Outlier Detection using Python

Import Libraries

In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

Outlier is a datapoint which lies outside of the overall distribution of a dataset.

Criteria to find an outlier

1.Data that falls above 1.5 times of IQR, above 3rd quartile and below 1st quartile 2.Data points which fall outside of 3 standard deviations, using z score.

Creating a dataset for Visualization

In [7]:

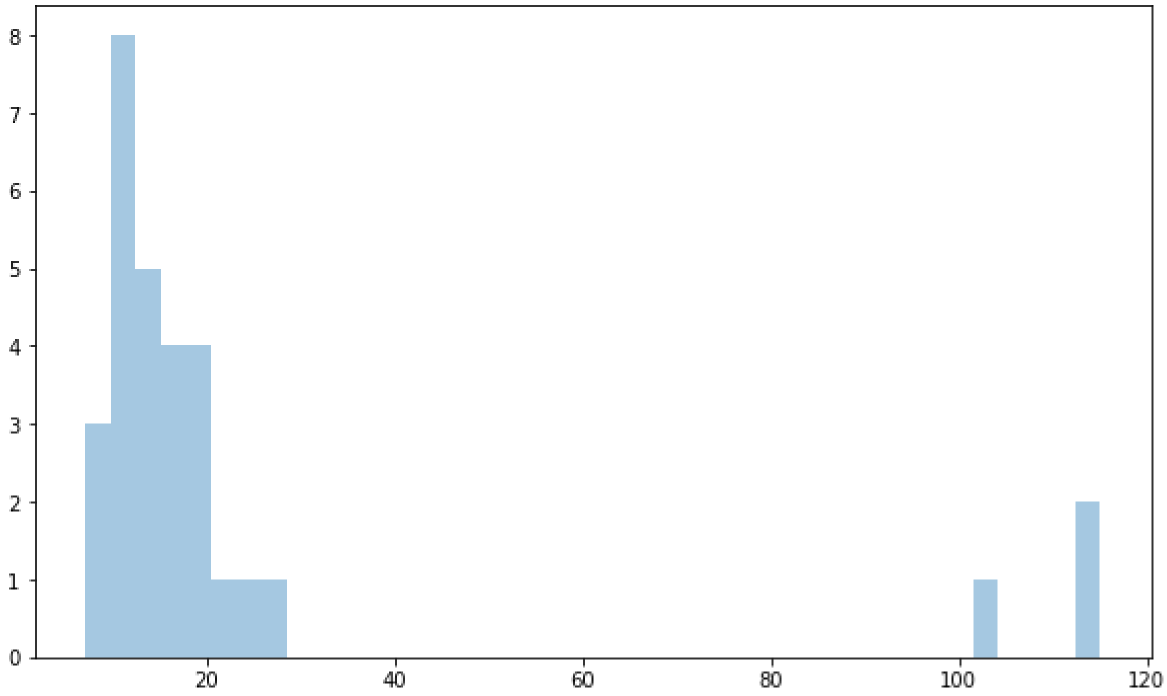
```
dataset = [12,13,14,19,10,9,12,16,104,18,17,11,16,10,10,9,15,18,17,113,14,15,19,25,27,2
```

In [8]:

```
plt.figure(figsize=(10,6))
sns.distplot(dataset, bins=40, kde=False)
```

Out[8]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x15676142748>
```



Detecting Outliers based on Z score

In [9]:

```
outliers = []

def detect_outliers(data):
    threshold=3
    mean=np.mean(data)
    standard_dev=np.std(data)

    for i in data:
        z_score= (i-mean)/standard_dev
        z_score= np.absolute(z_score)

        if z_score>3:
            outliers.append(i)

    return outliers
```

In [10]:
```
outliers = detect_outliers(dataset)
```

In [11]:
```
outliers
```

Out[11]:
```
[113, 115]
```

Detecting outliers based on IQR

In [12]:
```
sorted(dataset)
```

Out[12]:
```
[7,
 9,
 9,
 10,
 10,
 10,
 10,
 11,
 12,
 12,
 12,
 13,
 14,
 14,
 15,
 15,
 16,
 16,
 17,
 17,
 18,
 18,
 19,
 19,
 23,
 25,
 27,
 104,
 113,
 115]
```

Calculate 1st and 3rd Quartile

In [14]:
```
quartile1 = np.percentile(dataset, 25)
quartile3 = np.percentile(dataset, 75)
```

In [15]:
```
print(quartile1,quartile3)
```

```
11.25 18.75
```

Find Inter Quartile Range along with Lower & Upper bounds

In [17]:

```
iqr = quartile3-quartile1
iqr
```

Out[17]:

```
7.5
```

In [21]:

```
lower_bound = quartile1 - (1.5*iqr)
upper_bound = quartile3 + (1.5*iqr)
```

In [22]:

```
print(lower_bound,upper_bound)
```

```
0.0 30.0
```

In [27]:

```
def detect_outlier_using_iqr(low,high,data):
    outliers = []
    for i in data:
        if(i>high or i<low):
            outliers.append(i)

    return outliers
```

In [28]:

```
iqr_outliers = detect_outlier_using_iqr(lower_bound,upper_bound,dataset)
```

In [29]:

```
print(iqr_outliers)
```

```
[104, 113, 115]
```

In [ ]: