

```
In [1]: import pandas as pd
```

```
import numpy as np
```

```
import matplotlib.pyplot as plt
```

```
import seaborn as sns
```

```
In [2]: file_path=r"C:\Users\Mrityunjay\Desktop\Data science naresh it\Class notes by me\EDBANK.csv"
bank_df=pd.read_csv(file_path,sep=";")
bank_df
```

Out[2]:

	age	job	marital	education	default	balance	housing	loan	contact	day	duration	campaign	pdays	previous	age_update
0	30	unemployed	married	primary	no	1787	no	no	cellular
1	33	services	married	secondary	no	4789	yes	yes	cellular
2	35	management	single	tertiary	no	1350	yes	no	cellular
3	30	management	married	tertiary	no	1476	yes	yes	unknown
4	59	blue-collar	married	secondary	no	0	yes	no	unknown
...
4516	33	services	married	secondary	no	-333	yes	no	cellular
4517	57	self-employed	married	tertiary	yes	-3313	yes	yes	unknown
4518	57	technician	married	secondary	no	295	no	no	cellular
4519	28	blue-collar	married	secondary	no	1137	no	no	cellular
4520	44	entrepreneur	single	tertiary	no	1136	yes	yes	cellular

4521 rows × 17 columns



```
In [52]: #check the numerical columns.
```

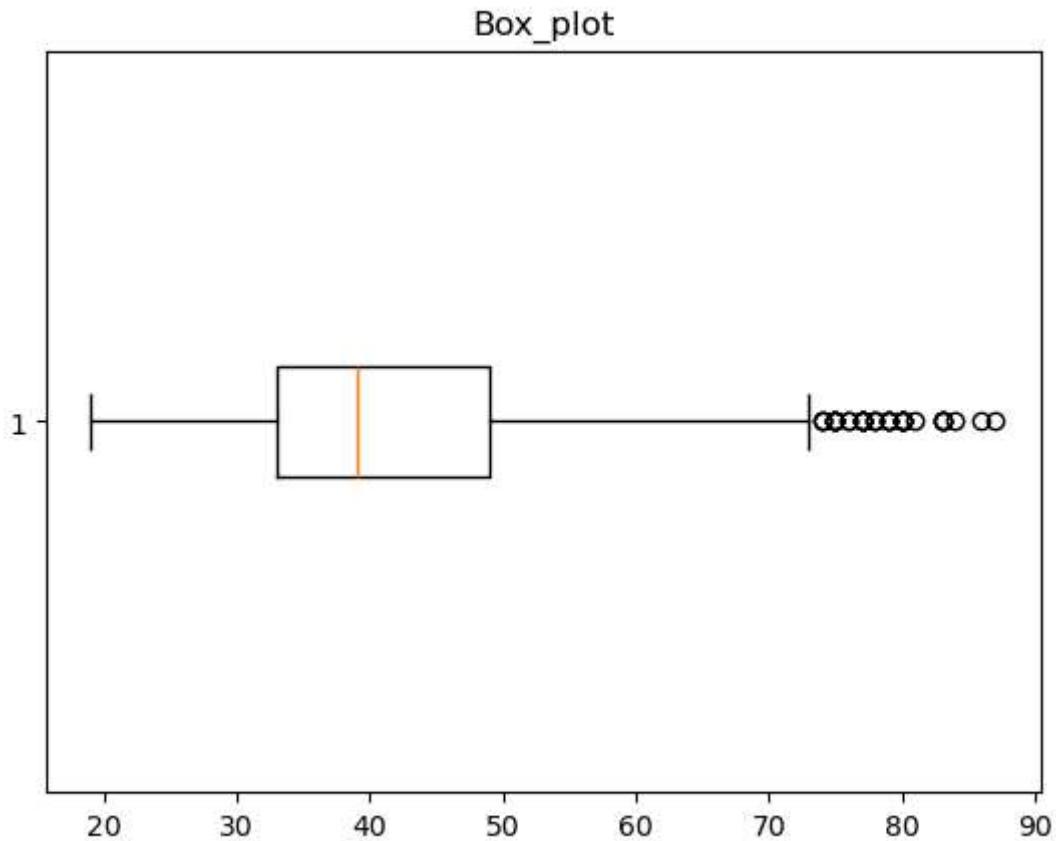
```
num_col=[i for i,j in dict(bank_df.dtypes).items() if j!="object"]      #checking num
num_col
```

```
Out[52]: ['age',
          'balance',
          'day',
          'duration',
          'campaign',
          'pdays',
          'previous',
          'age_update']
```

```
In [54]: #checking the outliers using the boxplot.
```

```
age_data=bank_df["age"]
plt.boxplot(age_data,vert=False)
plt.title("Box_plot")
```

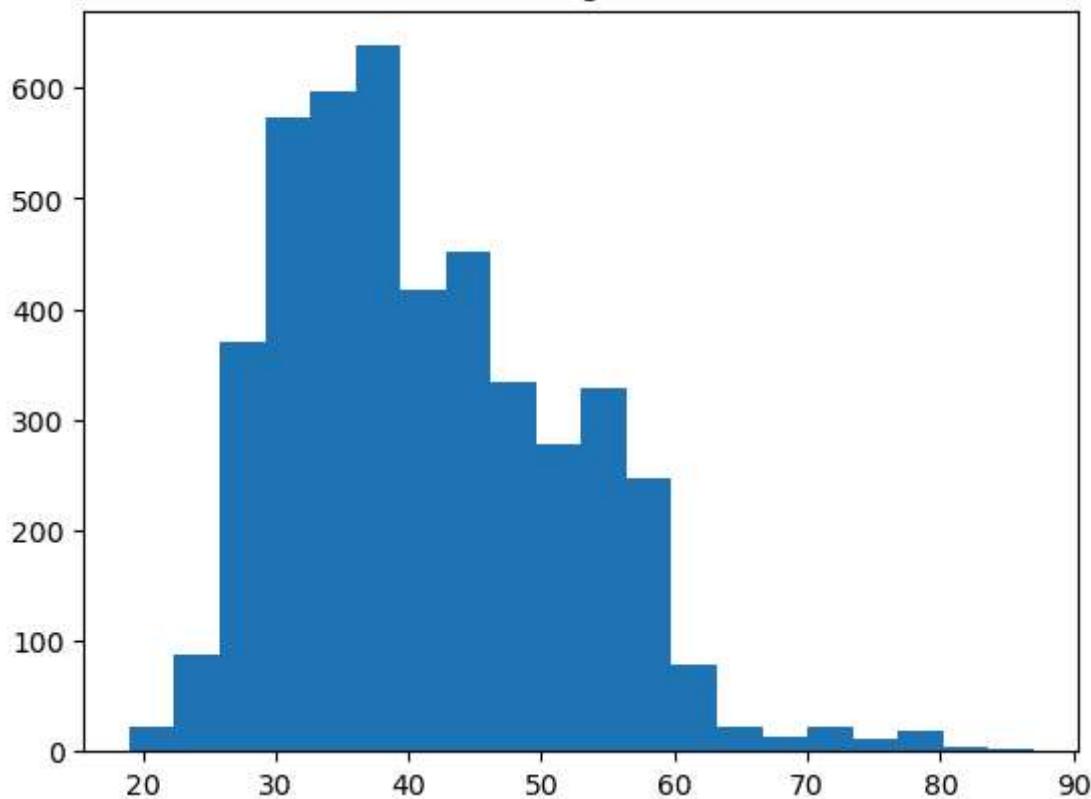
```
Out[54]: Text(0.5, 1.0, 'Box_plot')
```



```
In [5]: age_data=bank_df["age"]
plt.hist(age_data,bins=20)
plt.title("Histogram")
```

```
Out[5]: Text(0.5, 1.0, 'Histogram')
```

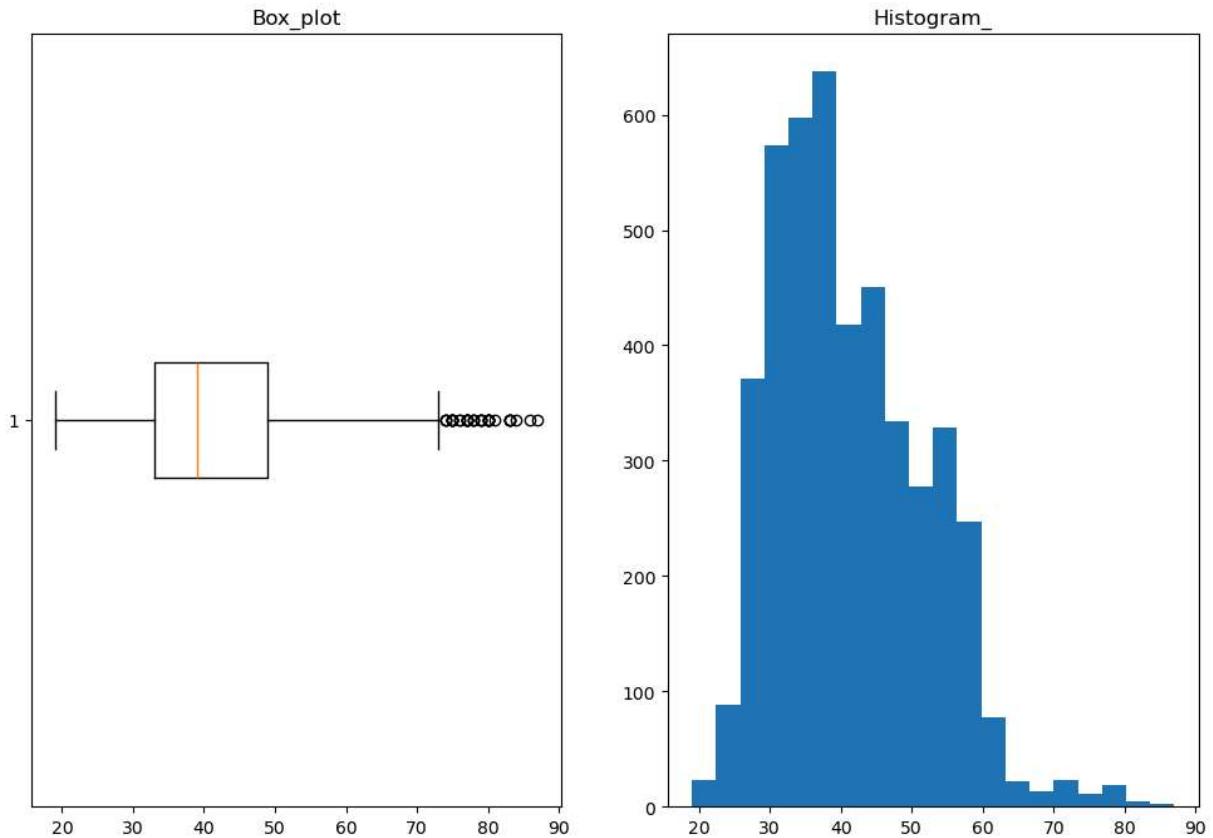
Histogram



```
In [58]: #Plot the boxplot and histogram two different way.  
age_data=bank_df["age"]  
plt.figure(figsize=(12,8))  
plt.suptitle("box_hist_plot")  
  
plt.subplot(1,2,1)  
plt.boxplot(age_data,vert=False)  
plt.title("Box_plot")  
  
plt.subplot(1,2,2)  
plt.hist(age_data,bins=20)  
plt.title("Histogram_")
```

Out[58]: Text(0.5, 1.0, 'Histogram_')

box_hist_plot



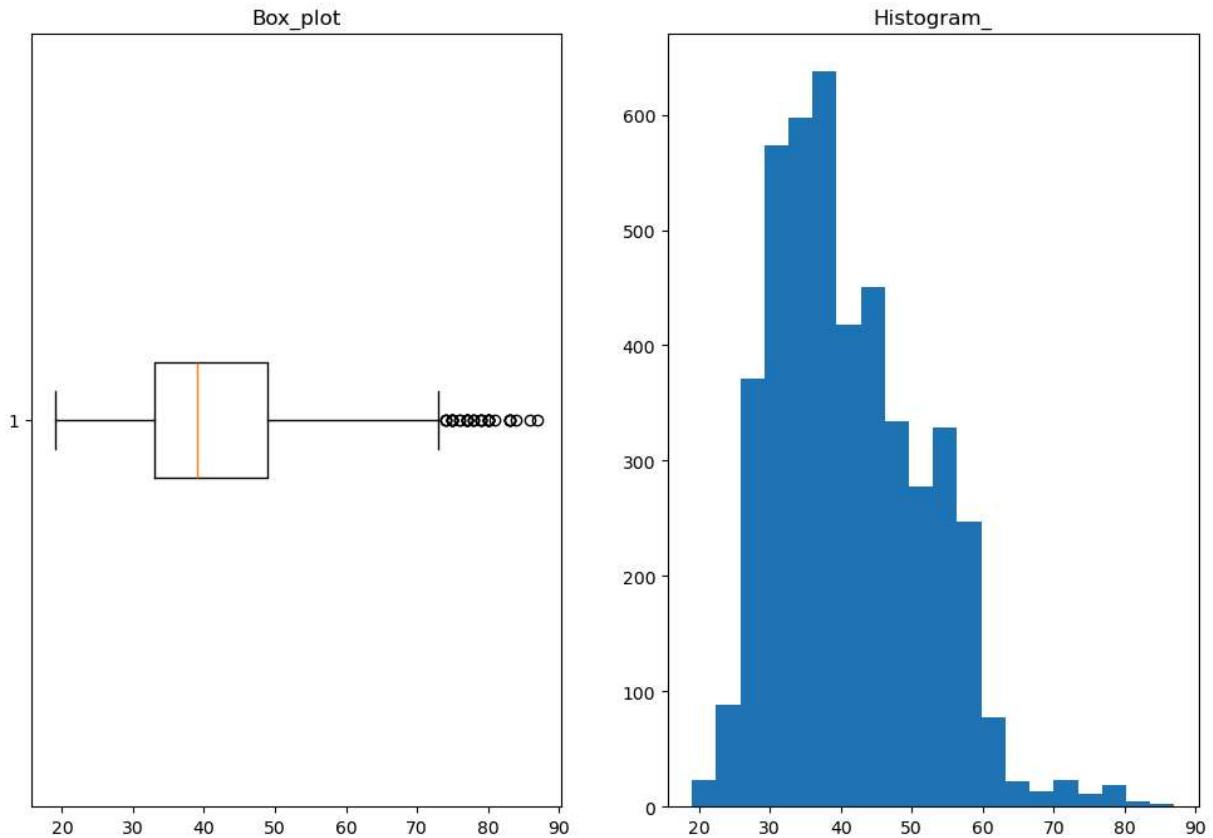
```
In [7]: #again use
age_data=bank_df["age"]
plt.figure(figsize=(12,8))
plt.suptitle("box_hist_plot")

plt.subplot(1,2,1).boxplot(age_data,vert=False)
plt.title("Box_plot")

plt.subplot(1,2,2).hist(age_data,bins=20)
plt.title("Histogram_")
```

Out[7]: Text(0.5, 1.0, 'Histogram_')

box_hist_plot



In [8]: #Mean,median,mode

```
mean=np.mean(bank_df["age"])    #mean age column
median=np.median(bank_df["age"]) #median age column
std=np.std(bank_df["age"])      #standard deviation age column
mean,median,std
```

Out[8]: (41.17009511170095, 39.0, 10.575041217961282)

In [9]: #25 percentile, 50 percentile, 75 percentile

```
Q1=np.percentile(bank_df["age"],25)  #25 percentile value
Q2=np.percentile(bank_df["age"],50)  #50 percentile value
Q3=np.percentile(bank_df["age"],75)  #75 percentile value
Q1,Q2,Q3
```

Out[9]: (33.0, 39.0, 49.0)

In [10]: #inter Quartile range

```
IQR=Q3-Q1
IQR
```

Out[10]: 16.0

In [11]: #Lower bound(Lb),upper bound(ub)
ub=Q3+1.5*IQR

```
lb=Q1-1.5*IQR  
ub,lb
```

Out[11]: (73.0, 9.0)

```
In [12]: #outliers in age column  
con1=bank_df["age"]>ub  
con2=bank_df["age"]<lb  
con3=con1|con2  
outliers_df=age_data[con3]  
outliers_df
```

```
Out[12]: 36      78  
129      77  
166      78  
199      75  
412      75  
477      77  
573      81  
633      83  
688      80  
1126     77  
1230     75  
1312     80  
1349     83  
1415     75  
1422     79  
1437     77  
1866     86  
1949     78  
1956     77  
2014     74  
2070     80  
2678     74  
2848     80  
2896     80  
3157     75  
3193     76  
3202     79  
3205     77  
3311     87  
3360     79  
3495     76  
3690     80  
3750     79  
3786     74  
4047     75  
4108     84  
4323     83  
4388     83  
Name: age, dtype: int64
```

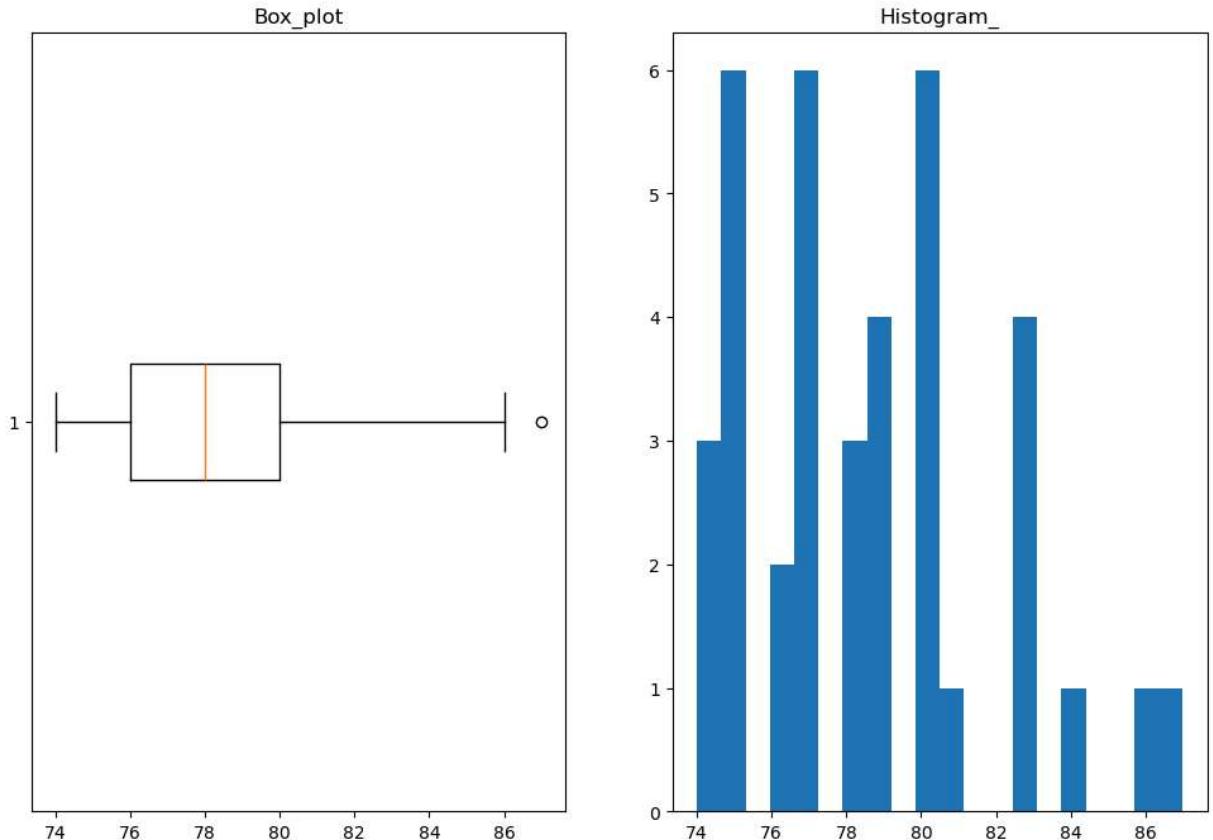
```
In [13]: #plot the outliers in age column  
  
plt.figure(figsize=(12,8))  
plt.suptitle("box_hist_plot")
```

```
plt.subplot(1,2,1).boxplot(outliers_df,vert=False)
plt.title("Box_plot")

plt.subplot(1,2,2).hist(outliers_df,bins=20)
plt.title("Histogram_")
```

Out[13]: Text(0.5, 1.0, 'Histogram_')

box_hist_plot



```
In [14]: con1=age_data>lb
con2=age_data<ub
con3=con1&con2
non_outliers_df=age_data[con2]
non_outliers_df
```

```
Out[14]: 0      30
1      33
2      35
3      30
4      59
      ..
4516    33
4517    57
4518    57
4519    28
4520    44
Name: age, Length: 4477, dtype: int64
```

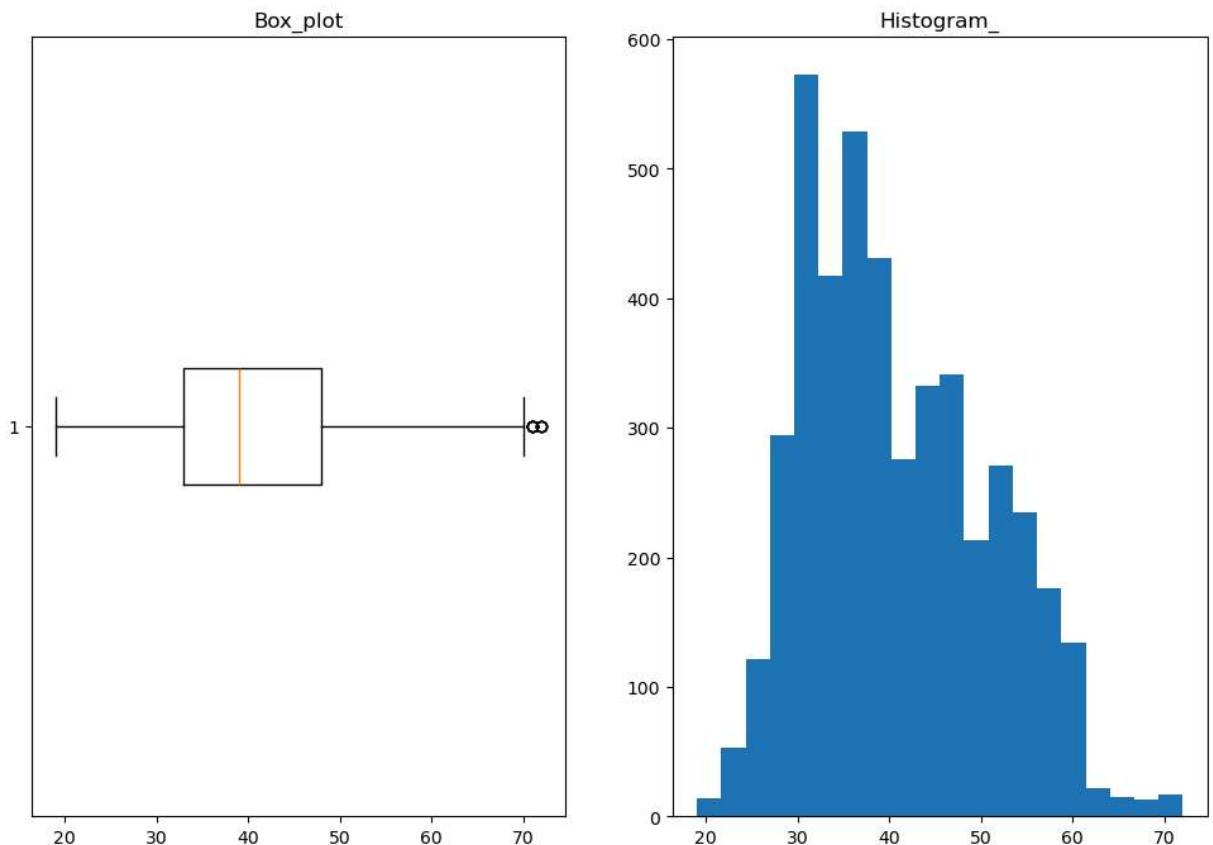
```
In [15]: #After removing outliers plot the age columns
age_data=bank_df["age"]
plt.figure(figsize=(12,8))
plt.suptitle("box_hist_plot")

plt.subplot(1,2,1).boxplot(non_outliers_df,vert=False)
plt.title("Box_plot")

plt.subplot(1,2,2).hist(non_outliers_df,bins=20)
plt.title("Histogram_")
```

Out[15]: Text(0.5, 1.0, 'Histogram_')

box_hist_plot



```
In [16]: #outliers in the age columns
age_data=bank_df["age"]
con1=age_data>ub
con2=age_data<lb
con3=con1|con2
outliers_df=bank_df[con3]
outliers_df
```

Out[16]:	age	job	marital	education	default	balance	housing	loan	contact
36	78	retired	divorced	primary	no	229	no	no	telephone
129	77	retired	divorced	tertiary	no	4659	no	no	cellular
166	78	housemaid	married	secondary	no	499	no	no	telephone
199	75	retired	married	secondary	no	3771	no	no	telephone
412	75	retired	divorced	tertiary	no	3810	yes	no	cellular
477	77	retired	married	tertiary	no	7802	no	no	telephone
573	81	retired	married	secondary	no	1	no	no	cellular
633	83	retired	married	secondary	no	0	no	no	cellular
688	80	management	married	primary	no	6483	no	no	telephone
1126	77	retired	married	secondary	no	610	no	no	cellular
1230	75	retired	divorced	secondary	no	1341	no	no	cellular
1312	80	retired	married	secondary	no	8304	no	no	telephone
1349	83	retired	married	primary	no	425	no	no	telephone
1415	75	retired	divorced	primary	no	852	no	no	cellular
1422	79	retired	married	secondary	no	4738	no	no	telephone
1437	77	retired	married	tertiary	no	0	no	no	cellular
1866	86	retired	married	secondary	no	1503	no	no	telephone
1949	78	retired	married	tertiary	no	226	no	no	telephone
1956	77	retired	married	primary	no	680	no	no	telephone
2014	74	retired	divorced	secondary	no	4079	no	no	cellular
2070	80	retired	married	secondary	no	8304	no	no	telephone
2678	74	retired	married	secondary	no	935	no	no	cellular
2848	80	retired	married	secondary	no	462	no	no	cellular
2896	80	retired	married	primary	no	1548	no	no	cellular
3157	75	blue-collar	married	secondary	no	6053	no	no	cellular
3193	76	retired	divorced	primary	no	86	no	no	cellular
3202	79	retired	married	primary	no	8556	no	no	telephone
3205	77	retired	married	primary	no	680	no	no	telephone
3311	87	retired	married	primary	no	230	no	no	cellular
3360	79	retired	married	primary	no	429	no	no	telephone

	age	job	marital	education	default	balance	housing	loan	contact
3495	76	retired	married	primary	no	2590	no	no	telephone
3690	80	housemaid	married	primary	no	0	no	no	cellular
3750	79	retired	divorced	unknown	no	2628	no	no	telephone
3786	74	retired	married	secondary	no	921	no	no	telephone
4047	75	retired	married	secondary	no	26452	no	no	telephone
4108	84	retired	divorced	primary	no	639	no	no	telephone
4323	83	retired	divorced	primary	no	0	no	no	telephone
4388	83	retired	divorced	primary	no	1097	no	no	telephone

In [17]:

```
#non outliers of the datasets
age_data=bank_df["age"]
con1=age_data>lb
con2=age_data<ub
con3=con1&con2
non_outliers_df=bank_df[con2]
non_outliers_df
```

Out[17]:

	age	job	marital	education	default	balance	housing	loan	contact	duration	campaign	pdays	previous	poutcome
0	30	unemployed	married	primary	no	1787	no	no	cellular
1	33	services	married	secondary	no	4789	yes	yes	cellular
2	35	management	single	tertiary	no	1350	yes	no	cellular
3	30	management	married	tertiary	no	1476	yes	yes	unknown
4	59	blue-collar	married	secondary	no	0	yes	no	unknown
...
4516	33	services	married	secondary	no	-333	yes	no	cellular
4517	57	self-employed	married	tertiary	yes	-3313	yes	yes	unknown
4518	57	technician	married	secondary	no	295	no	no	cellular
4519	28	blue-collar	married	secondary	no	1137	no	no	cellular
4520	44	entrepreneur	single	tertiary	no	1136	yes	yes	cellular

4477 rows × 17 columns

In [18]: #####Data#####		
age_data=bank_df["age"]		

```

age_non_outliers_df=non_outliers_df[ "age" ]

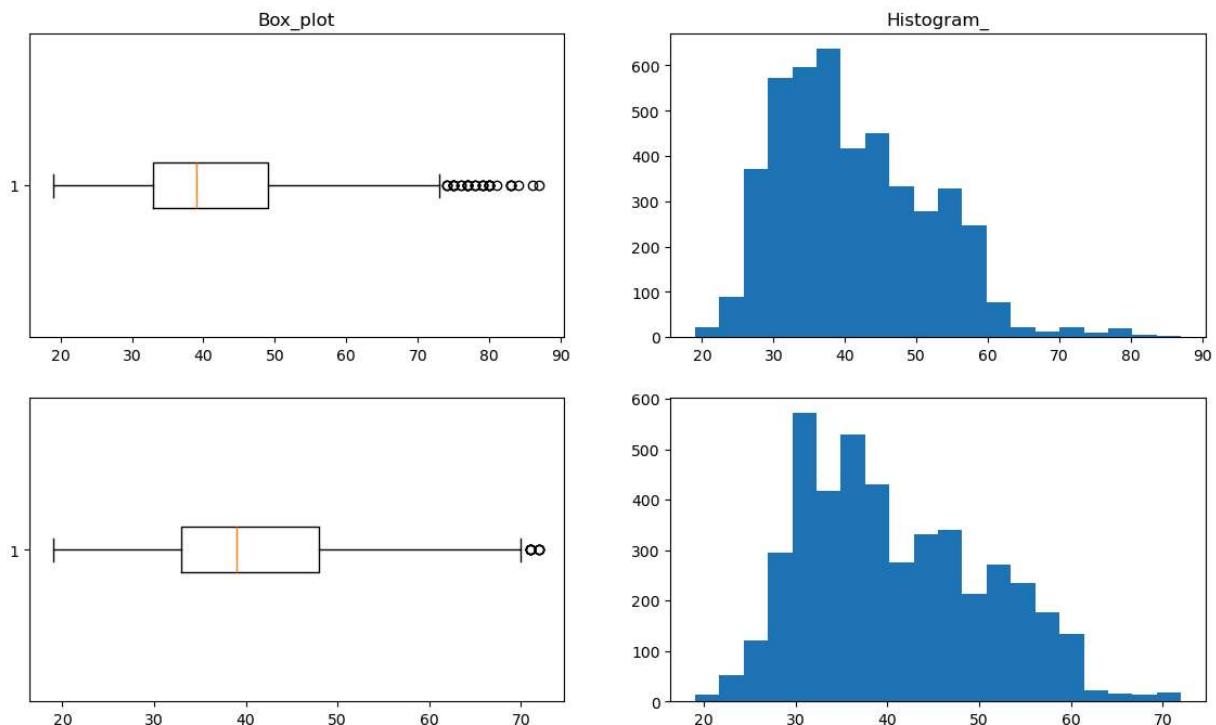
#####non outlier#####
plt.figure(figsize=(14,8))
plt.suptitle("comparing data age columns")

plt.subplot(2,2,1)
plt.boxplot(age_data,vert=False)
plt.title("Box_plot")

plt.subplot(2,2,2)
plt.hist(age_data,bins=20)
plt.title("Histogram_")
#####entire data outliers#####
plt.subplot(2,2,3)
plt.boxplot(age_non_outliers_df,vert=False)
plt.subplot(2,2,4)
plt.hist(age_non_outliers_df,bins=20)
plt.show()

```

comparing data age columns

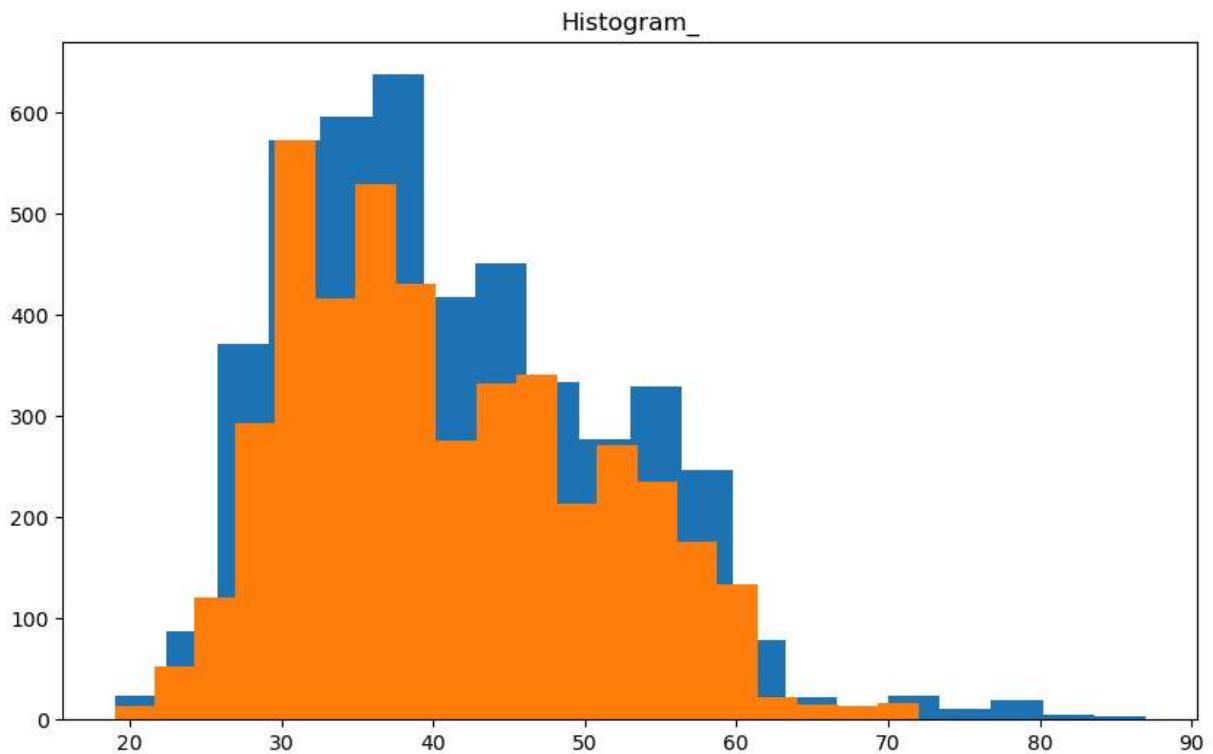


```

In [19]: ######Data#####
age_data=bank_df[ "age" ]
age_non_outliers_df=non_outliers_df[ "age" ]

plt.figure(figsize=(10,6))
plt.hist(age_data,bins=20)
plt.hist(age_non_outliers_df,bins=20)
plt.title("Histogram_")
plt.show()

```



How to deals outliers with medians?

```
In [21]: #####Deal with median value#####
Q1=np.percentile(bank_df["age"],25) #25 percentile value
Q2=np.percentile(bank_df["age"],50) #50 percentile value
Q3=np.percentile(bank_df["age"],75) #75 percentile value

#####IQR(inter Quartile range)#####
IQR=Q3-Q1

#####Lower bound(Lb),upper bound(ub)#####
ub=Q3+1.5*IQR
lb=Q1-1.5*IQR

#####
con1=bank_df["age"]>ub
con2=bank_df["age"]<lb
con3=con1|con2

##### median value #####
median=np.median(bank_df["age"])
```

```
In [22]: l=[]
for i in age_data:
    if i<lb or i>ub:
        median1=age_data.median()
        l.append(median1)
    else:
```

```
    l.append(i)
print(l)
```

[30, 33, 35, 30, 59, 35, 36, 39, 41, 43, 39, 43, 36, 20, 31, 40, 56, 37, 25, 31, 38, 42, 44, 44, 26, 41, 55, 67, 56, 53, 68, 31, 59, 32, 49, 42, 39.0, 32, 33, 23, 38, 36, 52, 32, 32, 34, 55, 26, 32, 61, 45, 37, 38, 34, 53, 48, 57, 33, 36, 54, 41, 63, 48, 56, 51, 31, 29, 41, 32, 37, 42, 31, 41, 56, 54, 41, 40, 50, 40, 27, 60, 28, 52, 37, 51, 41, 35, 38, 34, 39, 34, 27, 32, 57, 41, 41, 30, 36, 31, 36, 38, 49, 57, 34, 32, 37, 33, 56, 27, 21, 58, 32, 33, 25, 25, 30, 22, 39, 46, 31, 45, 32, 36, 51, 34, 24, 45, 32, 39.0, 41, 37, 43, 48, 27, 33, 29, 34, 52, 60, 32, 32, 56, 31, 42, 35, 56, 48, 46, 37, 41, 36, 45, 55, 39, 35, 55, 55, 27, 34, 34, 25, 41, 43, 28, 31, 39, 0, 45, 48, 32, 42, 37, 40, 32, 42, 43, 44, 37, 37, 28, 32, 34, 40, 34, 34, 34, 37, 36, 56, 49, 33, 30, 36, 23, 57, 27, 38, 42, 39.0, 34, 48, 35, 39, 29, 45, 42, 29, 38, 56, 36, 25, 38, 57, 31, 42, 45, 30, 49, 49, 53, 37, 49, 41, 54, 32, 33, 33, 36, 35, 52, 40, 44, 45, 30, 48, 33, 57, 57, 51, 34, 50, 44, 27, 50, 36, 42, 32, 42, 43, 31, 32, 55, 58, 46, 55, 34, 28, 42, 29, 54, 32, 39, 53, 58, 40, 29, 33, 38, 56, 40, 24, 46, 35, 35, 34, 35, 38, 50, 51, 59, 32, 37, 42, 40, 28, 47, 27, 41, 34, 50, 47, 53, 53, 47, 49, 29, 45, 38, 32, 70, 65, 56, 35, 56, 49, 38, 35, 38, 49, 55, 43, 43, 25, 30, 46, 50, 35, 26, 45, 37, 60, 38, 47, 33, 51, 35, 35, 48, 37, 29, 34, 32, 30, 47, 33, 33, 63, 51, 41, 56, 60, 41, 37, 36, 57, 55, 44, 47, 31, 35, 39, 50, 29, 30, 46, 27, 48, 26, 36, 42, 50, 49, 45, 23, 38, 32, 60, 30, 58, 60, 38, 51, 42, 30, 40, 37, 53, 27, 39, 39, 59, 37, 41, 45, 48, 48, 32, 35, 33, 28, 64, 35, 33, 41, 34, 37, 38, 39, 35, 28, 27, 48, 50, 45, 41, 39, 44, 54, 49, 34, 39.0, 42, 53, 49, 31, 45, 39, 46, 42, 37, 26, 37, 36, 29, 36, 26, 32, 40, 53, 29, 34, 43, 56, 55, 31, 27, 36, 44, 37, 30, 42, 30, 62, 24, 31, 66, 47, 39, 35, 35, 27, 32, 44, 42, 34, 25, 40, 43, 55, 50, 45, 35, 32, 59, 34, 39, 40, 36, 40, 55, 38, 61, 41, 57, 48, 39.0, 35, 54, 37, 56, 40, 40, 54, 55, 55, 52, 55, 33, 52, 33, 53, 46, 44, 48, 50, 34, 38, 42, 32, 58, 31, 19, 41, 31, 52, 42, 41, 30, 38, 32, 52, 48, 36, 45, 34, 36, 34, 61, 54, 50, 43, 47, 45, 57, 27, 49, 43, 40, 32, 58, 34, 46, 29, 52, 45, 26, 40, 41, 47, 27, 27, 48, 49, 35, 47, 54, 39, 28, 54, 34, 63, 42, 43, 37, 55, 43, 41, 47, 34, 28, 36, 50, 35, 40, 26, 36, 59, 28, 46, 50, 53, 39.0, 35, 58, 44, 38, 49, 33, 29, 28, 31, 33, 52, 43, 32, 36, 41, 45, 39, 41, 31, 35, 27, 57, 56, 53, 39, 32, 46, 56, 46, 29, 60, 33, 27, 50, 45, 58, 59, 58, 64, 47, 40, 36, 28, 38, 53, 46, 54, 32, 55, 55, 56, 40, 44, 32, 33, 41, 37, 58, 52, 49, 44, 28, 31, 37, 30, 28, 46, 47, 35, 39, 0, 30, 55, 22, 33, 53, 49, 51, 41, 34, 36, 35, 29, 40, 32, 48, 59, 35, 33, 55, 41, 42, 46, 35, 28, 25, 56, 30, 45, 40, 40, 39, 48, 31, 32, 34, 26, 31, 37, 29, 57, 47, 38, 48, 50, 33, 28, 30, 52, 36, 36, 46, 57, 28, 46, 55, 33, 53, 41, 60, 35, 43, 57, 46, 31, 53, 35, 32, 48, 50, 40, 42, 59, 27, 32, 35, 28, 37, 57, 42, 55, 52, 26, 52, 26, 33, 24, 37, 28, 30, 33, 55, 33, 42, 37, 59, 27, 23, 51, 50, 43, 37, 34, 41, 26, 49, 29, 30, 38, 58, 34, 53, 50, 30, 40, 57, 40, 41, 53, 48, 32, 34, 46, 45, 51, 31, 47, 32, 41, 37, 27, 50, 31, 40, 43, 39, 31, 48, 32, 47, 35, 42, 47, 59, 38, 50, 27, 55, 39, 31, 37, 28, 42, 40, 46, 48, 41, 55, 33, 46, 36, 48, 42, 46, 49, 36, 34, 51, 58, 48, 41, 49, 43, 32, 54, 33, 35, 56, 57, 31, 33, 29, 38, 37, 33, 30, 31, 28, 26, 31, 50, 45, 48, 41, 60, 41, 43, 36, 40, 28, 27, 49, 37, 31, 31, 31, 31, 51, 33, 30, 58, 34, 45, 28, 31, 40, 30, 34, 40, 59, 43, 41, 33, 33, 36, 32, 25, 25, 38, 34, 67, 32, 45, 33, 38, 32, 54, 51, 42, 41, 39, 38, 39, 46, 50, 33, 37, 31, 34, 34, 36, 40, 40, 41, 52, 40, 48, 33, 44, 55, 51, 34, 58, 39, 27, 55, 35, 37, 52, 41, 52, 34, 53, 33, 47, 35, 33, 55, 58, 44, 25, 37, 41, 34, 36, 44, 34, 56, 43, 28, 54, 37, 59, 58, 56, 32, 42, 40, 48, 46, 37, 39, 31, 59, 38, 58, 34, 40, 20, 34, 31, 39, 34, 24, 41, 40, 45, 36, 53, 23, 42, 48, 34, 36, 43, 36, 49, 55, 53, 42, 45, 31, 32, 36, 56, 46, 41, 31, 32, 38, 49, 46, 29, 36, 38, 53, 43, 41, 42, 55, 39, 30, 41, 44, 58, 35, 27, 34, 25, 36, 38, 30, 47, 41, 36, 63, 23, 32, 57, 48, 49, 50, 33, 53, 30, 38, 44, 39, 45, 36, 38, 36, 30, 28, 26, 54, 38, 32, 50, 43, 48, 57, 64, 26, 33, 50, 47, 39, 52, 31, 50, 47, 30, 32, 36, 46, 48, 51, 32, 35, 37, 38, 39.0, 32, 43, 36, 29, 32, 41, 26, 34, 57, 36, 42, 35, 52, 36, 46, 60, 57, 48, 59, 39, 44, 27, 59, 36, 44, 50, 41, 47, 32, 38, 55, 38, 31, 38, 29, 55, 35, 40, 34, 32, 33, 33, 37, 58,

36, 42, 34, 35, 60, 50, 28, 27, 37, 31, 34, 38, 32, 37, 33, 71, 27, 38, 34, 54, 30, 35, 33, 36, 59, 72, 64, 53, 35, 58, 40, 41, 48, 44, 39, 61, 36, 28, 58, 60, 66, 36, 49, 40, 23, 29, 44, 54, 47, 33, 30, 27, 49, 27, 51, 32, 30, 33, 27, 39.0, 37, 36, 3 7, 35, 32, 32, 35, 31, 28, 27, 22, 35, 69, 37, 45, 47, 52, 33, 60, 33, 44, 38, 54, 3 2, 33, 55, 51, 48, 37, 33, 30, 43, 49, 54, 31, 54, 36, 30, 27, 30, 30, 35, 33, 43, 4 1, 41, 46, 54, 32, 30, 40, 30, 27, 41, 54, 32, 31, 42, 48, 34, 55, 49, 46, 47, 24, 5 8, 32, 25, 49, 59, 30, 46, 42, 37, 44, 49, 41, 48, 31, 37, 51, 39.0, 32, 48, 49, 30, 27, 34, 49, 48, 40, 38, 46, 41, 28, 51, 33, 26, 34, 27, 42, 45, 31, 32, 39, 26, 40, 52, 40, 48, 31, 27, 47, 28, 40, 34, 29, 36, 39.0, 55, 43, 23, 44, 58, 29, 30, 29, 4 1, 35, 31, 27, 47, 53, 34, 34, 36, 40, 37, 65, 53, 28, 33, 56, 45, 39, 28, 36, 41, 4 6, 41, 59, 24, 34, 40, 42, 50, 25, 51, 50, 37, 21, 52, 55, 26, 38, 32, 31, 34, 33, 3 5, 44, 48, 29, 50, 37, 44, 36, 49, 31, 49, 35, 57, 42, 36, 39.0, 38, 40, 38, 34, 29, 28, 39.0, 51, 32, 36, 38, 49, 42, 43, 34, 59, 35, 33, 34, 64, 34, 39.0, 57, 30, 56, 49, 73, 39, 57, 32, 32, 45, 32, 31, 49, 29, 55, 30, 45, 39, 36, 33, 36, 31, 36, 38, 33, 40, 31, 39, 33, 53, 38, 59, 55, 38, 48, 53, 44, 57, 29, 31, 35, 31, 35, 40, 39, 43, 44, 29, 40, 33, 46, 27, 26, 41, 34, 39, 27, 31, 44, 55, 51, 50, 30, 46, 49, 56, 47, 30, 36, 40, 37, 42, 45, 34, 27, 30, 32, 46, 29, 53, 32, 49, 35, 38, 39, 34, 42, 35, 60, 57, 31, 29, 41, 46, 33, 32, 54, 37, 32, 43, 50, 34, 31, 43, 49, 22, 35, 56, 53, 54, 32, 41, 40, 33, 33, 34, 36, 34, 55, 28, 29, 31, 52, 54, 43, 55, 28, 45, 45, 51, 42, 43, 34, 36, 37, 50, 42, 34, 48, 47, 40, 37, 38, 29, 46, 26, 30, 42, 42, 31, 37, 26, 54, 70, 29, 50, 60, 32, 32, 34, 48, 25, 32, 32, 47, 32, 49, 53, 41, 47, 35, 33, 49, 46, 29, 58, 40, 34, 60, 43, 50, 33, 37, 55, 45, 47, 58, 36, 55, 31, 38, 42, 32, 39, 41, 59, 42, 33, 53, 43, 39, 27, 39, 27, 33, 29, 33, 41, 38, 30, 58, 37, 36, 45, 23, 53, 44, 32, 32, 38, 47, 34, 52, 45, 50, 52, 37, 51, 32, 33, 28, 66, 31, 35, 47, 36, 32, 34, 40, 33, 39, 38, 32, 65, 34, 34, 42, 31, 47, 44, 38, 28, 46, 51, 42, 37, 58, 43, 36, 34, 31, 49, 54, 29, 51, 40, 35, 25, 32, 30, 38, 46, 43, 32, 29, 56, 57, 38, 51, 35, 37, 48, 30, 60, 56, 45, 38, 20, 59, 34, 36, 53, 51, 58, 48, 56, 51, 35, 40, 59, 44, 49, 35, 41, 55, 51, 27, 57, 51, 38, 49, 40, 47, 48, 47, 56, 29, 38, 32, 42, 30, 26, 35, 35, 35, 57, 29, 32, 45, 51, 31, 50, 38, 37, 35, 37, 28, 38, 43, 43, 56, 32, 58, 47, 31, 38, 50, 32, 37, 39, 40, 41, 45, 31, 54, 39, 56, 35, 34, 31, 38, 41, 44, 49, 30, 31, 34, 70, 45, 31, 57, 40, 28, 44, 49, 46, 34, 58, 52, 27, 48, 33, 46, 51, 31, 35, 37, 60, 40, 50, 34, 32, 36, 32, 40, 37, 57, 46, 31, 39, 35, 32, 44, 41, 59, 39, 54, 27, 51, 33, 38, 52, 54, 33, 50, 39, 34, 41, 48, 38, 34, 32, 48, 28, 47, 32, 32, 38, 39.0, 47, 42, 44, 25, 34, 34, 53, 42, 30, 26, 40, 34, 34, 40, 3 6, 34, 32, 39, 36, 39, 33, 34, 42, 46, 32, 27, 35, 53, 29, 35, 49, 58, 40, 19, 30, 3 4, 60, 28, 46, 49, 59, 44, 33, 54, 26, 54, 48, 30, 29, 51, 53, 43, 34, 40, 43, 33, 6 6, 44, 33, 31, 71, 22, 46, 32, 45, 32, 49, 27, 46, 37, 30, 44, 45, 27, 57, 66, 40, 4 8, 33, 42, 47, 27, 39.0, 50, 46, 41, 36, 49, 46, 39.0, 30, 43, 44, 40, 38, 25, 49, 3 3, 40, 44, 32, 52, 35, 35, 32, 42, 59, 44, 50, 27, 55, 54, 31, 56, 51, 61, 34, 56, 2 9, 34, 35, 56, 45, 31, 37, 43, 40, 44, 38, 58, 24, 53, 36, 28, 45, 32, 46, 28, 51, 5 1, 30, 39, 28, 31, 31, 38, 31, 39.0, 40, 43, 34, 54, 51, 33, 41, 33, 48, 42, 35, 25, 38, 45, 59, 47, 33, 59, 41, 42, 51, 45, 30, 33, 43, 37, 73, 43, 52, 44, 56, 21, 43, 54, 59, 52, 31, 53, 24, 57, 48, 57, 51, 50, 34, 43, 31, 29, 39, 36, 38, 56, 41, 47, 38, 39.0, 37, 44, 33, 53, 69, 46, 30, 31, 38, 34, 48, 46, 42, 41, 33, 39, 27, 26, 3 8, 48, 54, 51, 47, 53, 35, 58, 52, 57, 52, 35, 48, 46, 39, 38, 34, 47, 35, 46, 27, 3 1, 31, 46, 31, 33, 42, 33, 40, 51, 31, 62, 24, 48, 41, 43, 52, 54, 32, 38, 41, 31, 3 5, 26, 52, 58, 57, 34, 59, 27, 42, 47, 33, 31, 37, 29, 38, 35, 31, 62, 32, 31, 51, 2 9, 43, 36, 34, 29, 57, 43, 33, 60, 51, 40, 51, 38, 35, 47, 45, 40, 29, 52, 26, 31, 5 5, 35, 56, 28, 27, 30, 51, 33, 32, 43, 46, 32, 40, 39, 51, 46, 43, 36, 48, 26, 39, 4 7, 23, 54, 38, 33, 35, 52, 25, 29, 35, 49, 41, 32, 29, 28, 59, 34, 55, 34, 24, 42, 3 4, 34, 51, 58, 44, 33, 34, 34, 42, 46, 31, 39, 34, 47, 42, 48, 30, 38, 24, 34, 46, 3 2, 46, 26, 42, 50, 41, 34, 32, 58, 45, 28, 35, 39, 49, 50, 37, 45, 30, 48, 36, 41, 5 5, 70, 41, 47, 34, 33, 58, 51, 45, 55, 30, 33, 27, 59, 34, 47, 44, 35, 45, 42, 38, 3 4, 35, 29, 58, 44, 45, 43, 44, 30, 38, 50, 21, 38, 42, 45, 34, 48, 34, 32, 35, 39, 3 6, 35, 57, 28, 43, 57, 34, 36, 47, 36, 33, 57, 57, 34, 51, 54, 52, 43, 58, 53, 44, 2 9, 27, 35, 40, 34, 38, 32, 41, 25, 38, 26, 37, 30, 36, 33, 35, 24, 29, 54, 27, 3

4, 39, 38, 37, 26, 36, 35, 30, 25, 34, 52, 39, 34, 34, 30, 33, 30, 51, 36, 48, 37, 5
 8, 56, 34, 33, 26, 40, 35, 45, 37, 35, 43, 28, 32, 26, 35, 35, 39, 42, 32, 30, 26, 3
 0, 32, 47, 33, 57, 35, 53, 24, 54, 31, 41, 44, 35, 30, 43, 51, 60, 43, 31, 56, 42, 5
 2, 40, 36, 40, 46, 32, 31, 41, 58, 36, 52, 42, 32, 62, 31, 41, 34, 44, 42, 37, 47, 3
 2, 46, 39, 28, 26, 52, 42, 33, 73, 35, 40, 51, 37, 39, 28, 49, 36, 45, 29, 35, 35, 3
 0, 46, 25, 36, 42, 57, 42, 29, 36, 31, 59, 50, 47, 46, 26, 31, 30, 47, 23, 44, 42, 3
 2, 28, 57, 38, 22, 54, 32, 32, 59, 45, 53, 50, 34, 35, 30, 62, 40, 26, 34, 50, 31, 3
 5, 55, 34, 58, 50, 31, 47, 38, 46, 42, 34, 37, 38, 59, 32, 55, 35, 56, 27, 42, 42, 4
 1, 53, 67, 53, 33, 31, 31, 30, 48, 30, 43, 38, 46, 59, 44, 35, 55, 39, 36, 33, 48, 3
 3, 67, 48, 57, 31, 30, 56, 26, 44, 44, 31, 47, 30, 37, 56, 43, 42, 60, 34, 34, 41, 3
 8, 23, 33, 36, 49, 34, 40, 72, 43, 44, 35, 46, 55, 50, 23, 34, 40, 61, 53, 57, 28, 2
 5, 38, 27, 45, 31, 39, 42, 46, 36, 30, 32, 52, 31, 60, 35, 38, 46, 45, 59, 34, 33, 4
 6, 48, 31, 32, 35, 36, 52, 45, 34, 25, 26, 57, 48, 48, 32, 58, 57, 31, 33, 53, 36, 3
 2, 45, 35, 41, 54, 49, 28, 24, 30, 32, 53, 42, 48, 33, 31, 56, 58, 37, 59, 50, 39, 3
 0, 47, 44, 38, 50, 27, 73, 46, 56, 36, 33, 40, 52, 51, 33, 54, 44, 50, 45, 36, 42, 3
 7, 28, 56, 59, 32, 57, 49, 56, 48, 27, 31, 28, 36, 58, 46, 32, 39, 35, 31, 29, 48, 6
 0, 39.0, 30, 52, 24, 29, 33, 34, 45, 31, 45, 27, 30, 45, 57, 34, 40, 39, 46, 55, 25,
 34, 37, 64, 45, 57, 21, 58, 41, 41, 58, 33, 32, 44, 47, 41, 54, 47, 32, 59, 29, 48,
 32, 46, 31, 53, 34, 48, 32, 31, 27, 60, 34, 52, 48, 45, 54, 52, 47, 54, 34, 39, 46,
 26, 37, 47, 35, 57, 34, 47, 27, 40, 39, 36, 42, 23, 34, 34, 49, 57, 59, 57, 34, 61,
 35, 42, 57, 42, 53, 63, 47, 54, 45, 28, 58, 48, 35, 37, 37, 37, 25, 58, 52, 19, 59,
 41, 34, 35, 41, 28, 53, 35, 33, 37, 32, 32, 54, 44, 36, 56, 30, 36, 43, 40, 32, 34,
 37, 28, 35, 53, 60, 40, 57, 29, 44, 41, 47, 43, 37, 34, 30, 57, 26, 34, 46, 38, 37,
 28, 57, 39, 49, 38, 27, 30, 38, 36, 38, 59, 37, 29, 43, 33, 54, 55, 32, 48, 33, 46,
 44, 47, 38, 39.0, 40, 43, 32, 39, 33, 31, 36, 35, 25, 33, 23, 31, 36, 44, 31, 55, 5
 1, 36, 27, 40, 49, 59, 32, 42, 35, 29, 29, 37, 49, 51, 61, 43, 42, 24, 46, 23, 26, 4
 3, 35, 38, 56, 31, 32, 28, 26, 49, 33, 39.0, 40, 42, 46, 32, 37, 32, 53, 39, 31, 34,
 44, 35, 39, 55, 34, 39, 58, 37, 56, 32, 41, 29, 44, 24, 43, 26, 39, 49, 52, 33, 30,
 32, 27, 58, 46, 28, 39, 41, 38, 50, 56, 34, 33, 61, 36, 34, 36, 45, 27, 45, 40, 36,
 46, 37, 36, 37, 22, 51, 49, 35, 50, 31, 47, 59, 32, 71, 31, 41, 35, 36, 46, 46, 47,
 35, 37, 56, 46, 44, 48, 28, 38, 34, 56, 55, 44, 38, 53, 41, 34, 34, 35, 38, 42, 56,
 37, 47, 29, 41, 43, 38, 31, 32, 40, 45, 43, 27, 33, 37, 60, 51, 44, 48, 57, 29, 50,
 36, 49, 49, 35, 39, 34, 57, 37, 25, 43, 37, 36, 49, 38, 39, 40, 34, 39, 53, 44, 32,
 50, 29, 55, 73, 52, 49, 63, 34, 32, 49, 40, 53, 53, 43, 35, 35, 25, 31, 48, 40, 46,
 30, 47, 23, 29, 38, 56, 52, 55, 43, 34, 43, 55, 34, 34, 43, 39, 39, 34, 55, 67, 34,
 47, 33, 45, 36, 59, 33, 52, 53, 41, 45, 60, 32, 28, 31, 53, 58, 38, 46, 53, 56, 52,
 38, 37, 37, 37, 66, 44, 61, 34, 33, 30, 27, 37, 38, 35, 50, 39, 35, 36, 28, 39, 39,
 30, 32, 28, 47, 53, 57, 47, 56, 38, 52, 46, 57, 42, 57, 51, 53, 37, 47, 48, 39, 42,
 36, 34, 61, 32, 35, 54, 31, 45, 32, 52, 36, 31, 53, 43, 47, 46, 34, 55, 23, 39.0, 5
 8, 35, 27, 24, 48, 31, 57, 53, 42, 50, 59, 38, 39, 28, 55, 33, 36, 38, 28, 32, 35, 5
 8, 30, 33, 36, 32, 34, 42, 41, 63, 38, 54, 39, 46, 37, 39.0, 28, 33, 46, 30, 60, 56,
 24, 58, 39.0, 32, 33, 39.0, 60, 54, 30, 50, 50, 37, 41, 49, 41, 40, 38, 34, 49, 72,
 34, 31, 33, 31, 55, 25, 34, 53, 39, 41, 32, 29, 56, 19, 39, 32, 43, 32, 53, 52, 43,
 48, 27, 27, 51, 39, 33, 50, 59, 58, 54, 60, 38, 39, 40, 55, 36, 31, 38, 52, 45, 32,
 58, 35, 36, 55, 45, 49, 44, 37, 35, 36, 44, 32, 56, 32, 35, 44, 59, 31, 60, 33, 45,
 45, 57, 36, 30, 30, 59, 58, 49, 48, 28, 59, 40, 32, 58, 28, 27, 38, 53, 60, 33, 52,
 64, 40, 52, 28, 49, 28, 29, 39.0, 37, 36, 35, 33, 60, 25, 69, 41, 48, 35, 30, 59, 3
 2, 28, 60, 36, 32, 34, 58, 53, 31, 33, 46, 29, 37, 58, 34, 34, 49, 53, 42, 40, 30, 3
 1, 55, 36, 31, 26, 31, 49, 54, 47, 61, 49, 51, 53, 35, 25, 39.0, 53, 21, 33, 40, 34,
 52, 27, 57, 51, 31, 49, 32, 28, 33, 50, 42, 45, 34, 56, 33, 34, 37, 37, 35, 38, 32,
 52, 49, 46, 42, 36, 32, 49, 46, 40, 36, 36, 34, 46, 32, 32, 32, 43, 25, 55, 24, 40,
 38, 48, 36, 57, 45, 33, 38, 26, 30, 55, 34, 60, 36, 65, 39, 52, 55, 26, 40, 52, 29,
 41, 30, 28, 26, 58, 29, 48, 35, 26, 49, 34, 32, 31, 48, 40, 42, 48, 38, 53, 59, 28,
 41, 50, 31, 30, 59, 33, 35, 30, 71, 30, 24, 34, 34, 52, 33, 38, 41, 42, 38, 48, 34,
 46, 33, 40, 36, 32, 33, 55, 58, 25, 47, 40, 59, 40, 30, 25, 58, 39, 40, 38, 66, 47,
 37, 36, 50, 39.0, 58, 42, 58, 28, 41, 30, 32, 27, 48, 36, 54, 36, 52, 34, 43, 32, 3

3, 51, 39, 44, 49, 25, 39, 54, 32, 36, 54, 31, 45, 31, 45, 33, 46, 43, 50, 44, 42, 2
 6, 47, 48, 60, 27, 30, 28, 58, 37, 36, 39, 52, 55, 30, 36, 39, 47, 42, 42, 58, 68, 4
 3, 44, 49, 57, 61, 36, 31, 51, 31, 56, 30, 38, 35, 31, 39, 50, 39, 26, 55, 43, 34, 5
 1, 31, 32, 53, 44, 38, 47, 36, 30, 46, 33, 43, 38, 27, 38, 41, 29, 39, 42, 47, 30, 3
 4, 45, 43, 59, 50, 39, 36, 44, 36, 27, 29, 70, 44, 55, 36, 28, 50, 49, 71, 31, 45, 4
 2, 45, 47, 60, 35, 31, 33, 50, 51, 34, 56, 29, 31, 44, 55, 35, 36, 54, 32, 36, 60, 3
 2, 57, 34, 27, 52, 45, 58, 39, 48, 36, 31, 41, 30, 57, 29, 29, 30, 44, 33, 56, 26, 5
 2, 32, 36, 26, 37, 34, 26, 32, 30, 27, 42, 33, 37, 45, 36, 39, 33, 47, 49, 46, 31, 4
 3, 30, 43, 42, 30, 33, 41, 29, 38, 29, 39.0, 38, 36, 38, 44, 31, 31, 57, 37, 50, 60,
 51, 48, 42, 36, 43, 31, 49, 35, 44, 34, 46, 49, 32, 35, 51, 57, 59, 40, 49, 51, 35,
 29, 32, 37, 49, 45, 34, 53, 42, 43, 52, 34, 34, 27, 43, 41, 72, 35, 41, 36, 51, 37,
 42, 26, 23, 50, 37, 35, 37, 39.0, 39, 47, 44, 36, 33, 42, 35, 31, 58, 46, 41, 58, 3
 3, 31, 55, 38, 55, 47, 51, 46, 61, 47, 34, 34, 41, 36, 26, 35, 36, 26, 58, 50, 61, 2
 8, 49, 39.0, 53, 46, 47, 42, 56, 42, 49, 43, 39, 66, 30, 38, 31, 32, 48, 34, 28, 40,
 36, 52, 46, 25, 52, 40, 26, 26, 35, 40, 31, 32, 33, 53, 46, 28, 31, 44, 35, 50, 32,
 51, 51, 31, 41, 57, 34, 47, 47, 36, 29, 39, 53, 47, 51, 48, 32, 36, 50, 39, 31, 49,
 33, 26, 27, 51, 26, 45, 54, 49, 47, 42, 50, 37, 54, 40, 50, 57, 33, 49, 35, 28, 58,
 31, 36, 49, 30, 29, 50, 26, 27, 32, 62, 34, 25, 34, 44, 38, 57, 36, 41, 36, 27, 37,
 47, 31, 39, 35, 40, 38, 31, 36, 53, 59, 29, 30, 52, 55, 56, 32, 24, 51, 36, 36, 42,
 49, 48, 36, 48, 30, 27, 38, 36, 45, 44, 42, 37, 48, 57, 44, 48, 56, 37, 47, 54, 51,
 47, 25, 39, 40, 38, 34, 53, 32, 35, 24, 58, 49, 45, 55, 42, 28, 48, 51, 38, 27, 50,
 44, 40, 29, 34, 44, 50, 34, 54, 34, 34, 52, 60, 39, 58, 41, 48, 58, 40, 48, 52, 50,
 25, 54, 34, 48, 37, 66, 32, 45, 43, 41, 40, 44, 43, 30, 32, 57, 31, 49, 31, 41, 44,
 54, 37, 34, 43, 44, 44, 53, 36, 58, 26, 34, 55, 55, 34, 41, 38, 28, 41, 30, 39, 41,
 36, 37, 59, 26, 43, 42, 46, 31, 43, 48, 41, 32, 45, 52, 37, 38, 36, 58, 37, 30, 47,
 40, 42, 71, 54, 53, 33, 30, 39, 32, 34, 39, 39.0, 33, 40, 37, 69, 52, 31, 28, 29, 4
 6, 28, 41, 42, 34, 28, 43, 32, 33, 70, 36, 53, 30, 45, 31, 28, 45, 51, 53, 40, 53, 3
 1, 30, 53, 40, 26, 47, 51, 45, 35, 36, 57, 42, 32, 30, 36, 43, 69, 31, 35, 26, 46, 3
 0, 33, 34, 48, 31, 46, 40, 39, 33, 50, 39.0, 40, 55, 40, 46, 43, 34, 35, 57, 25, 32,
 52, 31, 34, 42, 47, 50, 30, 33, 56, 34, 33, 32, 34, 37, 30, 29, 56, 31, 59, 36, 51,
 54, 37, 32, 42, 29, 52, 40, 30, 55, 49, 33, 32, 21, 42, 56, 39, 30, 55, 43, 53, 57,
 39, 56, 29, 38, 59, 42, 46, 31, 35, 50, 42, 36, 25, 42, 27, 32, 57, 48, 34, 33, 26,
 50, 60, 47, 31, 52, 36, 43, 30, 32, 31, 29, 48, 32, 30, 48, 51, 34, 35, 49, 36, 37,
 37, 49, 44, 40, 57, 39, 38, 51, 27, 38, 30, 36, 37, 53, 38, 48, 26, 33, 47, 45, 32,
 69, 65, 37, 45, 36, 62, 37, 39, 38, 31, 58, 44, 31, 33, 36, 31, 45, 30, 34, 34, 39,
 41, 32, 32, 36, 35, 32, 33, 49, 35, 31, 42, 34, 32, 29, 32, 50, 58, 59, 25, 57, 30,
 26, 50, 39, 45, 37, 47, 50, 40, 35, 53, 35, 54, 35, 31, 46, 52, 34, 46, 54, 37, 39,
 50, 44, 56, 40, 36, 33, 33, 42, 30, 33, 26, 26, 37, 59, 49, 33, 46, 55, 49, 51, 27,
 44, 40, 36, 46, 30, 35, 31, 37, 49, 27, 32, 70, 22, 58, 33, 39.0, 50, 53, 37, 55, 4
 9, 41, 40, 48, 27, 30, 37, 37, 40, 73, 50, 53, 47, 33, 50, 51, 42, 34, 44, 32, 60, 6
 0, 29, 39, 47, 30, 31, 34, 51, 38, 47, 46, 33, 30, 40, 38, 63, 33, 59, 29, 54, 57, 5
 7, 28, 30, 28, 45, 29, 42, 31, 59, 41, 57, 43, 30, 26, 52, 32, 39, 31, 39.0, 34, 40,
 39, 50, 30, 43, 49, 41, 35, 57, 29, 48, 38, 41, 39, 31, 51, 35, 45, 28, 57, 36, 49,
 34, 65, 26, 52, 32, 33, 43, 26, 45, 30, 37, 45, 34, 35, 41, 42, 48, 45, 47, 37, 32,
 40, 35, 31, 36, 44, 52, 28, 45, 38, 39, 28, 31, 46, 22, 49, 44, 31, 53, 55, 35, 35,
 37, 50, 37, 37, 29, 31, 40, 47, 55, 33, 53, 38, 61, 43, 42, 36, 31, 59, 29, 33, 44,
 43, 42, 32, 43, 39, 23, 43, 46, 31, 38, 53, 37, 49, 31, 45, 58, 35, 32, 28, 26, 48,
 30, 31, 31, 45, 38, 34, 42, 60, 42, 32, 42, 33, 42, 51, 36, 46, 40, 49, 38, 32, 33,
 57, 57, 28, 44]

In [23]: `l=np.where(con3,median,age_data)`
 1

Out[23]: `array([30., 33., 35., ..., 57., 28., 44.])`

```
In [24]: #After chaingin value of outliers plot
bank_df["age_update"] = 1
bank_df[["age", "age_update"]]
```

Out[24]:

	age	age_update
0	30	30.0
1	33	33.0
2	35	35.0
3	30	30.0
4	59	59.0
...
4516	33	33.0
4517	57	57.0
4518	57	57.0
4519	28	28.0
4520	44	44.0

4521 rows × 2 columns

```
In [25]: #####data#####
age_data=bank_df["age"]
age_update_data=bank_df["age_update"]

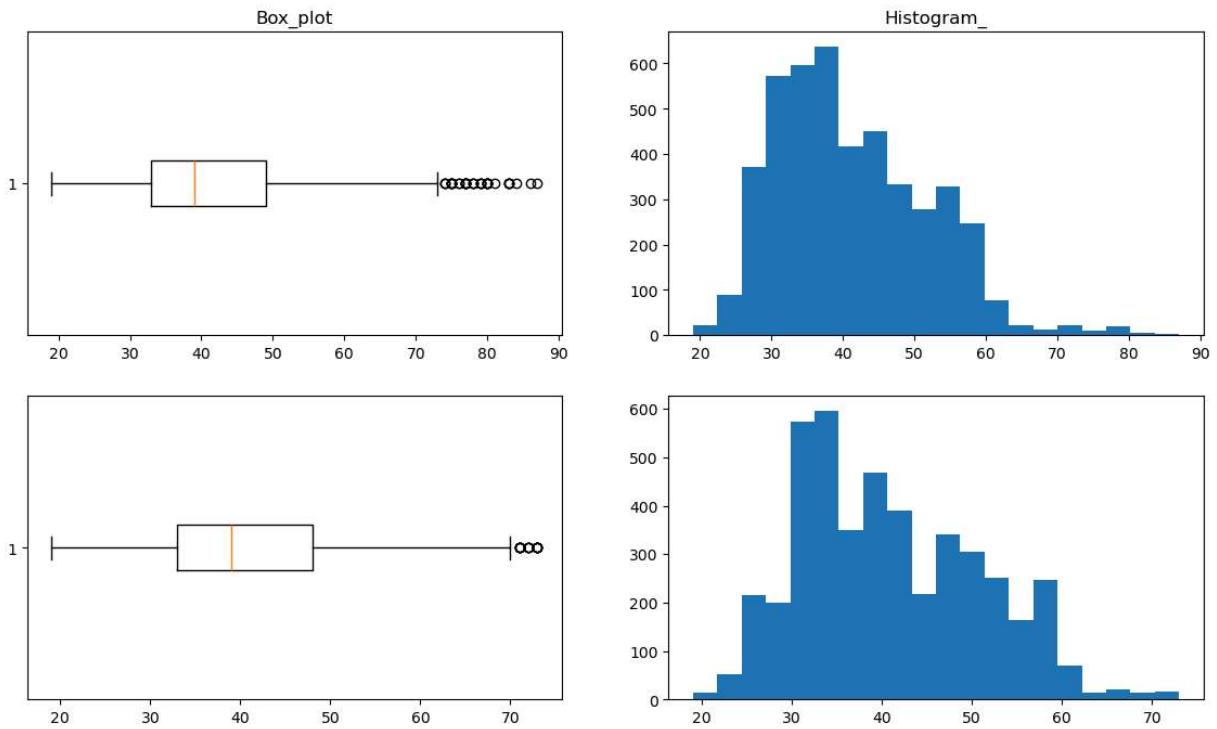
#####
plt.figure(figsize=(14,8))
plt.suptitle("comparing age coulmns ")

#####
plt.subplot(2,2,1)
plt.boxplot(age_data,vert=False)
plt.title("Box_plot")

plt.subplot(2,2,2)
plt.hist(age_data,bins=20)
plt.title("Histogram_")

#####
plt.subplot(2,2,3)
plt.boxplot(age_update_data,vert=False)
plt.subplot(2,2,4)
plt.hist(age_update_data,bins=20)
plt.show()
```

comparing age coulmns



In []: