first_published	author	genres	num_ratings	num_reviews	average_rati
0	3721	Stranger Than Fiction: An Independent Investig...		Albert D. Pastore	[]	8	1	4.
1	2833	The Life and Death of Carthage; A Survey of Pu...		Gilbert Charles-Picard	[History]	7	0	4
2	24141	El libro de Catherine/Catherine, called Birdy	1994	Karen Cushman	[Historical > Historical Fiction, Young Adult,...]	40761	1667	3
3	13232	Alice's Adventures in Wonderland		Julia Suarez	[Classics, Fantasy]	44	2	4
4	22996	Federico Garcia Lorca	1985	Ian Gibson	[Biography, History, Cultural > Spain, Poetry,...]	253	13	4

## While developing the system

At first I used the Bayesian Formula to make a weighted score for the books based on the average rating and number of raters so the books rated from 1 user as 5 star is not the same as the book rated from 1000 users as 5 star.

The Bayesian Formula is as follows: weighted rank (WR) =  $(v / (v+m)) R + (m / (v+m)) C$

where:

R = average for the design (mean) = (Rating)

v = number of votes for the design = (Rate Count)

m = minimum votes required to be listed in the top beers list

C = the midpoint of the scale

I chose the minimum votes to be at least in the top 80%.

I sorted the data according to the new scores.

In [11]:

```
q_books.head()
```

Out[11]:

		book_id	book_title	year_first_published	author	genres	num_ratings	num_reviews	average_rati
19838	8	Harry Potter Boxed Set, Books 1-5 (Harry Potter...)	2003	J.K. Rowling	[Fantasy, Young Adult, Fiction, Fantasy > Magi...]	74201	204	4.	
11880	4256	Harry Potter and the Prisoner of Azkaban	1999	J.K. Rowling	[Fantasy, Young Adult, Fiction, Fantasy > Magi...]	3276006	64426	4.	
24125	5	Harry Potter and the Prisoner of Azkaban	1999	J.K. Rowling	[Fantasy, Young Adult, Fiction, Fantasy > Magi...]	3274493	64408	4.	
20363	15872	Harry Potter y el misterio del príncipe	2005	J.K. Rowling	[Fantasy, Young Adult, Fiction, Fantasy > Magi...]	2748459	45378	4.	
1853	5991	混血王子的背叛	2005	J.K. Rowling	[Fantasy, Young Adult, Fiction, Fantasy > Magi...]	2745302	45332	4.	

As we see in table above, The score column is added but we have 2 problems in the data.

1. Some books in the data are duplicated.

2. There are books in different languages than English. We can solve the first problem easily by discarding the duplications according to the title of the book.

To solve the second problem I used the SpaCy library to detect the language and discard all the languages except English but the results were not very accurate which resulted in discarding a lot of

the English data. I decided to remove all the books that include non-ascii characters in their titles to at least reduce the number of non-English books.

In [21]:

```
q_books.head()
```

Out[21]:

	book_title	book_id	year_first_published	author	genres	num_ratings	num_reviews	average_rating
0	The Complete Calvin and Hobbes	24812		Bill Watterson	[Sequential Art > Comics, Humor, Sequential Arts]	38253	1086	4.5
1	The Essential Calvin and Hobbes	24817	1988	Bill Watterson	[Sequential Art > Comics, Humor, Sequential Arts]	116567	907	4.6
2	Harry Potter and the Prisoner of Azkaban	4256	1999	J.K. Rowling	[Fantasy, Young Adult, Fiction, Fantasy > Magic]	3276006	64426	4.5
3	Harry Potter and the Half-Blood Prince	2005	2005	J.K. Rowling	[Fantasy, Young Adult, Fiction, Fantasy > Magic]	2744285	45320	4.5
4	Harry Potter and the Goblet of Fire	6	2000	J.K. Rowling	[Fantasy, Young Adult, Fiction, Fantasy > Magic]	2942510	53663	4.5

Now the data is ready and we can complete our work on it.

The idea of my system is simple:

1. Find all the top 3 genres of each book the user chose and add them to a list.
2. Compare all the book genres in the data set to the list and give the books points according to the similar items.
3. Repeat steps 1 and 2 for the books' authors.
4. Recommend the most similar items and the highest rated books to the user.

In [12]:

```
show_data(chosen_books)
```

Out[12]:

	img	book_title	year_first_published	author	genres	num_ratings	average_rating
0		The Andromeda Strain	1969	michaelcrichton	[sciencefiction, fiction, thriller]	238324	

img	book_title	year_first_published	author	genres	num_ratings	average_ra
1	How to Start a Conversation and Make Friends: Revised and Updated	1983	dongabor	[selfhelp, nonfiction, language>communication]	1090	
2	Crossroads and Other Tales of Valdemar		mercedeslackey	[fantasy, shortstories, anthologies]	3295	
3	Monique and the Mango Rains: Two Years with a Midwife in Mali	2006	krisholloway	[nonfiction, cultural>africa, autobiography>memoir]	4141	
4	Arrows of the Queen	1987	mercedeslackey	[fantasy, youngadult, fiction]	39808	

Based on the chosen books above the lists will be as follows:

```
In [17]: print('genres list: ' + str(genres_list) + '\n')
print('authors list: ' + str(authors_list))
```

```
genres list: ['sciencefiction', 'fiction', 'thriller', 'selfhelp', 'nonfiction', 'language>communication', 'fantasy', 'shortstories', 'anthologies', 'cultural>africa', 'autobiography>memoir', 'youngadult']
```

```
authors list: ['michaelcrichton', 'dongabor', 'mercedeslackey', 'krisholloway']
```

The problem with the above approach is that if the genre or author is repeated in the books the user read it will be the same as the unrepeated ones in the score and most similar recommendations will have at most 4 as a similarity.

```
In [11]: show_data(q_books)
#qualified books
```

img	book_title	year_first_published	author	genres	num_ratings	average_rating
0	Jurassic Park	1990	michaelcrichton	[sciencefiction, fiction, thriller]	860193	4.06 4.05
1	Queen's Own	1990	mercedeslackey	[fantasy, fiction, youngadult]	7220	4.42 4.03
2	Michael Crichton's Jurassic World: Jurassic Park / The Lost World		michaelcrichton	[sciencefiction, fiction, thriller]	10026	4.23 3.98
3	La Amenaza de Andromeda	1969	michaelcrichton	[sciencefiction, fiction, thriller]	238452	3.91 3.91

	img	book_title	year_first_published	author	genres	num_ratings	average_rating	
4	None	Timeline	1999	michaelcrichton	[sciencefiction, fiction, thriller]	201379	3.86	3.85
5		Rescate en el tiempo [1999-1357]	1999	michaelcrichton	[sciencefiction, fiction, thriller]	201358	3.86	3.85
6		Esfera	1987	michaelcrichton	[sciencefiction, fiction, thriller]	178470	3.81	3.80
7		Le Monde Perdu	1995	michaelcrichton	[fiction, sciencefiction, thriller]	139532	3.81	3.81
8		El mundo perdido	1995	michaelcrichton	[fiction, sciencefiction, thriller]	139495	3.81	3.81
9		El Mundo Perdido	1995	michaelcrichton	[fiction, sciencefiction, thriller]	139439	3.81	3.81
10		The Lost World		michaelcrichton	[fiction, sciencefiction, thriller]	139439	3.81	3.81
11	None	Lost World Mov Tie-In	1995	michaelcrichton	[fiction, sciencefiction, thriller]	139439	3.81	3.81
12		Presa	2002	michaelcrichton	[fiction, sciencefiction, thriller]	173936	3.77	3.76
13		Estado de miedo	2004	michaelcrichton	[fiction, thriller, sciencefiction]	84422	3.71	3.70
14		Estado De Miedo	2004	michaelcrichton	[fiction, thriller, sciencefiction]	84417	3.71	3.70
15		State Of Fear		michaelcrichton	[fiction, thriller, sciencefiction]	84417	3.71	3.70
16		State of Fear	2004	michaelcrichton	[fiction, thriller, sciencefiction]	84411	3.71	3.70
17		Congo	1980	michaelcrichton	[fiction, sciencefiction, thriller]	168757	3.62	3.62
18		Next		michaelcrichton	[fiction, sciencefiction, thriller]	72362	3.55	3.55
19		The Terminal Man	1972	michaelcrichton	[fiction, sciencefiction, thriller]	25657	3.37	3.42

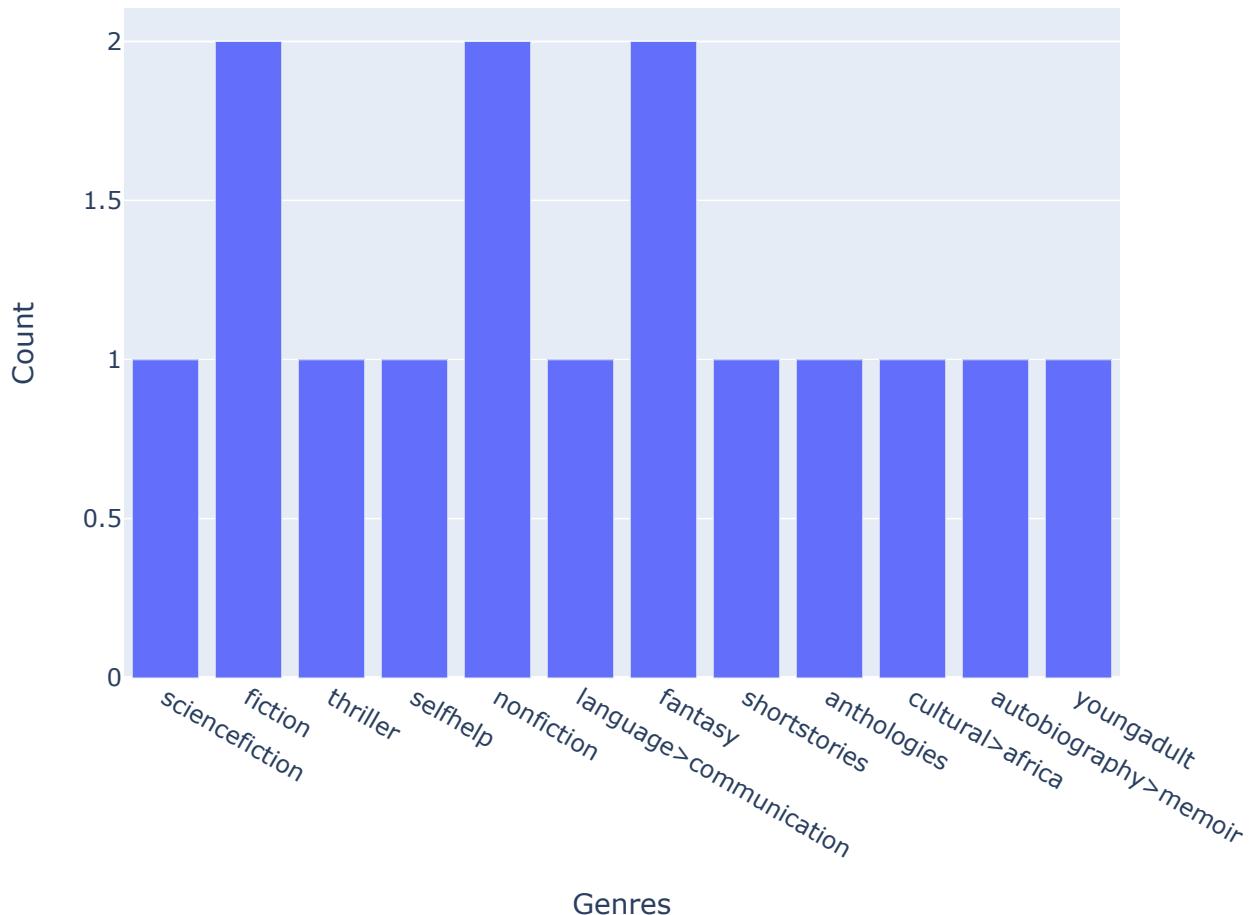
So, I decided to use dictionary instead of the list and make the genres as key and the times repeated in the list as the value of the key.

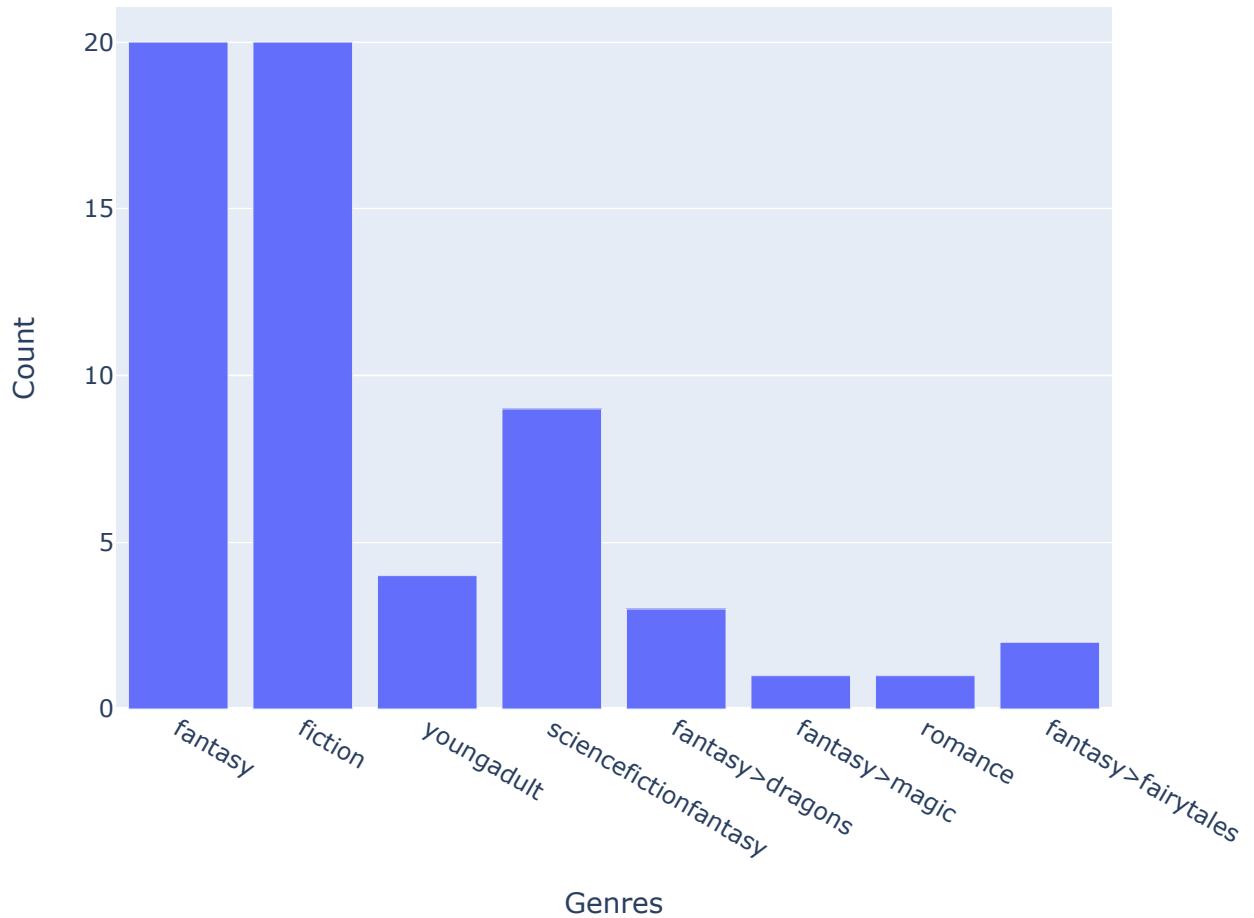
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In [13]:	show_data(q_books.head(20)) #qualified books after using dictionary																																																																																																																								
Out[13]:	<table border="1"> <thead> <tr> <th></th><th>img</th><th>book_title</th><th>year_first_published</th><th>author</th><th>genres</th><th>num_ratings</th><th>average_rating</th></tr> </thead> <tbody> <tr> <td>0</td><td></td><td>Queen's Own</td><td>1990</td><td>mercedeslackey</td><td>[fantasy, fiction, youngadult]</td><td>7220</td><td>4.42</td></tr> <tr> <td>1</td><td></td><td>Arrows of the Queen</td><td>1987</td><td>mercedeslackey</td><td>[fantasy, youngadult, fiction]</td><td>39808</td><td>4.08</td></tr> <tr> <td>2</td><td></td><td>Arrow's Fall</td><td>1988</td><td>mercedeslackey</td><td>[fantasy, fiction, sciencefictionfantasy]</td><td>21630</td><td>4.19</td></tr> <tr> <td>3</td><td></td><td>Exile's Valor</td><td>2003</td><td>mercedeslackey</td><td>[fantasy, fiction, sciencefictionfantasy]</td><td>12102</td><td>4.20</td></tr> <tr> <td>4</td><td></td><td>Winds of Fate</td><td>1991</td><td>mercedeslackey</td><td>[fantasy, fiction, sciencefictionfantasy]</td><td>16332</td><td>4.05</td></tr> <tr> <td>5</td><td></td><td>To Light a Candle</td><td>2004</td><td>mercedeslackey</td><td>[fantasy, fiction, fantasy&gt;dragons]</td><td>9713</td><td>4.13</td></tr> <tr> <td>6</td><td></td><td>Winds of Fury</td><td>1993</td><td>mercedeslackey</td><td>[fantasy, fiction, sciencefictionfantasy]</td><td>13502</td><td>4.07</td></tr> <tr> <td>7</td><td></td><td>When Darkness Falls</td><td>2006</td><td>mercedeslackey</td><td>[fantasy, fiction, fantasy&gt;magic]</td><td>7391</td><td>4.18</td></tr> <tr> <td>8</td><td></td><td>Storm Warning</td><td>1994</td><td>mercedeslackey</td><td>[fantasy, fiction, sciencefictionfantasy]</td><td>12637</td><td>4.05</td></tr> <tr> <td>9</td><td></td><td>Storm Rising</td><td>1995</td><td>mercedeslackey</td><td>[fantasy, fiction, sciencefictionfantasy]</td><td>12032</td><td>4.04</td></tr> <tr> <td>10</td><td></td><td>Joust</td><td>2003</td><td>mercedeslackey</td><td>[fantasy, fantasy&gt;dragons, fiction]</td><td>11282</td><td>4.03</td></tr> <tr> <td>11</td><td></td><td>The Serpent's Shadow</td><td>2001</td><td>mercedeslackey</td><td>[fantasy, fiction, romance]</td><td>10241</td><td>4.01</td></tr> <tr> <td>12</td><td></td><td>Owlflight</td><td>1997</td><td>mercedeslackey</td><td>[fantasy, fiction, sciencefictionfantasy]</td><td>10649</td><td>4.00</td></tr> <tr> <td>13</td><td></td><td>Alta</td><td>2004</td><td>mercedeslackey</td><td>[fantasy, fantasy&gt;dragons, fiction]</td><td>7944</td><td>4.04</td></tr> </tbody> </table>		img	book_title	year_first_published	author	genres	num_ratings	average_rating	0		Queen's Own	1990	mercedeslackey	[fantasy, fiction, youngadult]	7220	4.42	1		Arrows of the Queen	1987	mercedeslackey	[fantasy, youngadult, fiction]	39808	4.08	2		Arrow's Fall	1988	mercedeslackey	[fantasy, fiction, sciencefictionfantasy]	21630	4.19	3		Exile's Valor	2003	mercedeslackey	[fantasy, fiction, sciencefictionfantasy]	12102	4.20	4		Winds of Fate	1991	mercedeslackey	[fantasy, fiction, sciencefictionfantasy]	16332	4.05	5		To Light a Candle	2004	mercedeslackey	[fantasy, fiction, fantasy>dragons]	9713	4.13	6		Winds of Fury	1993	mercedeslackey	[fantasy, fiction, sciencefictionfantasy]	13502	4.07	7		When Darkness Falls	2006	mercedeslackey	[fantasy, fiction, fantasy>magic]	7391	4.18	8		Storm Warning	1994	mercedeslackey	[fantasy, fiction, sciencefictionfantasy]	12637	4.05	9		Storm Rising	1995	mercedeslackey	[fantasy, fiction, sciencefictionfantasy]	12032	4.04	10		Joust	2003	mercedeslackey	[fantasy, fantasy>dragons, fiction]	11282	4.03	11		The Serpent's Shadow	2001	mercedeslackey	[fantasy, fiction, romance]	10241	4.01	12		Owlflight	1997	mercedeslackey	[fantasy, fiction, sciencefictionfantasy]	10649	4.00	13		Alta	2004	mercedeslackey	[fantasy, fantasy>dragons, fiction]	7944	4.04
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	img	book_title	year_first_published	author	genres	num_ratings	average_rating
14		Phoenix and Ashes	2004	mercedeslackey	[fantasy, fantasy>fairytales, fiction]	7983	4.03
15		Owlknight	1999	mercedeslackey	[fantasy, fiction, sciencefictionfantasy]	9213	4.00
16		The Silver Gryphon	1996	mercedeslackey	[fantasy, fiction, sciencefictionfantasy]	10574	3.84
17		The Wizard of London	2005	mercedeslackey	[fantasy, fiction, fantasy>fairytales]	7078	3.81
18		Harry Potter and the Prisoner of Azkaban	1999	j.k.rowling	[fantasy, youngadult, fiction]	3276006	4.57
19		Harry Potter and the Half-Blood Prince	2005	j.k.rowling	[fantasy, youngadult, fiction]	2744285	4.57

In [14]:

```
show_chart(chosen_books) #Above chart the books chosen by user
show_chart(q_books.head(20)) #below chart The books recomended
```





Now if we see the charts above we notice that all the books recommended have the genres fantasy and fiction which means that the recommendations lack of diversity.

I decided to limit the genres occurrence in the recommendations to be at most 33% of the books which means just 7 books will have the same genre in the recommendations.

In [15]:

```
show_data(r_books)
```

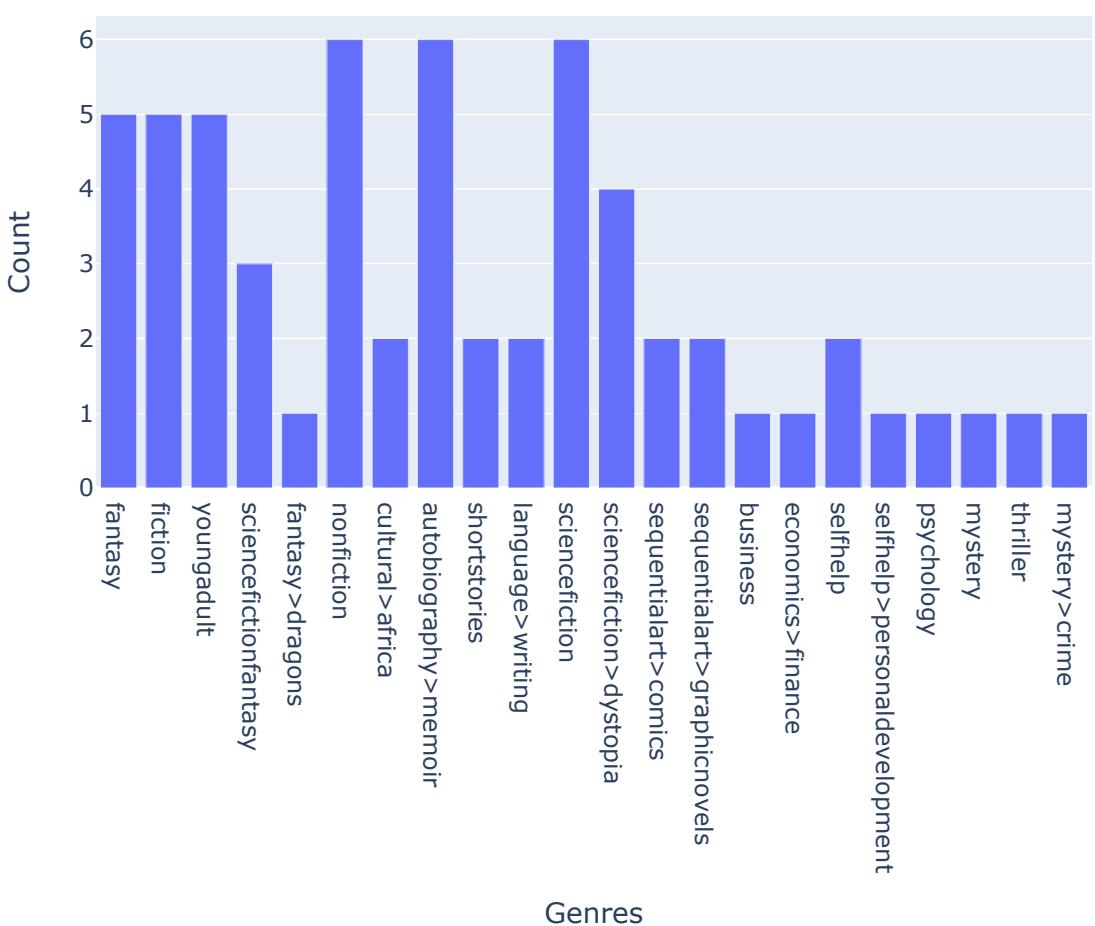
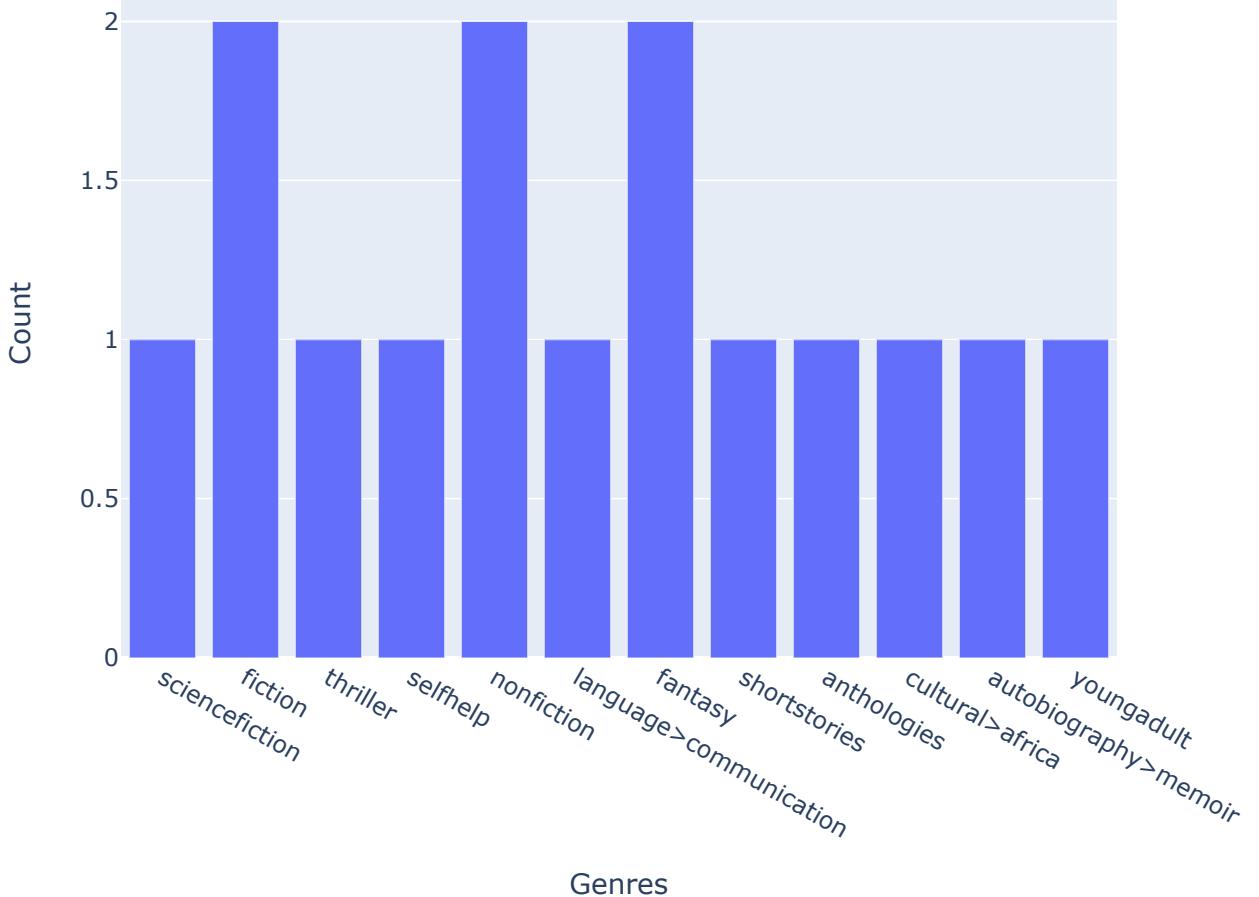
Out[15]:

	img	book_title	year_first_published	author	genres	num_ratings
0		Queen's Own	1990	mercedeslackey	[fantasy, fiction, youngadult]	7220
1		Arrow's Fall	1988	mercedeslackey	[fantasy, fiction, sciencefictionfantasy]	21630
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3		Winds of Fate	1991	mercedeslackey	[fantasy, fiction, sciencefictionfantasy]	16332
4		To Light a Candle	2004	mercedeslackey	[fantasy, fiction, fantasy>dragons]	9713
5		Out of Africa / Shadows on the Grass	1937	isakdinesen	[nonfiction, cultural>africa, autobiography>memoir]	10832

img	book_title	year_first_published	author	genres	num_ratings
6	Don't Let's Go to the Dogs Tonight: An African Childhood	2001	alexandrafuller	[autobiography>memoir, nonfiction, cultural>africa]	55646
7	Couldn't Keep it to Myself: Wally Lamb and the Women of York Correctional Institution	2003	wallylamb	[nonfiction, autobiography>memoir, shortstories]	7145
8	How to be Alone	2002	jonathanfranzen	[nonfiction, autobiography>memoir, shortstories]	11191
9	On Writing: A Memoir	2000	stephenking	[nonfiction, language>writing, autobiography>memoir]	251994
10	On Writing: A Memoir of the Craft	2000	stephenking	[nonfiction, language>writing, autobiography>memoir]	251899
11	The House of the Scorpion		nancyfarmer	[youngadult, sciencefiction, sciencefiction>dystopia]	92876
12	Uglies		scottwesterfeld	[youngadult, sciencefiction>dystopia, sciencefiction]	610399
13	Pretties		scottwesterfeld	[youngadult, sciencefiction>dystopia, sciencefiction]	250871
14	Specials		scottwesterfeld	[youngadult, sciencefiction>dystopia, sciencefiction]	181789
15	Transmetropolitan, Vol. 10: One More Time		warrenellis	[sequentialart>comics, sequentialart>graphicnovels, sciencefiction]	11180
16	Transmetropolitan, Vol. 3: Year of the Bastard		warrenellis	[sequentialart>comics, sequentialart>graphicnovels, sciencefiction]	14923
17	Secrets of the Millionaire Mind: Mastering the Inner Game of Wealth	2005	t.harveker	[business, economics>finance, selfhelp]	52896
18	Unlimited Power: The New Science Of Personal Achievement	1986	anthonyrobbins	[selfhelp, selfhelp>personaldevelopment, psychology]	32846
19	Beyond Reach		karinslaughter	[mystery, thriller, mystery>crime]	30308

In [16]:

```
show_chart(chosen_books) #Above chart the books chosen by user
show_chart(r_books) #below chart The books recommended
```



## Examples

In [19]:

```

titles = ["Middlemarch: Part 1 & Part 2"]
chosen_books = read_data(titles)
chosen_books = chosen_books.reset_index(drop=True)
r_books = recommend_books(q_books, titles)

show_data(chosen_books)

```

Out[19]:

	img	book_title	year_first_published	author	genres	num_ratings	average_rating
0		Middlemarch: Part 1 & Part 2	1871	georgeeliot	[classics, fiction, historical>historicalfiction]	144797	3.99

In [20]:

```
show_data(r_books)
```

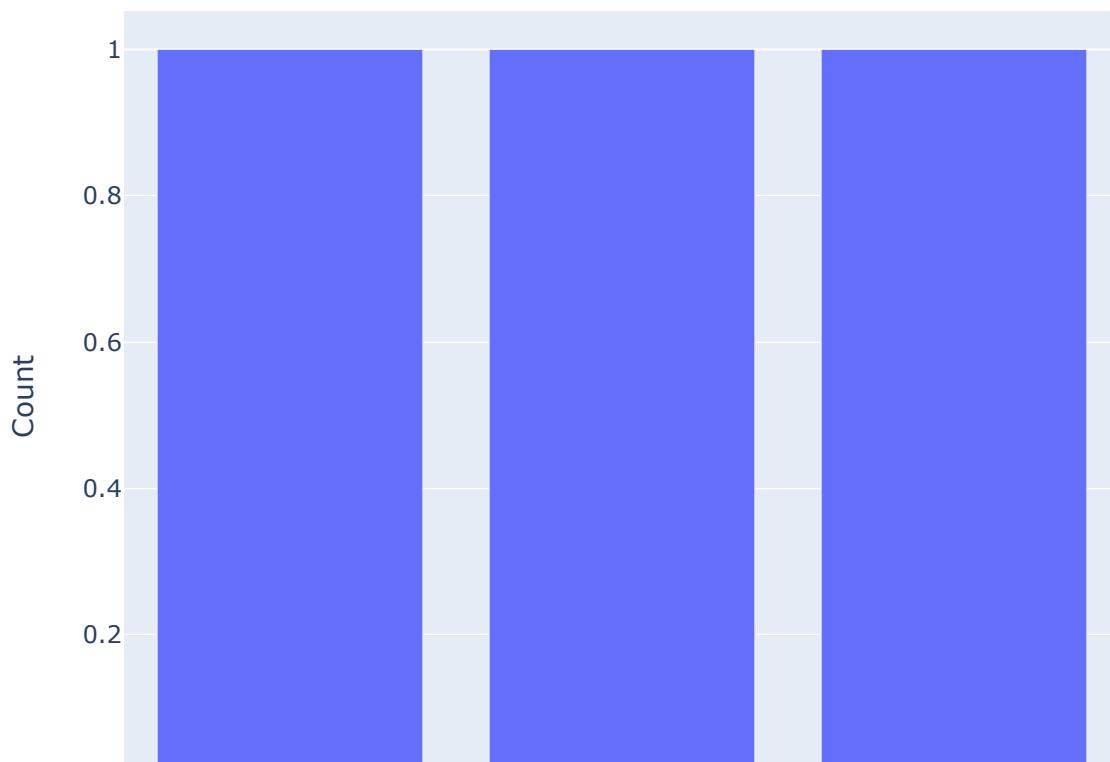
Out[20]:

	img	book_title	year_first_published	author	genres	num_ratings	average_rating
0		Middlemarch	1871	georgeeliot	[classics, fiction, historical>historicalfiction]	144797	
1		Adam Bede	1859	georgeeliot	[classics, fiction, historical>historicalfiction]	23824	
2		East Of Eden	1952	johnsteinbeck	[classics, fiction, historical>historicalfiction]	466848	
3		East of Eden	1952	johnsteinbeck	[classics, fiction, historical>historicalfiction]	466753	
4		Gone with the Wind	1936	margaretmitchell	[classics, historical>historicalfiction, fiction]	1139318	
5		The Complete Calvin and Hobbes		billwatterson	[sequentialart>comics, humor, sequentialart>graphicnovels]	38253	
6		The Essential Calvin and Hobbes	1988	billwatterson	[sequentialart>comics, humor, sequentialart>graphicnovels]	116567	
7		The Calvin And Hobbes: Tenth Anniversary Book	1995	billwatterson	[sequentialart>comics, humor, sequentialart>graphicnovels]	51863	
8		The Calvin and Hobbes Tenth Anniversary Book	1995	billwatterson	[sequentialart>comics, humor, sequentialart>graphicnovels]	51862	
9		The Complete Maus	1994	artspiegelman	[sequentialart>graphicnovels, sequentialart>comics, nonfiction]	167386	
10		It's A Magical World	1996	billwatterson	[sequentialart>comics, humor, sequentialart>graphicnovels]	28087	

	img	book_title	year_first_published	author	genres	num_ratings	average
11		Man's Search for Meaning	1946	viktore.frankl	[nonfiction, psychology, philosophy]	516794	
12		The Kissing Hand	1993	audreypenn	[childrens>picturebooks, childrens, animals]	67213	
13		The Night Before Christmas	1823	clementc.moore	[holiday>christmas, childrens, childrens>picturebooks]	115885	
14		The Lord of the Rings: The Making of the Movie Trilogy	2002	briansibley	[nonfiction, culture>film, art]	19090	
15		Mere Christianity	1942	c.s.lewis	[christian, nonfiction, religion]	341609	
16		Ender's Game	1985	orsonscottcard	[sciencefiction, youngadult, fantasy]	1235916	
17		On Writing: A Memoir	2000	stephenking	[nonfiction, language>writing, autobiography>memoir]	251994	
18		On Writing: A Memoir of the Craft	2000	stephenking	[nonfiction, language>writing, autobiography>memoir]	251899	
19		Disney's Beauty and the Beast	1991	teddyslater	[childrens, childrens>picturebooks, fantasy>fairytales]	30589	

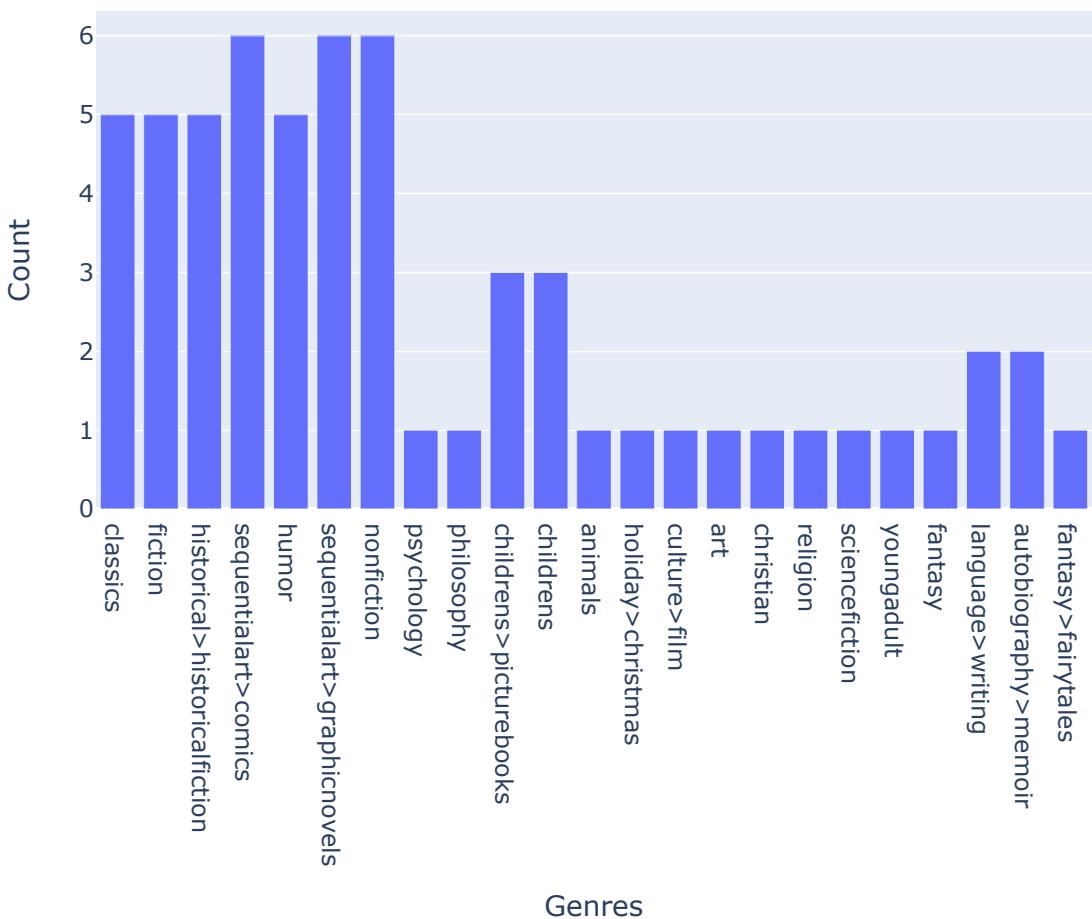
In [21]:

```
show_chart(chosen_books) #Above chart the books chosen by user
show_chart(r_books) #below chart The books recommended
```



```
0 classics fiction historical>historicalfiction
```

Genres



In [22]:

```
titles = ["Middlemarch: Part 1 & Part 2", "George Washington's Rules of Civility & Decent Behavior in Company and Conversation"]
chosen_books = read_data(titles)
chosen_books = chosen_books.reset_index(drop=True)
r_books = recomend_books(q_books, titles)

show_data(chosen_books)
```

Out[22]:

	img	book_title	year_first_published	author	genres	num_ratings	average_
0		Middlemarch: Part 1 & Part 2	1871	georgeeliot	[classics, fiction, historical>historicalfiction]	144797	
1		George Washington's Rules of Civility & Decent Behavior in Company and Conversation	1887	georgewashington	[history, nonfiction, classics]	1502	

In [23]:

```
show_data(r_books)
```

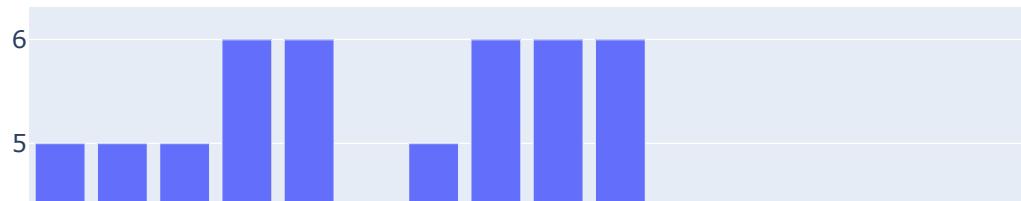
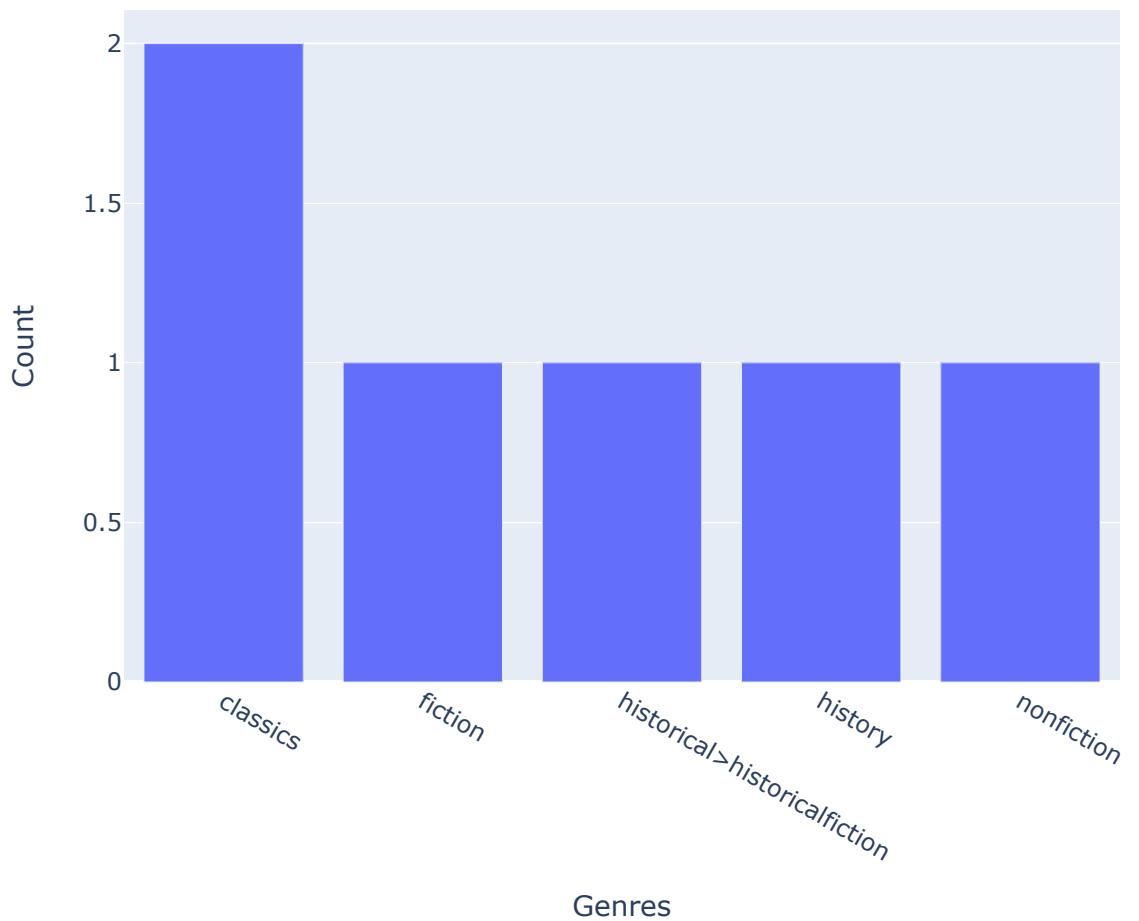
Out[23]:

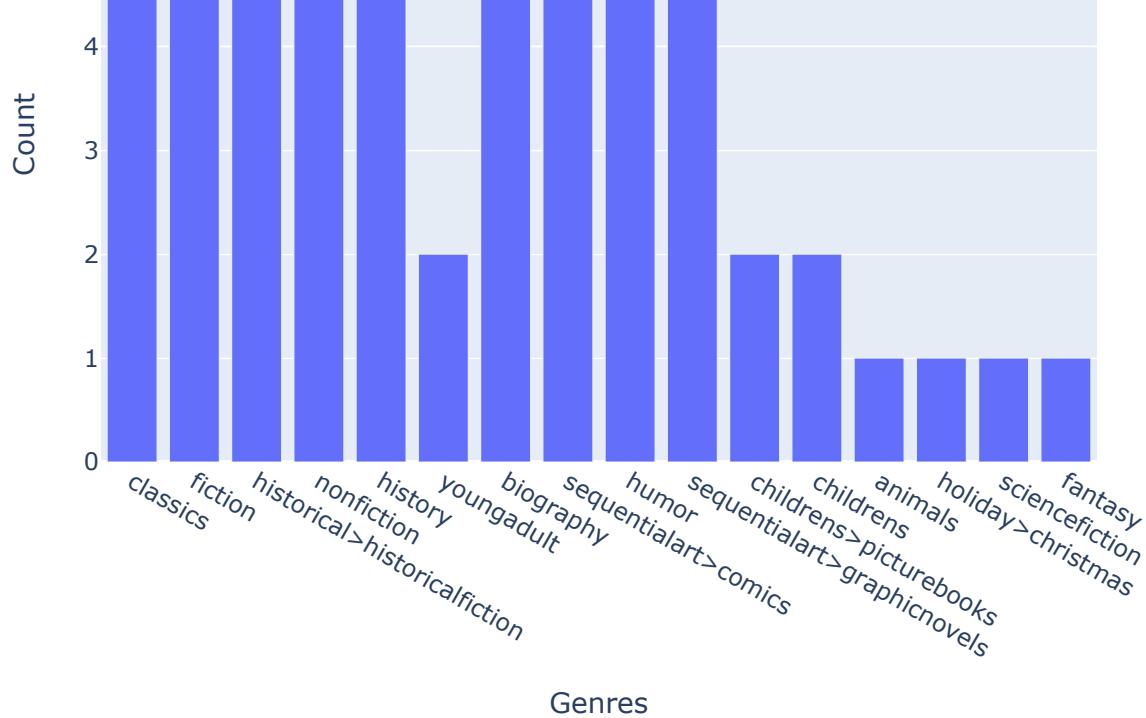
	img	book_title	year_first_published	author	genres	num_ratings	av
0		Middlemarch	1871	georgeeliot	[classics, fiction, historical>historicalfiction]	144797	
1		Adam Bede	1859	georgeeliot	[classics, fiction, historical>historicalfiction]	23824	
2		East Of Eden	1952	johnsteinbeck	[classics, fiction, historical>historicalfiction]	466848	
3		East of Eden	1952	johnsteinbeck	[classics, fiction, historical>historicalfiction]	466753	
4		Night	1956	eliewiesel	[nonfiction, classics, history]	1069764	
5		The Book Thief	2005	markuszusak	[historical>historicalfiction, fiction, youngadult]	2096334	
6		If This Is a Man & The Truce	1987	primolevi	[nonfiction, history, biography]	17306	
7		Long Walk to Freedom: Autobiography of Nelson Mandela	1994	nelsonmandela	[biography, nonfiction, history]	80486	
8		Long Walk to Freedom: The Autobiography of Nelson Mandela with Connections	1994	nelsonmandela	[biography, nonfiction, history]	80486	
9		Long Walk To Freedom	1994	nelsonmandela	[biography, nonfiction, history]	27437	
10		Team of Rivals: The Political Genius of Abraham Lincoln		doriskearnsgoodwin	[history, nonfiction, biography]	178598	
11		The Complete Calvin and Hobbes		billwatterson	[sequentialart>comics, humor, sequentialart>graphicnovels]	38253	
12		The Essential Calvin and Hobbes	1988	billwatterson	[sequentialart>comics, humor, sequentialart>graphicnovels]	116567	
13		The Calvin And Hobbes: Tenth Anniversary Book	1995	billwatterson	[sequentialart>comics, humor, sequentialart>graphicnovels]	51863	
14		The Calvin and Hobbes Tenth Anniversary Book	1995	billwatterson	[sequentialart>comics, humor, sequentialart>graphicnovels]	51862	

	img	book_title	year_first_published	author	genres	num_ratings	av
15		It's A Magical World	1996	billwatterson	[sequentialart>comics, humor, sequentialart>graphicnovels]	28087	
16		It's a Magical World		billwatterson	[sequentialart>comics, humor, sequentialart>graphicnovels]	28084	
17		The Kissing Hand	1993	audreypenn	[childrens>picturebooks, childrens, animals]	67213	
18		The Night Before Christmas	1823	clementc.moore	[holiday>christmas, childrens, childrens>picturebooks]	115885	
19		Ender's Game	1985	orsonscottcard	[sciencefiction, youngadult, fantasy]	1235916	

In [24]:

```
show_chart(chosen_books) #Above chart the books chosen by user
show_chart(r_books) #below chart The books recomended
```





```
In [25]: titles = ["Middlemarch: Part 1 & Part 2", "George Washington's Rules of Civility & Decent Behavior in Company and Conversation", "Bowling Alone: The Collapse and Revival of American Community", "The Andromeda Strain", "How to Start a Conversation and Make Friends: Revised and Updated", "Crossroads and Other Tales of Valdemar"]
chosen_books = read_data(titles)
chosen_books = chosen_books.reset_index(drop=True)
r_books = recomend_books(q_books, titles)

show_data(chosen_books)
```

	img	book_title	year_first_published	author	genres	num_ratings	average_rating
0		Middlemarch: Part 1 & Part 2	1871	georgeeliot	[classics, fiction, historical>historicalfiction]	144797	4.1
1		George Washington's Rules of Civility & Decent Behavior in Company and Conversation	1887	georgewashington	[history, nonfiction, classics]	1502	4.5
2		Bowling Alone: The Collapse and Revival of American Community	2000	robertd.putnam	[nonfiction, sociology, politics]	6051	4.1
3		The Andromeda Strain	1969	michaelcrichton	[sciencefiction, fiction, thriller]	238324	4.1
4		How to Start a Conversation and Make Friends: Revised and Updated	1983	dongabor	[selfhelp, nonfiction, language>communication]	1090	4.1
5		Crossroads and Other Tales of Valdemar		mercedeslackey	[fantasy, shortstories, anthologies]	3295	4.1

img	book_title	year_first_published	author	genres	num_ratings	average
6	Monique and the Mango Rains: Two Years with a Midwife in Mali	2006	krisholloway	[nonfiction, cultural>africa, autobiography>memoir]	4141	
7	The Idiot Brain: A Neuroscientist Explains What Your Head is Really Up To		deanburnett	[nonfiction, science, psychology]	7286	
8	Because Internet: Understanding the New Rules of Language		gretchenmcculloch	[nonfiction, humanities>linguistics, humanities>language]	8815	
9	What Men Live By	1885	leotolstoy	[classics, fiction, shortstories]	12855	
10	We Are Bellingcat: Global Crime, Online Sleuths, and the Bold Future of News		eliothiggins	[nonfiction, politics, writing>journalism]	1398	
11	Durkheim Is Dead!: Sherlock Holmes Is Introduced to Social Theory: Sherlock Holmes Is Introduced to Social Theory	2003	arthurasaburger	[sociology, philosophy>theory]	104	
12	1984	1949	georgeorwell	[classics, fiction, sciencefiction]	3664053	
13	Animal Farm	1999	danielmoran	[classics]	84	
14	The Master and Margarita	1967	mikhailbulgakov	[classics, fiction, cultural>russia]	280311	
15	Permanent Record		edwardsnowden	[nonfiction, biography, politics]	42604	

In [26]:

```
show_data(r_books)
```

Out[26]:

img	book_title	year_first_published	author	genres	num_ratings	average
0 None	Down And Out In Paris And London	1933	georgeorwell	[nonfiction, classics, autobiography>memoir]	76139	

	img	book_title	year_first_published	author	genres	num_ratings	average
1		Night	1956	eliewiesel	[nonfiction, classics, history]	1069764	
2		Schindler's List	1982	thomaskeneally	[history, nonfiction, classics]	156820	
3	None	Schindler's List (Unabridged)	1982	thomaskeneally	[history, nonfiction, classics]	156820	
4		I Know Why the Caged Bird Sings	1969	mayaangelou	[nonfiction, classics, autobiography>memoir]	462348	
5		The Souls of Black Folk	1903	w.e.b.dubois	[nonfiction, history, classics]	39174	
6		The Illustrated Man	1951	raybradbury	[sciencefiction, shortstories, fiction]	89994	
7		Jurassic Park	1990	michaelcrichton	[sciencefiction, fiction, thriller]	860193	
8	None	Welcome to the Monkey House	1968	kurtvonnegutjr.	[fiction, shortstories, sciencefiction]	58746	
9		Michael Crichton's Jurassic World: Jurassic Park / The Lost World		michaelcrichton	[sciencefiction, fiction, thriller]	10026	
10		The Cyberiad (Fables for the Cybernetic Age)	1965	stanislawlem	[sciencefiction, fiction, shortstories]	11036	
11		The Cyberiad	1965	stanislawlem	[sciencefiction, fiction, shortstories]	11034	
12		The Origins of Totalitarianism	1951	hannaharendt	[history, philosophy, politics]	9737	
13		The Road to Serfdom	1944	friedricha.hayek	[economics, politics, philosophy]	20746	
14		The Door in the Hedge	1981	robinmckinley	[fantasy, youngadult, shortstories]	9327	
15		Voyager	1993	dianagabaldon	[historical>historicalfiction, romance, fantasy]	281245	

img	book_title	year_first_published	author	genres	num_ratings	average
16 	Dragonfly in Amber	1992	dianagabaldon	[historical>historicalfiction, romance, fantasy]	315765	
17 	Drums of Autumn	1996	dianagabaldon	[historical>historicalfiction, romance, fantasy]	228672	
18 	Cross Stitch	1991	dianagabaldon	[historical>historicalfiction, romance, fantasy]	919923	
19 	Son of the Shadows	2000	julietmarillier	[fantasy, romance, historical>historicalfiction]	29213	

In [27]:

```
show_chart(chosen_books) #Above chart the books chosen by user
show_chart(r_books) #below chart The books recomended
```

