```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import sqlite3
from datetime import datetime, timedelta
from collections import Counter
```

```
filename="/content/Cookies" #EDIT ME
connection = sqlite3.connect(filename)
cursor = connection.cursor()
connection.text_factory = lambda x: x.decode(errors = 'ignore')
data = pd.read_sql_query("SELECT * FROM cookies;",connection)
# results = pd.DataFrame.to_csv(cursor.fetchall())
```

```
data
```

	creation_utc	top_frame_site_key	host_key	name	value
0	13251816993285322		.microsoft.com	MC1	

```
data.isnull().sum()
```

```
creation_utc          0
top_frame_site_key    0
host_key              0
name                  0
value                 0
encrypted_value       0
path                  0
expires_utc           0
is_secure             0
is_httponly           0
last_access_utc       0
has_expires           0
is_persistent         0
priority              0
samesite              0
source_scheme         0
source_port           0
is_same_party         0
dtype: int64
```

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 3255 entries, 0 to 3254
Data columns (total 18 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   creation_utc        3255 non-null   int64
 1   top_frame_site_key  3255 non-null   object
 2   host_key            3255 non-null   object
 3   name                3255 non-null   object
 4   value               3255 non-null   object
 5   encrypted_value     3255 non-null   object
 6   path                3255 non-null   object
 7   expires_utc         3255 non-null   int64
 8   is_secure           3255 non-null   int64
 9   is_httponly         3255 non-null   int64
 10  last_access_utc     3255 non-null   int64
 11  has_expires         3255 non-null   int64
 12  is_persistent       3255 non-null   int64
 13  priority            3255 non-null   int64
 14  samesite            3255 non-null   int64
 15  source_scheme       3255 non-null   int64
 16  source_port         3255 non-null   int64
 17  is_same_party       3255 non-null   int64
dtypes: int64(12), object(6)
memory usage: 457.9+ KB
```

Removing irrelevant Columns

```
data1 = data.iloc[:,[0,2,7,8,9,10,11,12,13,14,15,16,17]]
```

```
data1
```

	creation_utc	host_key	expires_utc	is_secure	is_httponly
0	13251816993285322	.microsoft.com	13283352993285322	1	0
1	13251816993288893	www.office.com	13283352993000000	1	0
2	13251817007699570	.getadblock.com	13325230064000000	0	0
3	13251817015380626	.getadblock.com	13293694093000000	0	0
4	13251826966335515	.visualstudio.com	13305385797000000	0	0
...	...	...	...	...	...
3250	13251831469430935	.adnxs.com	13287150593759549	1	1
3251	13279374608739907	.web.whatsapp.com	0	1	0
3252	13279374608739907	.web.whatsapp.com	0	1	0
3253	13279374720457955	.google.com	13310910720457955	0	0
3254	13279374720458036	.google.com	13310910720458036	1	1

3255 rows × 13 columns

```
data1.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 3255 entries, 0 to 3254
```

```
Data columns (total 16 columns):
 #   Column           Non-Null Count  Dtype         
---  ------           --------------  -----         
 0   creation_utc     3255 non-null   int64         
 1   host_key         3255 non-null   object        
 2   expires_utc      3255 non-null   int64         
 3   is_secure        3255 non-null   int64         
 4   is_httponly      3255 non-null   int64         
 5   last_access_utc  3255 non-null   int64         
 6   has_expires      3255 non-null   int64         
 7   is_persistent    3255 non-null   int64         
 8   priority         3255 non-null   int64         
 9   samesite         3255 non-null   int64         
 10  source_scheme    3255 non-null   int64         
 11  source_port      3255 non-null   int64         
 12  is_same_party    3255 non-null   int64         
 13  Created          3255 non-null   datetime64[ns]
 14  Expires          3255 non-null   object        
 15  Last Accessed    3255 non-null   datetime64[ns]
dtypes: datetime64[ns](2), int64(12), object(2)
memory usage: 407.0+ KB
```

Below Function will convert column in Datetime

```
def get_chrome_datetime(chromedate):
    """Return a `datetime.datetime` object from a chrome format datetime
    Since `chromedate` is formatted as the number of microseconds since January, 1601"""
    if chromedate != 86400000000 and chromedate:
        try:
            return datetime(1601, 1, 1) + timedelta(microseconds=chromedate)
        except Exception as e:
            # print(f"Error: {e}, chromedate: {chromedate}")
            return datetime(1601, 1, 1) + timedelta(microseconds=13283352993285322)
    else:
        return datetime(1601, 1, 1) + timedelta(microseconds=13283352993285322)
```

```
data1['Created'] = data1.iloc[:,0].apply(lambda x: get_chrome_datetime(x))
data1['Expires'] = data1.iloc[:,2].apply(lambda x: get_chrome_datetime(x))
data1['Last Accessed'] = data1.iloc[:,5].apply(lambda x: get_chrome_datetime(x))
data1 = data1.drop(columns=['creation_utc','expires_utc','last_access_utc'])
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1: SettingWithCopyWarning:
```

```
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-vers
  """Entry point for launching an IPython kernel.
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-vers

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-vers
  This is separate from the ipykernel package so we can avoid doing imports until
```

```
data1.head()
```

	host_key	is_secure	is_httponly	has_expires	is_persistent	priority	samesite	source_scheme	source_port	is_same_pa
0	.microsoft.com	1	0	1	1	1	0	2	-1	
1	www.office.com	1	0	1	1	1	0	2	-1	
2	.getadblock.com	0	0	1	1	1	-1	2	443	

```
data1.isnull().sum()
```

```
host_key         0
is_secure        0
is_httponly      0
has_expires      0
is_persistent    0
priority         0
samesite         0
source_scheme    0
source_port      0
is_same_party    0
```

```
Created          0
Expires          0
Last Accessed    0
dtype: int64
```

Extracting Count of cookies by sites. It will show us sites with the greatest no. of cookies store.

```
print(type(tt))
tt = pd.DataFrame(Counter(data1['host_key']).items(),columns=['Name','Count'])
Cookie_count = tt.sort_values('Count',ascending=False)
```

We can see that 'justpremium.com' has highest cookie count.

```
Cookie_count
```

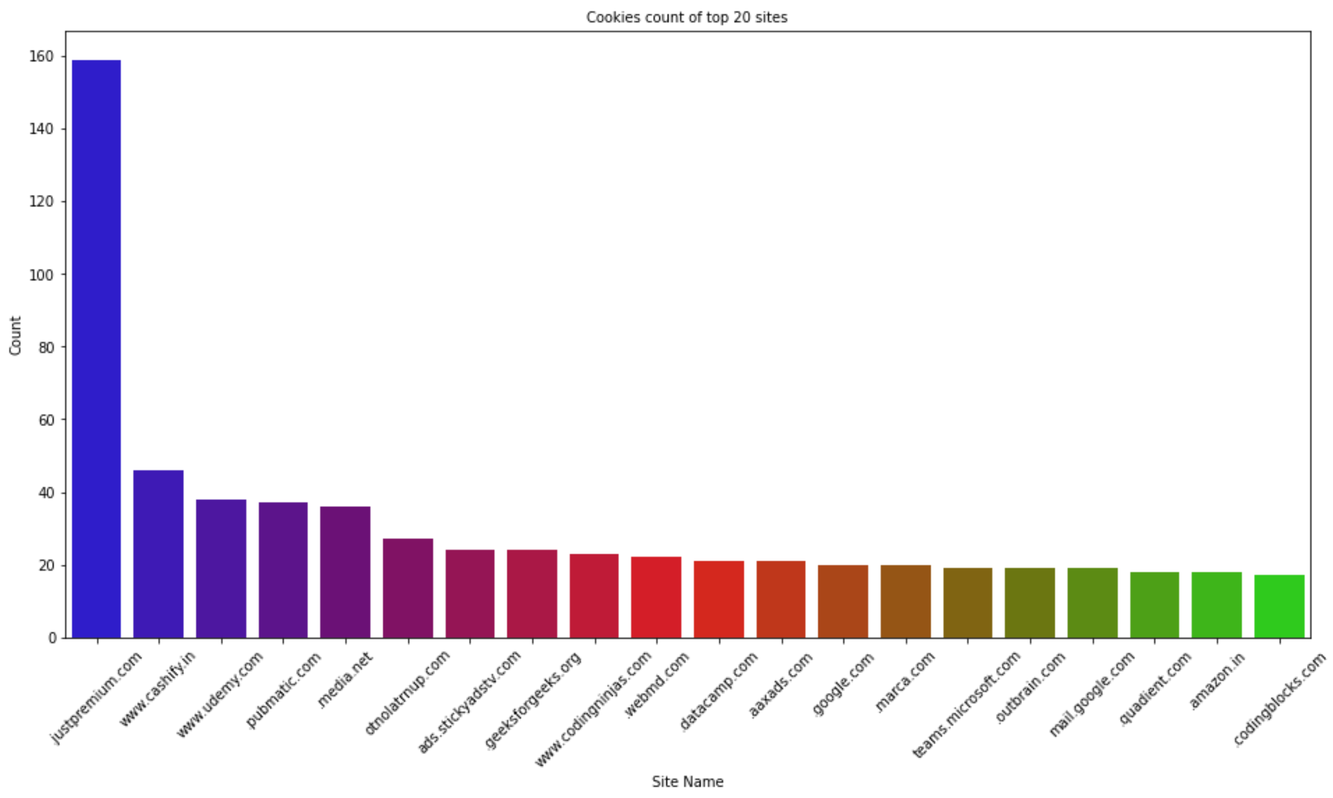
	Name	Count
499	.justpremium.com	159
356	www.cashify.in	46
177	www.udemy.com	38
766	.pubmatic.com	37
11	.media.net	36
...	...	...
476	.onlinemath4all.com	1
479	auth.geeksforgeeks.org	1
480	.ads.linkedin.com	1
481	e3.adpushup.com	1
991	.liadm.com	1

992 rows × 2 columns

```
Cookie_count[:20]
```

```
plt.figure(figsize = (16, 8))
# for label in (ax.get_xticklabels() + ax.get_yticklabels()):
#   label.set_fontsize(26)
ax = sns.barplot(x='Name',y='Count',data=Cookie_count[:20], palette = 'brg'    )

ax.set_title(label = 'Cookies count of top 20 sites', fontsize = 10)
ax.set_xlabel(xlabel = 'Site Name', fontsize = 10)
ax.set_ylabel(ylabel = 'Count', fontsize = 10)
plt.xticks(rotation=45,fontsize = 10)
plt.yticks(fontsize = 10)
plt.show()
```



Below Function will help us find time difference between cookie creation time and cookie expiry time, From there we can get the total duration of a cookie.

```
def dtdiff(x,y):
  # x = datetime(x)
  # y = datetime(y)
  try:
    z = y-x
    x = str(z)
    x = x.split()
    x = int(x[0])
  except:
    return 0

  return x
```

```
data1
```

	host_key	is_secure	is_httponly	has_expires	is_persistent	priority	s
0	.microsoft.com	1	0	1	1	1	
1	www.office.com	1	0	1	1	1	
2	.getadblock.com	0	0	1	1	1	
3	.getadblock.com	0	0	1	1	1	
4	.visualstudio.com	0	0	1	1	1	
...	...	...	...	...	...	...	
3250	.adnxs.com	1	1	1	1	1	
3251	.web.whatsapp.com	1	0	0	0	1	

```
data1.iloc[1,11]
```

```
datetime.datetime(2021, 12, 7, 12, 16, 33)
```

```
data2 =[]
for i in range(0,3255):
  data2.append(dtdiff(data1.iloc[i,10],data1.iloc[i,11]))
```

```
data1['Duration'] = data2
```

```
data2 = data1.sort_values('Duration',ascending=False)
```

```
data2
```

	host_key	is_secure	is_httponly	has_expires	is_persistent	priorit
412	app.wts2.one	1	0	1	1	
411	app.wts2.one	1	0	1	1	
410	app.wts2.one	1	0	1	1	
409	app.wts2.one	1	0	1	1	
1618	accounts.spotify.com	1	1	1	1	
...	...	...	...	...	...	.
232	.www.geeksforgeeks.org	0	0	1	1	
3080	.docs.google.com	1	1	1	1	

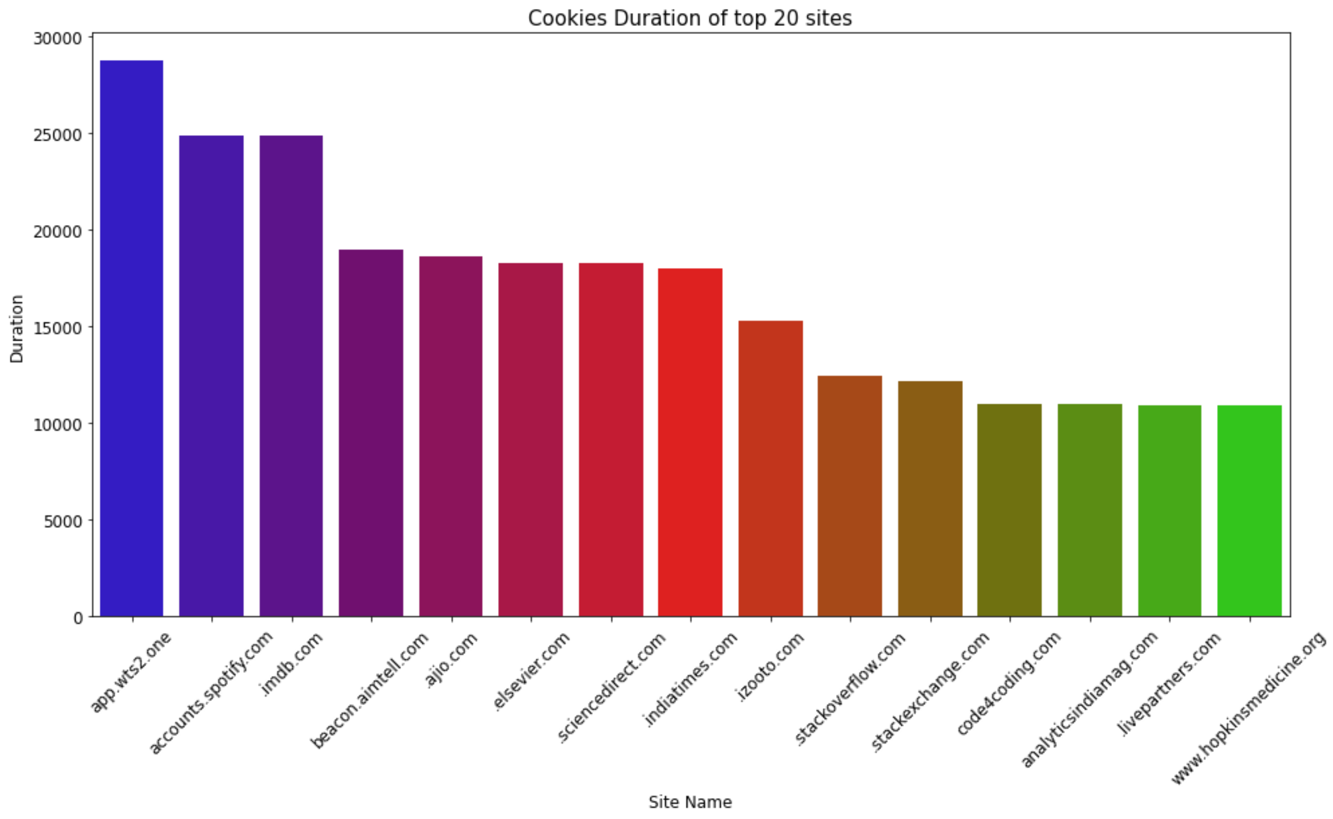
```
data3 = data2.iloc[:,[0,13]]
data3
```

	host_key	Duration
412	app.wts2.one	28758
411	app.wts2.one	28758
410	app.wts2.one	28758
409	app.wts2.one	28758
1618	accounts.spotify.com	24855
...	...	...
232	.www.geeksforgeeks.org	0
3080	.docs.google.com	0
3068	.itnext.io	0
3158	pypi.org	0
3118	.thepythoncode.com	0

3255 rows × 2 columns

```
plt.figure(figsize = (16, 8))
# for label in (ax.get_xticklabels() + ax.get_yticklabels()):
#   label.set_fontsize(26)
ax = sns.barplot(x='host_key',y='Duration',data=data3[:20], palette = 'brg'    )

ax.set_title(label = 'Cookies Duration of top 20 sites', fontsize = 15)
ax.set_xlabel(xlabel = 'Site Name', fontsize = 12)
ax.set_ylabel(ylabel = 'Duration', fontsize = 12)
plt.xticks(rotation=45,fontsize = 12)
plt.yticks(fontsize = 12)
plt.show()
```


Cookies Duration of top 20 sites
Duration
30000
25000
20000
15000
10000
5000
0
app.wts2.one
accounts.spotify.com
.imdb.com
beacon.aimtell.com
.ajio.com
.elsevier.com
.sciencedirect.com
.indiatimes.com
.izooto.com
.stackoverflow.com
.stackexchange.com
code4coding.com
analyticsindiamag.com
.livepartners.com
www.hopkinsmedicine.org
Site Name