In [1]:
```
# Import the packages
# read the data

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

path=r"C:\Users\omkar\OneDrive\Documents\Data science\Naresh IT\Datafiles\V
visa_df=pd.read_csv(path)
visa_df.head(3)
```

Out[1]:

	case_id	continent	education_of_employee	has_job_experience	requires_job_training	no_
0	EZYV01	Asia	High School	N	N	
1	EZYV02	Asia	Master's	Y	N	
2	EZYV03	Asia	Bachelor's	N	Y	

Steps in Outlier analysis

- Step-1: Find the Q1 , Q2 and Q3
  - np.percentile(column data, q)
- Step-2: Calculate the IQR
  - IQR= Q3-Q1
- Step-3: Calculate lower boundary and upper boundary
  - lb: Q1-1.5IQR
  - ub: Q3+1.5IQR
- Step-4: Find the Outliersdf
  - c1: column data < lb
  - c2: column data > ub
  - c: apply the main condition
  - main data[c]

In [3]:
```
#####------------- Step-1------###########
Q1=np.percentile(visa_df['prevailing_wage'],25)
Q2=np.percentile(visa_df['prevailing_wage'],50)
Q3=np.percentile(visa_df['prevailing_wage'],75)

#####------------- Step-2------###########
IQR=Q3-Q1

#####------------- Step-3------###########
lb=Q1-1.5*IQR
ub=Q3+1.5*IQR

#####------------- Step-4------###########
c1=visa_df['prevailing_wage']<lb
c2=visa_df['prevailing_wage']>ub
con=c1|c2
#####------------- Step-5------###########
outliers_df=visa_df[con]
outliers_df

#####------------- Step-6------###########
c1=visa_df['prevailing_wage']>lb
c2=visa_df['prevailing_wage']<ub
con=c1&c2
non_outliers_df=visa_df[c1&c2]
non_outliers_df
```

Out[3]:

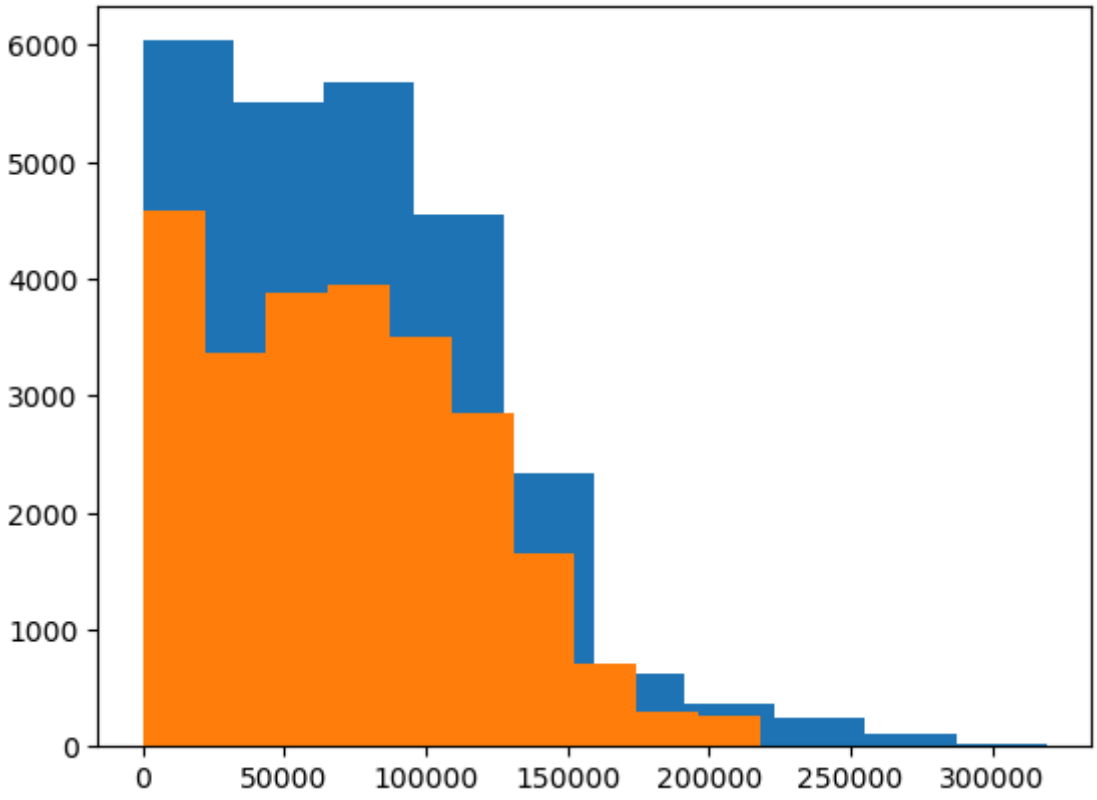
	case_id	continent	education_of_employee	has_job_experience	requires_job_traini
0	EZYV01	Asia	High School	N	
1	EZYV02	Asia	Master's	Y	
2	EZYV03	Asia	Bachelor's	N	
3	EZYV04	Asia	Bachelor's	N	
4	EZYV05	Africa	Master's	Y	
...	...	...	...	...	
25474	EZYV25475	Africa	Doctorate	N	
25475	EZYV25476	Asia	Bachelor's	Y	
25477	EZYV25478	Asia	Master's	Y	
25478	EZYV25479	Asia	Master's	Y	
25479	EZYV25480	Asia	Bachelor's	Y	

25053 rows × 12 columns

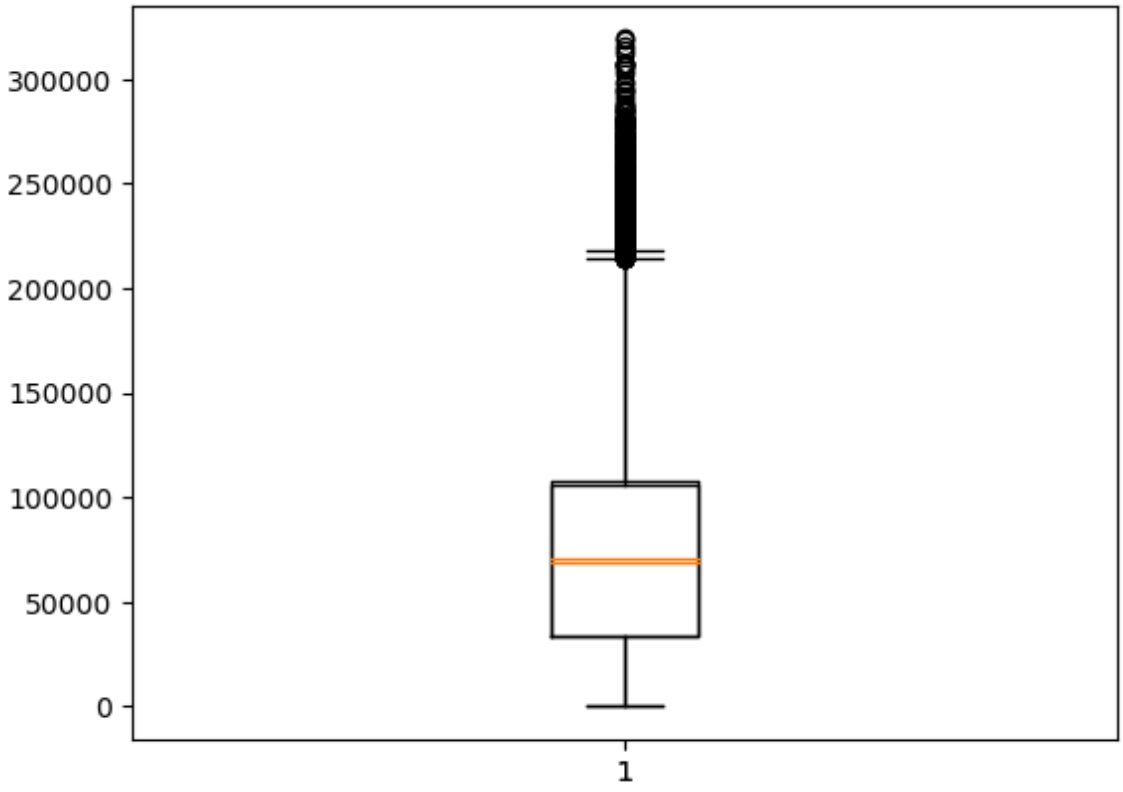
Compare original data with non outliers data

will plot histogram and box plot of the both

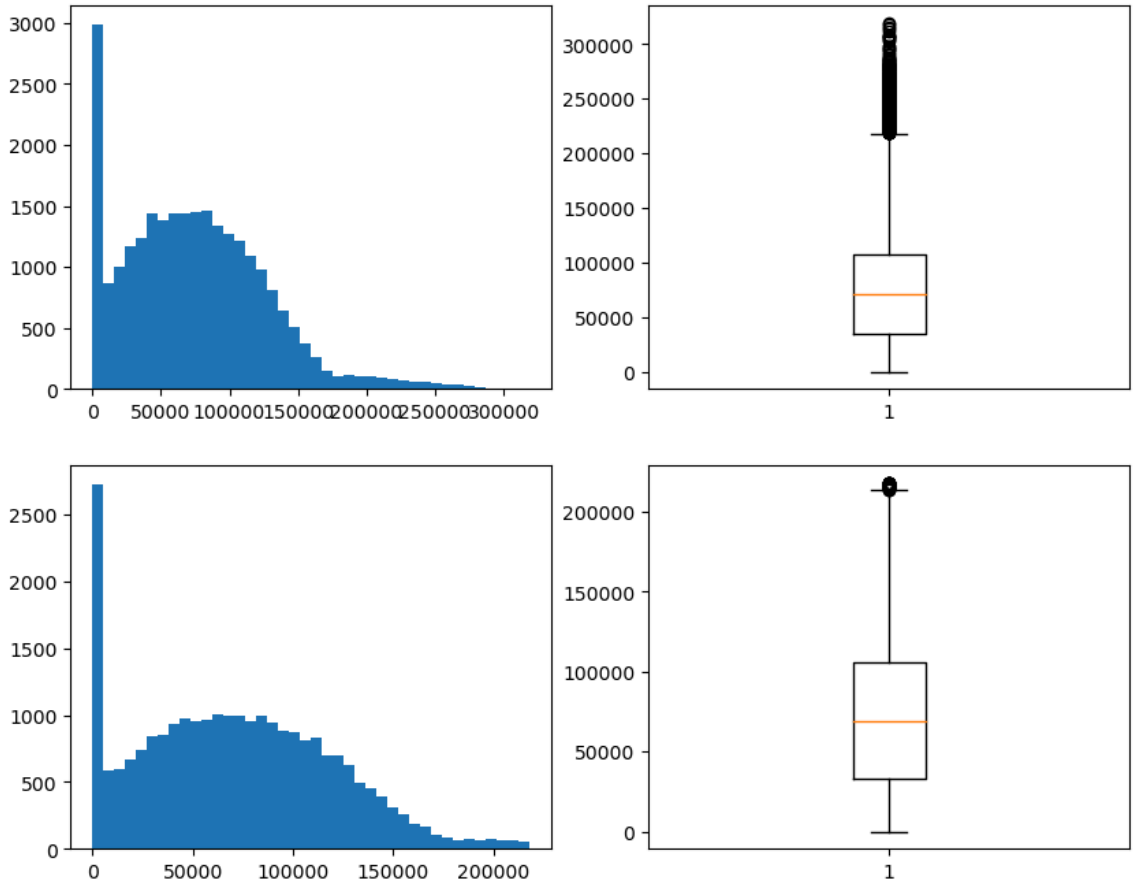
In [5]:
```
plt.hist(visa_df['prevailing_wage'])
plt.hist(non_outliers_df['prevailing_wage'])
plt.show()
```



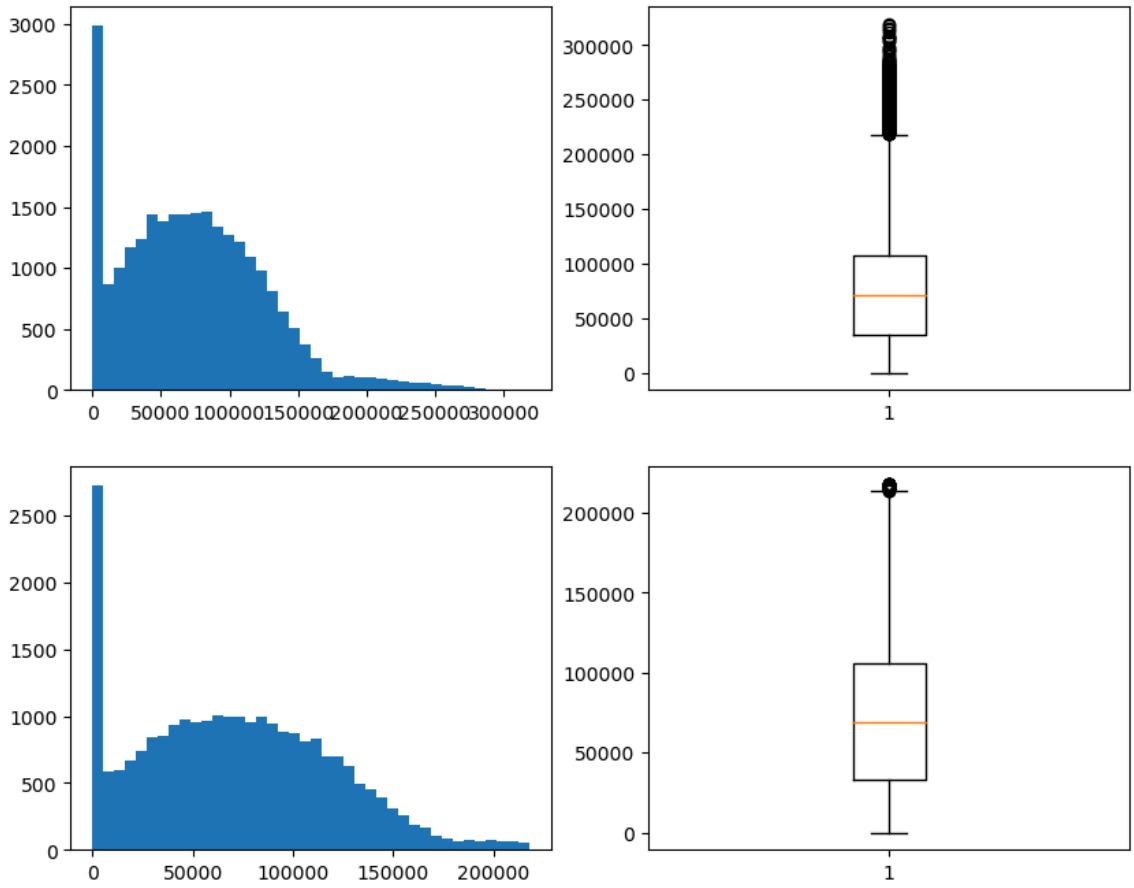
In [6]:
```
plt.boxplot(visa_df['prevailing_wage'])
plt.boxplot(non_outliers_df['prevailing_wage'])
plt.show()
```



In [13]:
```
plt.figure(figsize=(10,8))
plt.subplot(2,2,1)
plt.hist(visa_df['prevailing_wage'],bins=40)
plt.subplot(2,2,2)
plt.boxplot(visa_df['prevailing_wage'])
plt.subplot(2,2,3)
plt.hist(non_outliers_df['prevailing_wage'],bins=40)
plt.subplot(2,2,4)
plt.boxplot(non_outliers_df['prevailing_wage'])
plt.show()
```



In [17]:
```
plt.figure(figsize=(10,8))
plt.subplot(2,2,1).hist(visa_df['prevailing_wage'],bins=40)
plt.subplot(2,2,2).boxplot(visa_df['prevailing_wage'])
plt.subplot(2,2,3).hist(non_outliers_df['prevailing_wage'],bins=40)
plt.subplot(2,2,4).boxplot(non_outliers_df['prevailing_wage'])
plt.show()
```



How to deal outliers

Drop the outliers

- we can drop the outliers if outlier percentage < 2%
- But this is not recommended , we lost other columns data also

Impute with Median values

- As we know that Median does not affect by outliers
- So it is good prcatice we can impute outliers with Median value

Cap with Q3 or Q1 value

- If outliers are presnt less than lower bound then fill with Q1
- If outliers are more than upper bound then fill with Q3

In [ ]:
```
# Task 3
# Read the each observation from prevailing wage
# if that observation <lb or >ub : fill with median value
# else: keep as it is


# take empty list =[]
# median= visa_df['pwage'].medain()
# for  i in visa_df['pwage']:
#     if i<lb or i>ub:
#        emptylist.append(median)
#     else:
#        emptylist.append(i)

# 25480
```

In [1]:
```
# Import the packages
# Read the data


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

path=r"C:\Users\omkar\OneDrive\Documents\Data science\Naresh IT\Datafiles\Vi
visa_df=pd.read_csv(path)
visa_df.head(3)
```

Out[1]:

	case_id	continent	education_of_employee	has_job_experience	requires_job_training	no_
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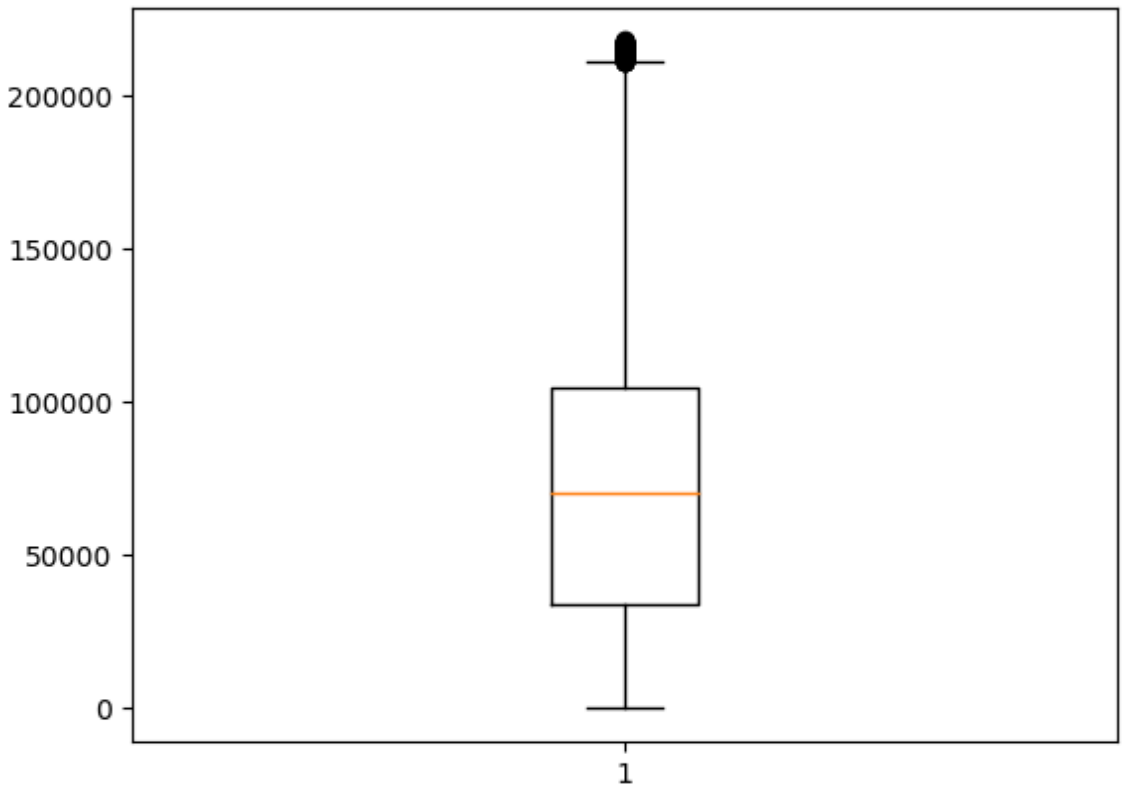
1	EZYV02	Asia	Master's	Y	N	
2	EZYV03	Asia	Bachelor's	N	Y	

In [3]:
```
#####------------- Step-1------###########
Q1=np.percentile(visa_df['prevailing_wage'],25)
Q2=np.percentile(visa_df['prevailing_wage'],50)
Q3=np.percentile(visa_df['prevailing_wage'],75)

#####------------- Step-2------###########
IQR=Q3-Q1

#####------------- Step-3------###########
lb=Q1-1.5*IQR
ub=Q3+1.5*IQR

median=visa_df['prevailing_wage'].median()

list1=[]
for i in visa_df['prevailing_wage']:
    if i<lb or i>ub:
        list1.append(median)
    else:
        list1.append(i)

visa_df['prevailing_wage_new']=list1
```

In [5]:
```
plt.boxplot(visa_df['prevailing_wage_new'])
plt.show()
```



np.where

In [ ]:
```
# Read the data again

path=r"C:\Users\omkar\OneDrive\Documents\Data science\Naresh IT\Datafiles\V
visa_df=pd.read_csv(path)
visa_df.head(3)
```

- above replace one we use a traditional approach
- for loop, list, if-else
- the same we can get by using np.where method

In [12]:
```
dict1={'Name':['A','B','C','D'],
       'Num':[1,2,3,4]}
d=pd.DataFrame(dict1)
d
d['Num']>2
```

Out[12]:
```
0    False
1    False
2     True
3     True
Name: Num, dtype: bool
```

In [10]:
```
# I want to replace with 100 num which has >2
# other wise keep same number
l=[]
for i in d['Num']:
    if i>2:
        l.append(100)
    else:
        l.append(i)
d['Num']=l
d

# How many condition  i>2 if it is True ==== one value
#                         if it is false ==== another
```

Out[10]:

	Name	Num
0	A	1
1	B	2
2	C	100
3	D	100

np.where(con,True,False)

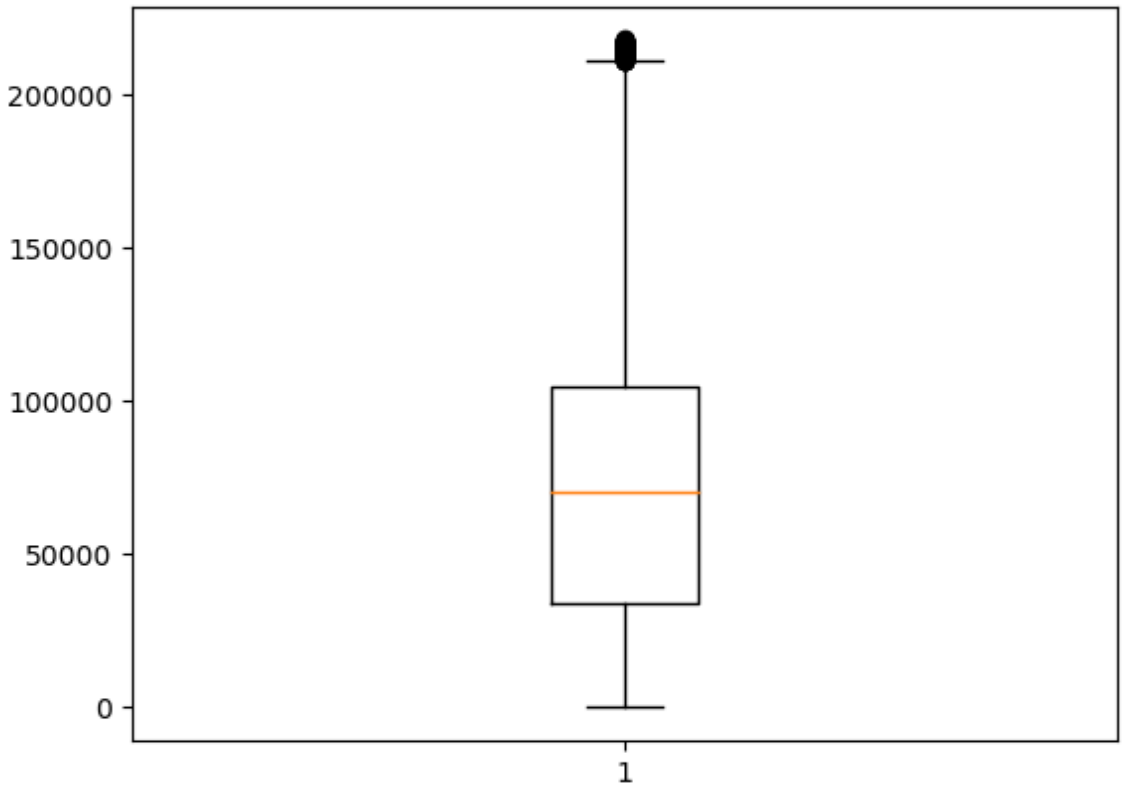
- Will take 3 arguments
  - Condition
    - con= d['Num']>2
  - True value
    - t=100
  - False value
    - f= d['Num']

In [14]:
```
l=np.where(d['Num']>2,100,d['Num'])

d['Num']=l
d
```

Out[14]:

	Name	Num
0	A	1
1	B	2
2	C	100
3	D	100

In [16]:
```
#####------------- Step-1------###########
Q1=np.percentile(visa_df['prevailing_wage'],25)
Q2=np.percentile(visa_df['prevailing_wage'],50)
Q3=np.percentile(visa_df['prevailing_wage'],75)

#####------------- Step-2------###########
IQR=Q3-Q1

#####------------- Step-3------###########
lb=Q1-1.5*IQR
ub=Q3+1.5*IQR

median=visa_df['prevailing_wage'].median()

c1=visa_df['prevailing_wage']<lb
c2=visa_df['prevailing_wage']>ub
con=c1|c2

t=median
f=visa_df['prevailing_wage']

visa_df['prevailing_wage']=np.where(con,t,f)
plt.boxplot(visa_df['prevailing_wage'])
plt.show()
```



In [15]:
```
dict1={'Name':['A','B','C','D'],'Num':[1,2,3,4]}
d1=pd.DataFrame(dict1)
d1
l=[]
for i in d1['Num']:
    if i >2:
        l.append(100)
    else:
        l.append(i)
d1['Num']=l
d1
```

Out[15]:

	Name	Num
0	A	1
1	B	2
2	C	100
3	D	100

In [ ]:
```

```