

```
In [1]: import pandas as pd
import numpy as np
import warnings
warnings.filterwarnings("ignore")
import seaborn as sns
import matplotlib.pyplot as plt
```

```
In [3]: data=pd.read_csv(r"C:\Users\Kishore\OneDrive\Desktop\CSV Files\animes.csv")
```

In [6]: data

Out[6]:

	genre	aired	episodes	members	popularity	ranked	score	img_url
	['Comedy', 'Sports', 'Drama', 'School', 'Shounen']	Oct 4, 2015 to Mar 27, 2016	25.0	489888	141	25.0	8.82	https://cdn.myanimelist.net/images/anime/9/766...
	['Drama', 'Music', 'Romance', 'School', 'Shounen']	Oct 10, 2014 to Mar 20, 2015	22.0	995473	28	24.0	8.83	https://cdn.myanimelist.net/images/anime/3/671...
	['Sci-Fi', 'Adventure', 'Mystery', 'Drama', 'Fantasy']	Jul 7, 2017 to Sep 29, 2017	13.0	581663	98	23.0	8.83	https://cdn.myanimelist.net/images/anime/6/867...
	['Action', 'Military', 'Adventure', 'Comedy', 'Fantasy']	Apr 5, 2009 to Jul 4, 2010	64.0	1615084	4	1.0	9.23	https://cdn.myanimelist.net/images/anime/1223/...
	['Action', 'Mystery', 'Supernatural', 'Vampire']	Jan 6, 2017	1.0	214621	502	22.0	8.83	https://cdn.myanimelist.net/images/anime/3/815...

	['Sci-Fi', 'Adventure', 'Comedy', 'Magic']	Oct 6, 2016 to Dec 29, 2016	13.0	134252	843	1070.0	7.73	https://cdn.myanimelist.net/images/anime/4/822...
	['Adventure', 'Fantasy', 'Magic', 'Martial Arts']	Apr 6, 1995 to Mar 28, 1996	52.0	84407	1292	1071.0	7.73	https://cdn.myanimelist.net/images/anime/2/201...
	['Mystery', 'Horror', 'Supernatural']	Oct 22, 2000 to Mar 25, 2001	19.0	83093	1314	1073.0	7.73	https://cdn.myanimelist.net/images/anime/9/183...
	['Action', 'Adventure', 'Comedy', 'Historical']	Dec 21, 2002	1.0	71989	1469	1077.0	7.73	https://cdn.myanimelist.net/images/anime/1162/...
	['Military', 'Sci-Fi', 'Space', 'Drama', 'Mecha']	Mar 12, 1988	1.0	29248	2604	1081.0	7.73	https://cdn.myanimelist.net/images/anime/1523/...

In [9]: `data.head(5)`

Out[9]:

	title	synopsis	genre	aired	episodes	members	popularity	ranked	score	
	yuu!! cond ason	Following their participation at the Inter- Hig...	['Comedy', 'Sports', 'Drama', 'School', 'Shoun...	Oct 4, 2015 to Mar 27, 2016	25.0	489888	141	25.0	8.82	https://cdn.myanimelist.net/im
	u wa Uso	Music accompanies the path of the human metron...	['Drama', 'Music', 'Romance', 'School', 'Shoun...	Oct 10, 2014 to Mar 20, 2015	22.0	995473	28	24.0	8.83	https://cdn.myanimelist.net/im
	byss	The Abyss— a gaping chasm stretching down into ...	['Sci-Fi', 'Adventure', 'Mystery', 'Drama', 'F...	Jul 7, 2017 to Sep 29, 2017	13.0	581663	98	23.0	8.83	https://cdn.myanimelist.net/im
	netal mist: ood	"In order for something to be obtained, someth...	['Action', 'Military', 'Adventure', 'Comedy', ...	Apr 5, 2009 to Jul 4, 2010	64.0	1615084	4	1.0	9.23	https://cdn.myanimelist.net/im
	atari tsu- hen	After helping revive the legendary vampire Kis...	['Action', 'Mystery', 'Supernatural', 'Vampire']	Jan 6, 2017	1.0	214621	502	22.0	8.83	https://cdn.myanimelist.net/im

In [10]:

data.tail(5)

Out[10]:

e	synopsis	genre	aired	episodes	members	popularity	ranked	score	
s	Cocona is an average middle schooler living wi...	['Sci-Fi', 'Adventure', 'Comedy', 'Magic']	Oct 6, 2016 to Dec 29, 2016	13.0	134252	843	1070.0	7.73	https://cdn.myanimelist.net/images/a
ji	While visiting the National Library, junior-hi...	['Adventure', 'Fantasy', 'Magic', 'Martial Art...']	Apr 6, 1995 to Mar 28, 1996	52.0	84407	1292	1071.0	7.73	https://cdn.myanimelist.net/images/a
o n	Years ago, all of the ghosts in a haunted scho...	['Mystery', 'Horror', 'Supernatural']	Oct 22, 2000 to Mar 25, 2001	19.0	83093	1314	1073.0	7.73	https://cdn.myanimelist.net/images/a
a : o o o	Inuyasha and company have finally destroyed Na...	['Action', 'Adventure', 'Comedy', 'Historical']...	Dec 21, 2002	1.0	71989	1469	1077.0	7.73	https://cdn.myanimelist.net/images/a
it : s k	The year is Universal Century 0093. Char Aznab...	['Military', 'Sci-Fi', 'Space', 'Drama', 'Mecha']	Mar 12, 1988	1.0	29248	2604	1081.0	7.73	https://cdn.myanimelist.net/images/a

In [11]:

data.describe()

Out[11]:

	uid	episodes	members	popularity	ranked	score
count	19311.000000	18605.000000	1.931100e+04	19311.000000	16099.000000	18732.000000
mean	19358.904096	11.460414	3.472609e+04	7720.830304	6866.524194	6.436107
std	14271.446515	47.950386	1.121772e+05	4676.786104	4390.018768	1.007941
min	1.000000	1.000000	2.500000e+01	1.000000	1.000000	1.250000
25%	4833.500000	1.000000	3.880000e+02	3725.000000	2895.500000	5.770000
50%	18327.000000	2.000000	2.389000e+03	7539.000000	6963.000000	6.410000
75%	33896.500000	12.000000	1.450150e+04	11613.000000	10601.500000	7.150000
max	40960.000000	3057.000000	1.871043e+06	16338.000000	14675.000000	9.230000

In [12]: data.info()

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 19311 entries, 0 to 19310
Data columns (total 12 columns):
#   Column          Non-Null Count  Dtype
---  -
0   uid              19311 non-null  int64
1   title            19311 non-null  object
2   synopsis         18336 non-null  object
3   genre            19311 non-null  object
4   aired            19311 non-null  object
5   episodes         18605 non-null  float64
6   members          19311 non-null  int64
7   popularity       19311 non-null  int64
8   ranked           16099 non-null  float64
9   score            18732 non-null  float64
10  img_url          19131 non-null  object
11  link             19311 non-null  object
dtypes: float64(3), int64(3), object(6)
memory usage: 1.8+ MB
```

In [13]: data.max()

```
Out[13]: uid              40960
title              ○
genre              []
aired              Sep, 2020
episodes           3057.0
members            1871043
popularity         16338
ranked             14675.0
score              9.23
link              https://myanimelist.net/anime/9999/One_Piece_3... (https://myanimelist.net/anime/9999/One_Piece_3...)
dtype: object
```

In [14]: data.min()

```
Out[14]: uid              1
title              "0"
genre              ['Action', 'Adventure', 'Cars', 'Comedy', 'Kid...
aired              1917
episodes           1.0
members            25
popularity         1
ranked             1.0
score              1.25
link              https://myanimelist.net/anime/1/Cowboy_Bebop (https://myanimelist.net/anime/1/Cowboy_Bebop)
dtype: object
```

In [16]: data.shape

Out[16]: (19311, 12)

In [19]: `list(data)`

Out[19]:

```
['uid',
 'title',
 'synopsis',
 'genre',
 'aired',
 'episodes',
 'members',
 'popularity',
 'ranked',
 'score',
 'img_url',
 'link']
```

In [26]: `data.isnull().sum()`

Out[26]:

```
uid          0
title        0
synopsis     975
genre        0
aired        0
episodes    706
members      0
popularity   0
ranked     3212
score       579
img_url     180
link        0
dtype: int64
```

In [43]: `data1=data.drop(columns=['episodes','synopsis','img_url','link','aired'])`

data1

Out[43]:

	uid	title	genre	members	popularity	ranked	score
0	28891	Haikyuu!! Second Season	['Comedy', 'Sports', 'Drama', 'School', 'Shoun...	489888	141	25.0	8.82
1	23273	Shigatsu wa Kimi no Uso	['Drama', 'Music', 'Romance', 'School', 'Shoun...	995473	28	24.0	8.83
2	34599	Made in Abyss	['Sci-Fi', 'Adventure', 'Mystery', 'Drama', 'F...	581663	98	23.0	8.83
3	5114	Fullmetal Alchemist: Brotherhood	['Action', 'Military', 'Adventure', 'Comedy', ...]	1615084	4	1.0	9.23
4	31758	Kizumonogatari III: Reiketsu-hen	['Action', 'Mystery', 'Supernatural', 'Vampire']	214621	502	22.0	8.83
...
19306	32979	Flip Flappers	['Sci-Fi', 'Adventure', 'Comedy', 'Magic']	134252	843	1070.0	7.73
19307	123	Fushigi Yuugi	['Adventure', 'Fantasy', 'Magic', 'Martial Art...	84407	1292	1071.0	7.73
19308	1281	Gakkou no Kaidan	['Mystery', 'Horror', 'Supernatural']	83093	1314	1073.0	7.73
19309	450	InuYasha Movie 2: Kagami no Naka no Mugenjo	['Action', 'Adventure', 'Comedy', 'Historical']...	71989	1469	1077.0	7.73
19310	87	Mobile Suit Gundam: Char's Counterattack	['Military', 'Sci-Fi', 'Space', 'Drama', 'Mecha']	29248	2604	1081.0	7.73

19311 rows × 7 columns

```
In [47]: data1["ranked"].fillna(0, inplace = True)
```

```
In [48]: data1.fillna(8.1, inplace=True)
```

```
In [49]: data1
```

```
Out[49]:
```

	uid	title	genre	members	popularity	ranked	score
0	28891	Haikyuu!! Second Season	['Comedy', 'Sports', 'Drama', 'School', 'Shoun...	489888	141	25.0	8.82
1	23273	Shigatsu wa Kimi no Uso	['Drama', 'Music', 'Romance', 'School', 'Shoun...	995473	28	24.0	8.83
2	34599	Made in Abyss	['Sci-Fi', 'Adventure', 'Mystery', 'Drama', 'F...	581663	98	23.0	8.83
3	5114	Fullmetal Alchemist: Brotherhood	['Action', 'Military', 'Adventure', 'Comedy', ...]	1615084	4	1.0	9.23
4	31758	Kizumonogatari III: Reiketsu-hen	['Action', 'Mystery', 'Supernatural', 'Vampire']	214621	502	22.0	8.83
...
19306	32979	Flip Flappers	['Sci-Fi', 'Adventure', 'Comedy', 'Magic']	134252	843	1070.0	7.73
19307	123	Fushigi Yuugi	['Adventure', 'Fantasy', 'Magic', 'Martial Art...	84407	1292	1071.0	7.73
19308	1281	Gakkou no Kaidan	['Mystery', 'Horror', 'Supernatural']	83093	1314	1073.0	7.73
19309	450	InuYasha Movie 2: Kagami no Naka no Mugenjo	['Action', 'Adventure', 'Comedy', 'Historical'...	71989	1469	1077.0	7.73
19310	87	Mobile Suit Gundam: Char's Counterattack	['Military', 'Sci-Fi', 'Space', 'Drama', 'Mecha']	29248	2604	1081.0	7.73

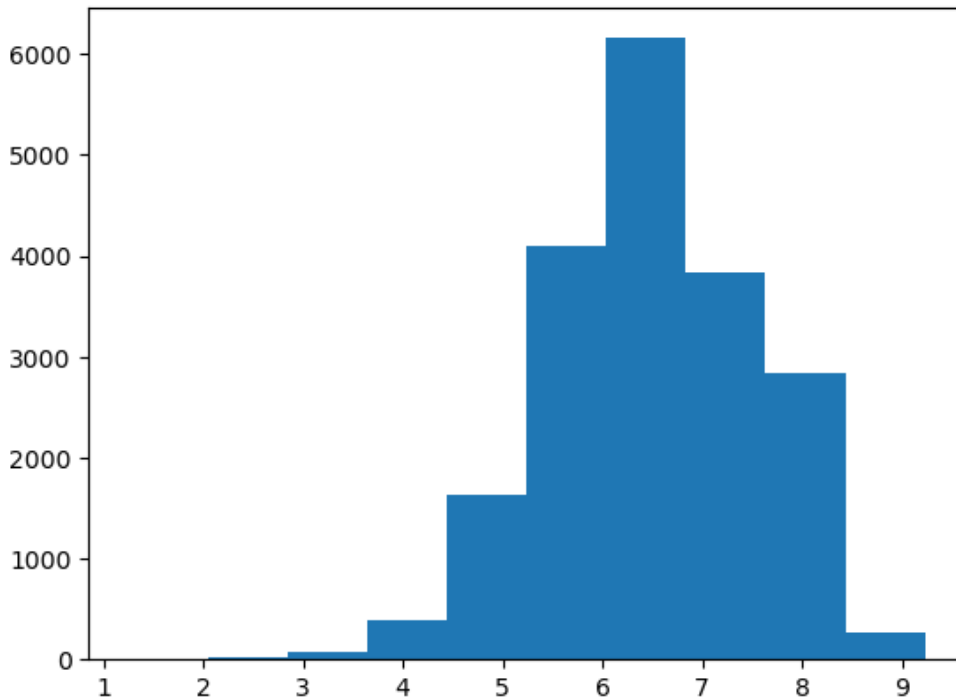
19311 rows × 7 columns

```
In [50]: data1.isnull().sum()
```

```
Out[50]: uid          0
title          0
genre          0
members        0
popularity     0
ranked         0
score          0
dtype: int64
```

```
In [75]: plt.hist(data1['score'])
```

```
Out[75]: (array([2.000e+00, 1.400e+01, 7.400e+01, 3.970e+02, 1.628e+03, 4.090e+03,
        6.155e+03, 3.836e+03, 2.845e+03, 2.700e+02]),
array([1.25 , 2.048, 2.846, 3.644, 4.442, 5.24 , 6.038, 6.836, 7.634,
        8.432, 9.23 ]),
<BarContainer object of 10 artists>)
```



```
In [76]: x = data1['popularity'].values
y = data1['score'].values
print(f'Anime Popularity: {x}')
print(f'Anime Members: {y}')
```

```
Anime Popularity: [ 141  28  98 ... 1314 1469 2604]
Anime Members: [8.82 8.83 8.83 ... 7.73 7.73 7.73]
```

```
In [77]: x = x.reshape(-1, 1)
y = y.reshape(-1, 1)
print(x)
print(y)
```

```
[[ 141]
 [ 28]
 [ 98]
 ...
 [1314]
 [1469]
 [2604]]
[[8.82]
 [8.83]
 [8.83]
 ...
 [7.73]
 [7.73]
 [7.73]]
```

```
In [78]: from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x,y, test_size = 0.2, random_state = 7)
```



```
In [79]: from sklearn.linear_model import LinearRegression
model = LinearRegression()
model.fit(x_train, y_train)
```

```
Out[79]: ▾ LinearRegression
LinearRegression()
```

```
In [80]: y_pred=model.predict(x_test)
y_pred
```

```
Out[80]: array([[5.25203077],
 [5.55990742],
 [6.58985237],
 ...,
 [5.29863462],
 [6.4392637 ],
 [5.34232572]])
```

```
In [81]: #Intercept
print(model.intercept_)

#slope
print(model.coef_)
```

```
[7.609894]
[[-0.00014564]]
```

```
In [82]: from sklearn import metrics
from sklearn.metrics import mean_squared_error
from sklearn.metrics import r2_score

print("Mean Absolute Error: ", metrics.mean_absolute_error(y_test, y_pred))
print("Mean Squared Error: ", metrics.mean_squared_error(y_test, y_pred))
print("Root Mean Squared Error: ", np.sqrt(metrics.mean_squared_error(y_test, y_pred)))
print("R2 Score: ", metrics.r2_score(y_test, y_pred))
```

```
Mean Absolute Error: 0.5982361050626246
Mean Squared Error: 0.6352177114303907
Root Mean Squared Error: 0.7970054651195252
R2 Score: 0.4097607510504019
```

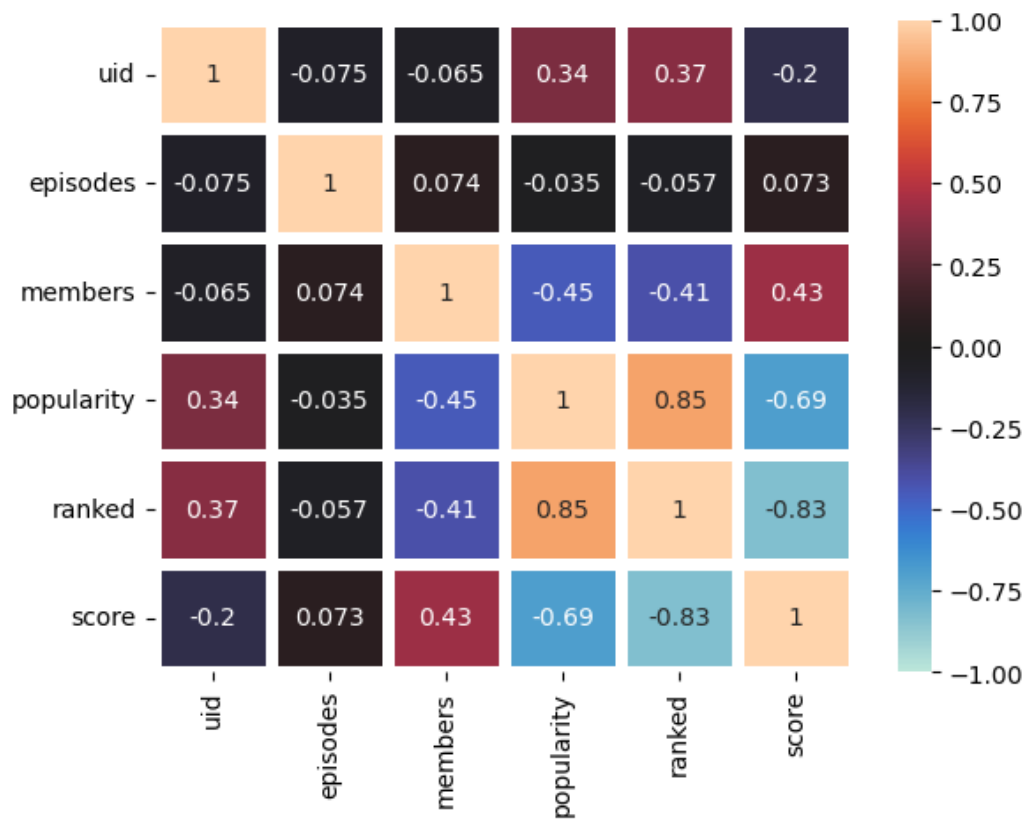
```
In [83]: cor=data.corr()
cor
```

```
Out[83]:
```

	uid	episodes	members	popularity	ranked	score
uid	1.000000	-0.075184	-0.065095	0.342304	0.368896	-0.200402
episodes	-0.075184	1.000000	0.073963	-0.035215	-0.057196	0.073052
members	-0.065095	0.073963	1.000000	-0.448320	-0.408786	0.426010
popularity	0.342304	-0.035215	-0.448320	1.000000	0.854241	-0.694138
ranked	0.368896	-0.057196	-0.408786	0.854241	1.000000	-0.834105
score	-0.200402	0.073052	0.426010	-0.694138	-0.834105	1.000000

```
In [84]: import seaborn as sns
sns.heatmap(cor,vmax=1,vmin=-1,annot=True,linewidth=5,cmap='icefire')
```

Out[84]: <Axes: >



In []: