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HP Election - 2022

Agenda - Understanding and Performing Univariate Analysis

Univariate Analysis

- The term univariate analysis refers to the analysis of one variable. You can remember this because the prefix “uni” means “one.” The purpose of univariate analysis is to understand the distribution of values for a single variable. In other words, independent analysis of each column/variable/feature is known Univariate Analysis.

Importing Liabraries

In [1]:

```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline
```

Generally before starting EDA, we should ask 7 basic questions about the data set and try to clean, transform the dataset as required. We are doing the same in below steps before starting EDA.

In [2]:

```
## Ignoring the encoding errors in my case, using "encoding_erros = 'ignore' parc
df = pd.read_csv('Himachal_Pradesh_Political_party_candidates.csv', encoding_errc
```

In [3]:

```
df.head(2)
```

Out[3]:

	Sno	Candidate	Constituency	Party	Criminal Case	Education	Total Assets	Liabilitie
0	1	Abhay Kumar Ashok	DHARAMSHALA	IND	0	Post Graduate	Rs97,40,093\r\n~ 97Lacs+	Rs0\r\n
1	2	Abhinay Bhardwaj	HAMIRPUR	Rashtriya Devbhumi Party	0	Graduate	Rs5,42,477\r\n~ 5Lacs+	Rs2,50,000\r\n 2Lacs

In [4]:

```
# Converting two major columns of Data set from String/object to int
# 1. Total assests value
# 2. Liabilities value
```

In [5]:

```
# .str.replace() is used to remove unwanted characters from the coulmn values so
# the object to int
df['Total Assets'] = df['Total Assets'].str.replace('Rs',"")
df['Total Assets'] = df['Total Assets'].str.replace('\r\n~',"")
df['Total Assets'] = df['Total Assets'].str.replace(',',"")
df['Total Assets']= df['Total Assets'].str.split().str[0]
df['Total Assets'] = df['Total Assets'].str.strip()
df['Total Assets'] = df['Total Assets'].astype(int) # converting object to int
```

In [6]:

```
# .str.replace() is used to remove unwanted characters from the coulmn values so
# the object to int
df['Liabilities'] = df['Liabilities'].str.replace('Rs',"")
df['Liabilities'] = df['Liabilities'].str.replace('\r\n~',"")
df['Liabilities'] = df['Liabilities'].str.replace(',',"")
df['Liabilities']= df['Liabilities'].str.split().str[0]
df['Liabilities'] = df['Liabilities'].str.strip()
df['Liabilities'] = df['Liabilities'].astype(int) # converting object to int
```

In [7]:

```
df.drop('Sno', axis = 1,inplace = True)
```

In [8]:

```
df.isnull().sum()
```

Out[8]:

```
Candidate        0
Constituency     0
Party            0
Criminal Case    0
Education        0
Total Assets     0
Liabilities      0
dtype: int64
```

In [9]:

```
df.sample(5)
```

Out[9]:

	Candidate	Constituency	Party	Criminal Case	Education	Total Assets	Liabilities
261	Rajesh Dharmani	GHUMARWIN	INC	1	Post Graduate	13294907	365614
303	Ravi Kumar Mehta	SHIMLA RURAL	BJP	1	Post Graduate	23087042	2310662
96	Dr.Ram Lal Markanda	LAHAUL AND SPITI (ST)	BJP	0	Doctorate	13929621	2000000
144	K. L. Thakur	NALAGARH	IND	0	Graduate Professional	25275022	13754673
67	Chander Mohan	UNA	IND	0	Graduate	6959604	0

In [10]:

```
df.info() # finally we can see our required columns in INT type
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 412 entries, 0 to 411
Data columns (total 7 columns):
 #   Column          Non-Null Count  Dtype 
---  ------          --------------  ----- 
 0   Candidate       412 non-null    object
 1   Constituency    412 non-null    object
 2   Party           412 non-null    object
 3   Criminal Case   412 non-null    int64 
 4   Education       412 non-null    object
 5   Total Assets    412 non-null    int32 
 6   Liabilities     412 non-null    int32 
dtypes: int32(2), int64(1), object(4)
memory usage: 19.4+ KB
```

Identifying Nature of columns to perform EDA:

There are 2 types of columns avaailable in our data set:

1. Numerical Columns
2. Categorical Columns

which type of EDA method to be used depends on the nature of coulmn

Starting EDA

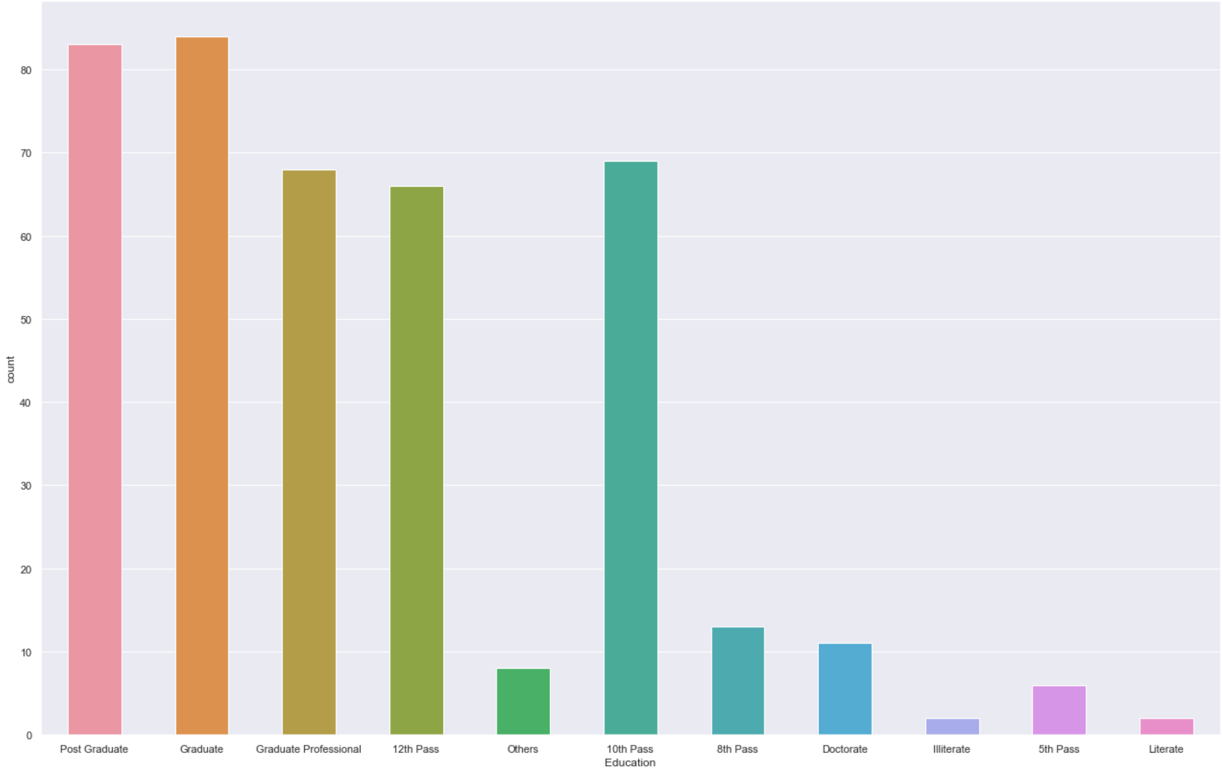
1 . Categorical Columns

To analyse the categoriacal columns, below given two kinds of plots are most accurate:

1. Count plot - Gives a frequency count category wise
2. Pie chart - To get the insights in %age, use pie charts

a. countplot

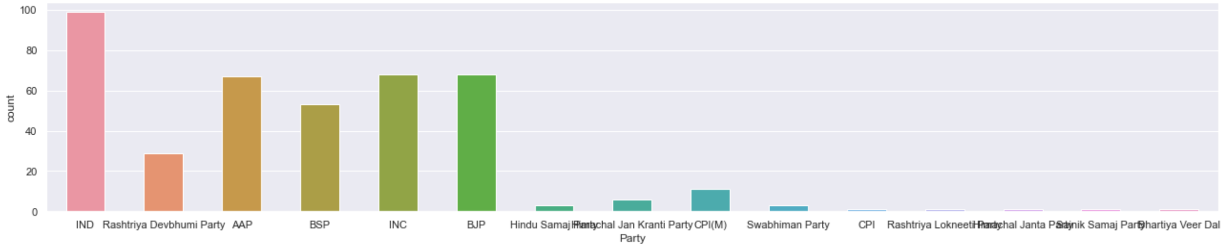
In [24]:
```
sns.countplot(data = df, x = 'Education', width=.5)
sns.set(rc={"figure.figsize":(12, 4)}) #width=12, #height=4
```



What insights we can draw ----

1. The highest qualification of candidates is Doctrate
2. Highest no. of people are Graduate, and very negligible are Illetrate.
3. 12th pass candidates are less than 10th pass.
4. There are candiadates who are even below 5th Pass - 'Literate'.

In [27]:
```
sns.countplot(data = df, x = 'Party', width=.5)
sns.set(rc={"figure.figsize":(22, 14)}) #width=22, #height=14
```



What insights we can draw ---

1. The highest number of candidates are of IND party.

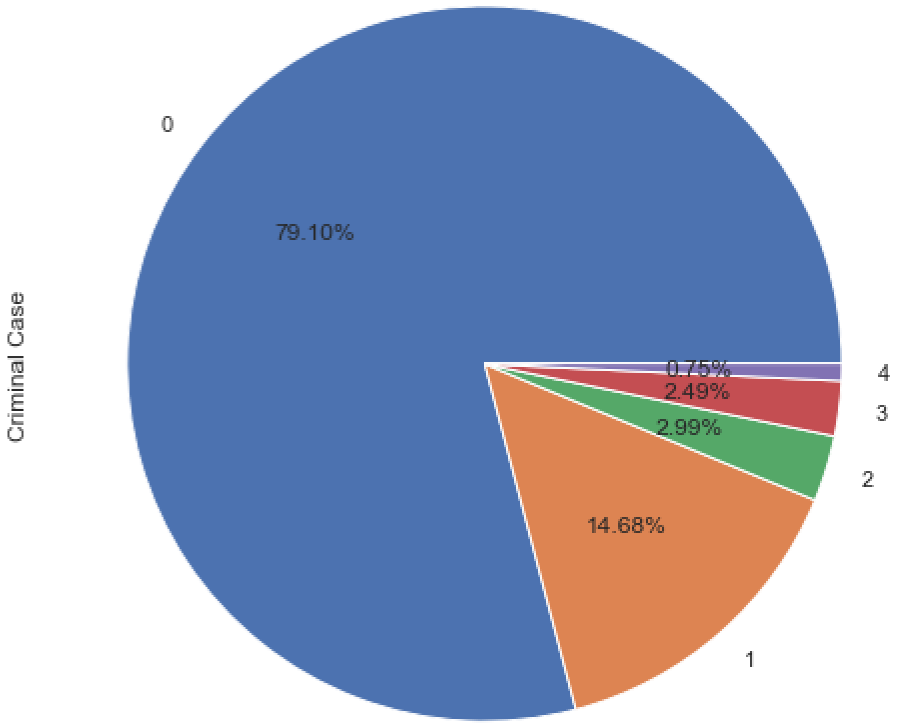
2. Candidates of INC and BJP are equal.
3. Which all parties are partcipating in election.

```
In [13]: df['Criminal Case'].value_counts()
```

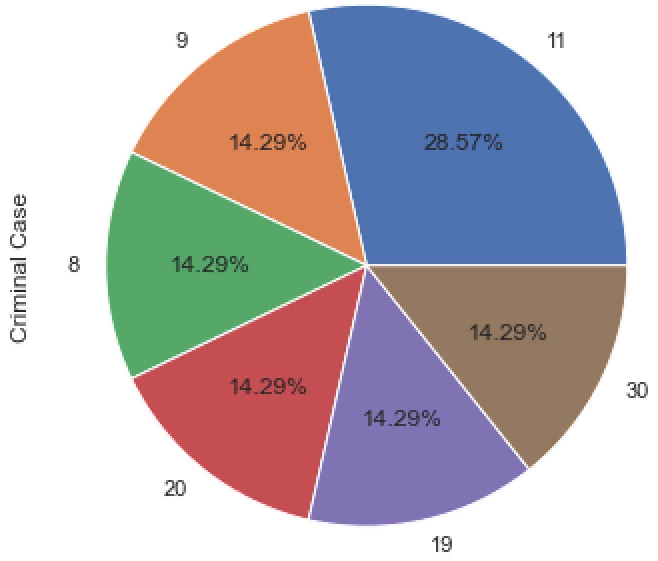
```
Out[13]: 0     318
         1      59
         2      12
         3      10
         4       3
         5       3
         11      2
         9       1
         8       1
         20      1
         19      1
         30      1
         Name: Criminal Case, dtype: int64
```

b. Pie chart

```
In [14]: df['Criminal Case'].value_counts()[0:5].plot(kind = 'pie',autopct = '%.2f%%')
         # To change the size of your pie chart/figure
         fig = plt.gcf()
         fig.set_size_inches(8,16)
```



In [15]:
```
df['Criminal Case'].value_counts()[6:].plot(kind = 'pie',autopct = '%.2f%%')
# To change the size of your pie chart/figure
fig = plt.gcf()
fig.set_size_inches(12,6)
```



The above three codes of analysis helping us to gather info about the Criminal cases of candidates

1. What are the number of criminal cases and how many candidates fall into which category, and that too percenatge wise

2. Numerical Columns

a. Histogram

Plot univariate or bivariate histograms to show distributions of datasets.

A histogram is a classic visualization tool that represents the distribution of one or more variables by counting the number of observations that fall within discrete bins.

In [16]:
```
df.groupby(['Party']).sum()
```

Out[16]:

	Criminal Case	Total Assets	Liabilities
Party			
AAP	31	2.487807e+09	472854726.0
BJP	25	4.965818e+09	253437883.0
BSP	2	4.561986e+08	23083506.0
Bhartiya Veer Dal	5	7.828000e+05	96000.0
CPI	0	7.126000e+06	1375000.0
CPI(M)	67	4.496489e+08	13696393.0
Himachal Jan Kranti Party	1	1.610552e+07	457000.0
Himachal Janta Party	0	2.335426e+06	400000.0
Hindu Samaj Party	0	1.516740e+06	36000.0
INC	85	8.044365e+09	912624177.0
IND	24	2.326939e+09	348878621.0
Rashtriya Devbhumi Party	8	3.091173e+08	73064281.0
Rashtriya Lokneeti Party	0	1.063000e+07	1700000.0
Sainik Samaj Party	0	2.889500e+07	0.0
Swabhiman Party	0	8.783050e+07	820000.0

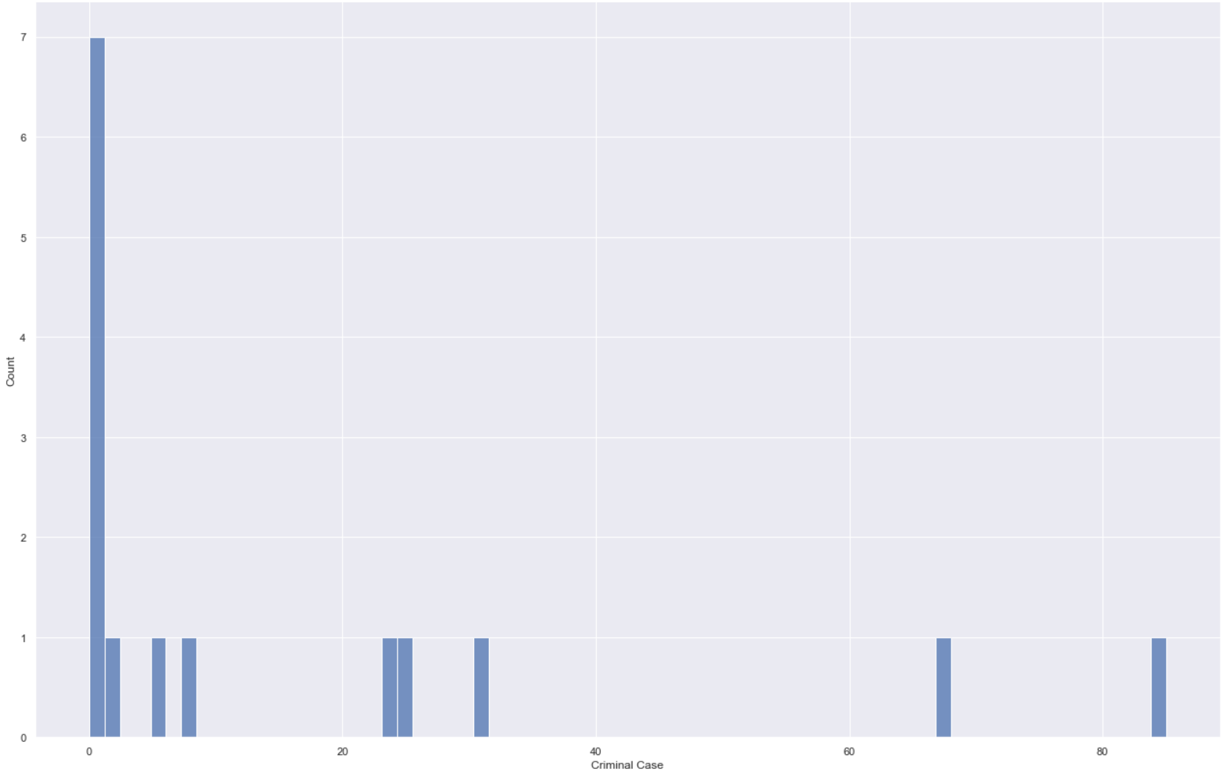
In [17]:
```
# Sometimes in a dataset having large distributions, ploting histograms directly
# Therefore we have first calculated some aggregate figures using pd.groupby func
# to verify and read the histogram accurately we have printed the output of grour
```

In [18]:

```
grps = df.groupby(['Party']).sum()
sns.histplot(data = grps, x = grps.get('Criminal Case'),bins = 70)
```

Out[18]:

```
<AxesSubplot:xlabel='Criminal Case', ylabel='Count'>
```

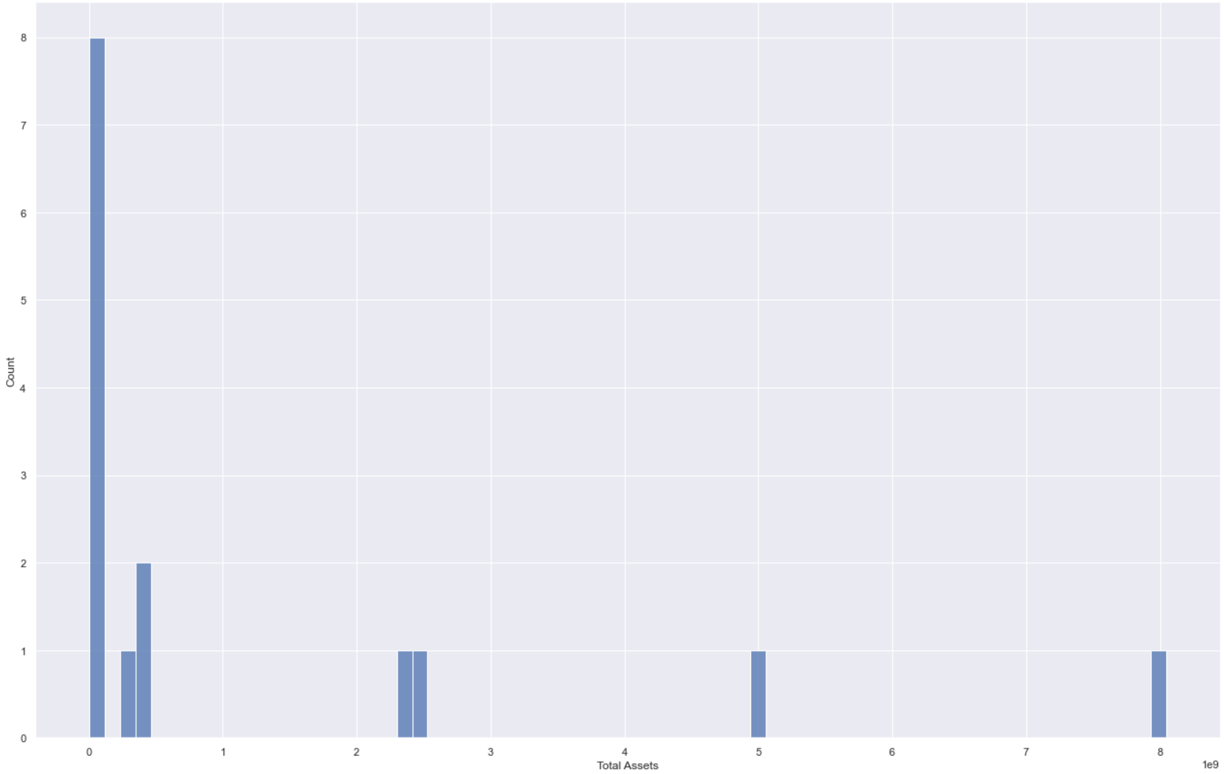


What insights we can draw---

1. Majority of the parties do not have criminal cases filed against their candidates. The number is around 7, precisely 6 as we can count the same xthrough above groupby function output.
2. There is only one party having crosses the mark of greater than 80 criminal cases in total, precisely 85 and the party is INC - INDIAN NATIONAL CONGRESS
3. The least cases is against Himachal Jan Kranti Party.

```
In [19]: sns.histplot(data = grps, x = grps.get('Total Assets'),bins = 70)
```

```
Out[19]: <AxesSubplot:xlabel='Total Assets', ylabel='Count'>
```



What insights we can draw---

The value of Total Assets owned by different parties in billions. And the Award goes to INC - INDIAN NATIONAL CONGRESS.

b. Distplot

It is going to get drooped in coming versions of Seaborn, and hence we are skipping this.

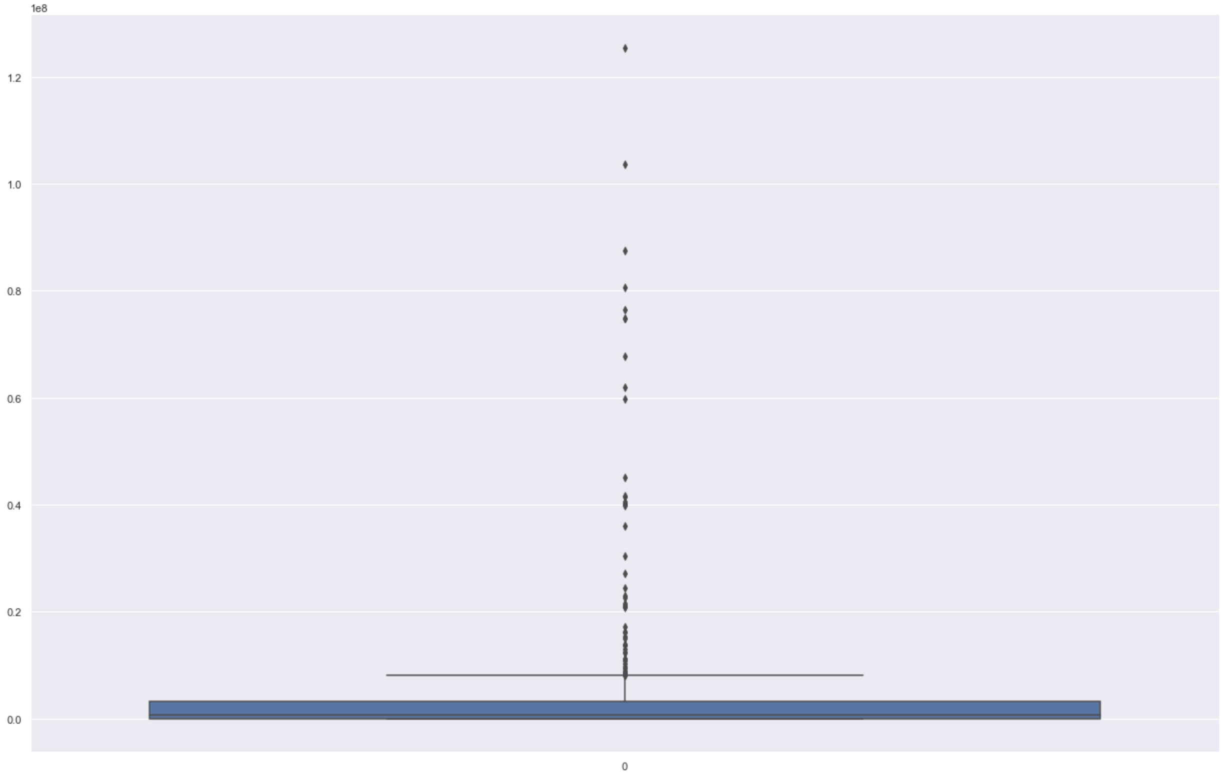
c. Boxplot

In [20]:

```
sns.boxplot(df['Liabilities'])
```

Out[20]:

```
<AxesSubplot:>
```



Some other methods/functions to analyse the Numerical data:

In [21]:

```
grps.get('Total Assets').max()
```

Out[21]:

```
8044365114.0
```

In [22]:

```
grps.get('Liabilities').max()
```

Out[22]:

```
912624177.0
```

In [23]:

```
grps.get('Criminal Case').max()
```

Out[23]:

```
85
```