Import required packages

In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

Read the data

In [2]:
```
file_location="C:\\Users\\omkar\\OneDrive\\Documents\\Data science\\Naresh I
visa_df=pd.read_csv(file_location)
visa_df.head()
```

Out[2]:

	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	
3	EZYV04	Asia	Bachelor's	N	N	
4	EZYV05	Africa	Master's	Y	N	

In [3]:
```
visa_df.dtypes
```

Out[3]:
```
case_id                  object
continent                object
education_of_employee    object
has_job_experience       object
requires_job_training    object
no_of_employees           int64
yr_of_estab               int64
region_of_employment     object
prevailing_wage         float64
unit_of_wage             object
full_time_position       object
case_status              object
dtype: object
```

$prevailing - wage$

In [4]:
```
p_wage=visa_df['prevailing_wage']
p_wage
```

Out[4]:
```
0           592.2029
1         83425.6500
2        122996.8600
3         83434.0300
4        149907.3900
             ...
25475     77092.5700
25476    279174.7900
25477    146298.8500
25478     86154.7700
25479     70876.9100
Name: prevailing_wage, Length: 25480, dtype: float64
```

- count
- max
- min
- mean
- median
- 25p
- 50p
- 75p

In [5]:
```
p_wage.count()
```

Out[5]:
```
25480
```

In [6]:
```
p_wage=visa_df[['prevailing_wage']]
p_wage.count().iloc[0]

p_wage=visa_df['prevailing_wage']
p_wage.count()
```

Out[6]:
```
25480
```

In [7]:
```
p_wage=visa_df['prevailing_wage']
wage_count=p_wage.count()
wage_mean=round(p_wage.mean(),2)
wage_median=round(p_wage.median(),2)
wage_max=round(p_wage.max(),2)
wage_min=round(p_wage.min(),2)
# print(wage_count)
# print(wage_mean)
# print(wage_median)
# print(wage_max)
# print(wage_min)

list1=[wage_count,wage_max,wage_min,wage_mean,wage_median]
index_list=['count','max','min','mean','median']
pd.DataFrame(list1,
             columns=['prevailing_wage'],
             index=index_list)
```

Out[7]:

	prevailing_wage
count	25480.00
max	319210.27
min	2.14
mean	74455.81
median	70308.21

In [8]:
```
# Numerical columns seperaetly
num_cols=visa_df.select_dtypes(exclude='object').columns
dict1={}
for i in num_cols:
    count=visa_df[i].count()
    mean=round(visa_df[i].mean(),2)
    median=round(visa_df[i].median(),2)
    maxx=round(visa_df[i].max(),2)
    minn=round(visa_df[i].min(),2)
    list1=[count,maxx,minn,mean,median]
    dict1[i]=list1
index_list=['count','max','min','mean','median']
numer_df=pd.DataFrame(dict1,index=index_list)
numer_df.to_csv("numer_df.csv")
numer_df
```

Out[8]:

	no_of_employees	yr_of_estab	prevailing_wage
count	25480.00	25480.00	25480.00
max	602069.00	2016.00	319210.27
min	-26.00	1800.00	2.14
mean	5667.04	1979.41	74455.81
median	2109.00	1997.00	70308.21

In [9]:
```
visa_df.describe()
```

Out[9]:

	no_of_employees	yr_of_estab	prevailing_wage
count	25480.000000	25480.000000	25480.000000
mean	5667.043210	1979.409929	74455.814592
std	22877.928848	42.366929	52815.942327
min	-26.000000	1800.000000	2.136700
25%	1022.000000	1976.000000	34015.480000
50%	2109.000000	1997.000000	70308.210000
75%	3504.000000	2005.000000	107735.512500
max	602069.000000	2016.000000	319210.270000

In [10]:
```
p_wage=visa_df['prevailing_wage']
wage_count=p_wage.count()
wage_mean=round(p_wage.mean(),2)
wage_median=round(p_wage.median(),2)
wage_max=round(p_wage.max(),2)
wage_min=round(p_wage.min(),2)
wage_std=round(p_wage.std(),2)

list1=[wage_count,wage_max,wage_min,
       wage_mean,wage_median,wage_std]
index_list=['count','max','min','mean','median','std']
pd.DataFrame(list1,
             columns=['prevailing_wage'],
             index=index_list)
```

Out[10]:

	prevailing_wage
count	25480.00
max	319210.27
min	2.14
mean	74455.81
median	70308.21
std	52815.94

In [ ]:
```
# what ever we did  the calculations on above
# by using pandas dataframe way
# the same we can achieve by numpy package also
```

In [11]:
```
# wage_mean=round(p_wage.mean(),2)=== pandas
p_wage=visa_df['prevailing_wage']
np.mean(p_wage)
np.median(p_wage)
np.max(p_wage)
np.min(p_wage)
np.std(p_wage)
```

Out[11]: 74455.81459209183

percentile-quantile

- In the numpy package we have np.percentile() and np.quantile()
- percentile: if you want to 25p 25
- quantile: q1=25p (0.25) q2=50p q3=75p
- Assume that a student got 120 Marks 95P
- 95% of students has marks below 120

In [12]:
```
np.percentile(p_wage,25)
```

Out[12]:
```
34015.479999999996
```

In [15]:
```
np.quantile(p_wage,0.25)
```

Out[15]:
```
34015.479999999996
```

In [16]:
```
p_wage=visa_df['prevailing_wage']
########### Pandas series #####################
wage_count=p_wage.count()
wage_mean=round(p_wage.mean(),2)
wage_median=round(p_wage.median(),2)
wage_max=round(p_wage.max(),2)
wage_min=round(p_wage.min(),2)
wage_std=round(p_wage.std(),2)
######### Numpy ############################
wage_25p=round(np.percentile(p_wage,25),2)
wage_50p=round(np.percentile(p_wage,50),2)
wage_75p=round(np.percentile(p_wage,75),2)

list1=[wage_count,wage_max,wage_min,
       wage_mean,wage_median,wage_std,
       wage_25p,wage_50p,wage_75p]

index_list=['count','max','min','mean',
            'median','std','25%','50%','75%']
pd.DataFrame(list1,
             columns=['prevailing_wage'],
             index=index_list)
```

Out[16]:

	prevailing_wage
count	25480.00
max	319210.27
min	2.14
mean	74455.81
median	70308.21
std	52815.94
25%	34015.48
50%	70308.21
75%	107735.51

In [17]:
```
# Numerical columns seperaetly
num_cols=visa_df.select_dtypes(exclude='object').columns
dict1={}
for i in num_cols:
    count=visa_df[i].count()
    mean=round(visa_df[i].mean(),2)
    median=round(visa_df[i].median(),2)
    maxx=round(visa_df[i].max(),2)
    minn=round(visa_df[i].min(),2)
    std=round(visa_df[i].std(),2)
    p25=round(np.percentile(visa_df[i],25),2)
    p50=round(np.percentile(visa_df[i],50),2)
    p75=round(np.percentile(visa_df[i],75),2)
    list1=[count,maxx,minn,mean,median,std,p25,p50,p75]
    dict1[i]=list1
index_list=['count','max','min','mean',
            'median','std','25%','50%','75%']
numer_df=pd.DataFrame(dict1,index=index_list)
numer_df.to_csv("numer_df.csv")
numer_df
```

Out[17]:

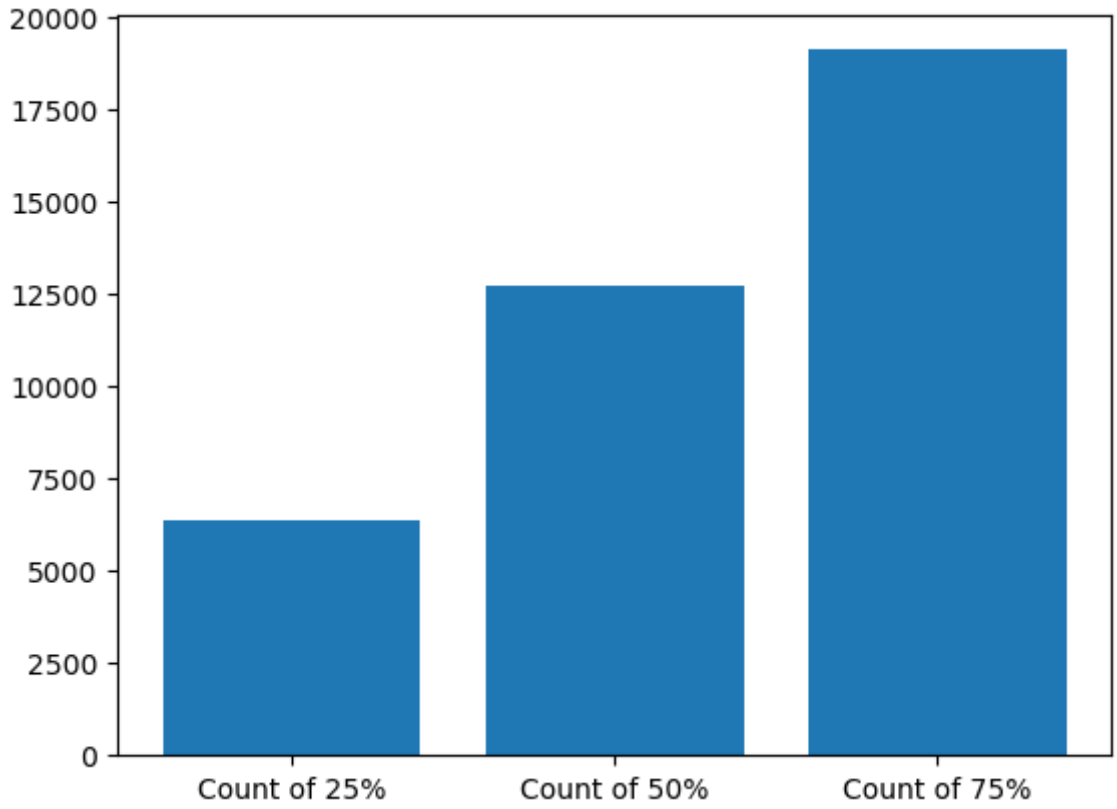
	no_of_employees	yr_of_estab	prevailing_wage
count	25480.00	25480.00	25480.00
max	602069.00	2016.00	319210.27
min	-26.00	1800.00	2.14
mean	5667.04	1979.41	74455.81
median	2109.00	1997.00	70308.21
std	22877.93	42.37	52815.94
25%	1022.00	1976.00	34015.48
50%	2109.00	1997.00	70308.21
75%	3504.00	2005.00	107735.51

In [29]:
```
#pwage 25p = 34015

#25% of total employees has wages below 34015

#100
#25 members salary  < 34k

50*(25480)/100

#6370 employees has wages less than 34015
#12740 employees has wages less than 70308.21
```

Out[29]: 12740.0

In [37]:
```
p_wage=visa_df['prevailing_wage']
count_25p=len(p_wage[p_wage<np.percentile(p_wage,25)])
count_50p=len(p_wage[p_wage<np.percentile(p_wage,50)])
count_75p=len(p_wage[p_wage<np.percentile(p_wage,75)])

l1=['Count of 25%','Count of 50%','Count of 75%']
l2=[count_25p,count_50p,count_75p]
d1=pd.DataFrame(zip(l1,l2),columns=['Till per','Count'])
plt.bar('Till per','Count',data=d1)
```

Out[37]:
```
<BarContainer object of 3 artists>
```



In [ ]:
```
# You want to extract a dataframe
# which has wages less than 34015(25p)

# 100     25 mem     34k
```

In [42]:
```
# step-1:  take the reference column first
# Step-2: apply the condition
#         it will provide True or Flase
# Step-3: Apply the original dataframe on top of that
#         So that it will give only True values

p_wage=visa_df['prevailing_wage']
p_25=np.percentile(p_wage,25)
con=p_wage<p_25
visa_df[con]

visa_df[visa_df['prevailing_wage']<34015]
```

Out[42]:

	case_id	continent	education_of_employee	has_job_experience	requires_job_traini
0	EZYV01	Asia	High School	N	
7	EZYV08	North America	Bachelor's	Y	
12	EZYV13	Asia	Bachelor's	Y	
16	EZYV17	Europe	Master's	Y	
17	EZYV18	Asia	Master's	Y	
...	...	...	...	...	
25461	EZYV25462	Asia	Master's	Y	
25465	EZYV25466	North America	High School	N	
25466	EZYV25467	Europe	Bachelor's	Y	
25470	EZYV25471	North America	Master's	Y	
25473	EZYV25474	Asia	Bachelor's	Y	

6370 rows × 12 columns

In [43]:
```
p_wage=visa_df['prevailing_wage']
p_50=np.percentile(p_wage,50)
con=p_wage<p_50
visa_df[con]
```

Out[43]:

	case_id	continent	education_of_employee	has_job_experience	requires_job_traini
0	EZYV01	Asia	High School	N	
6	EZYV07	Asia	Bachelor's	N	
7	EZYV08	North America	Bachelor's	Y	
9	EZYV10	Europe	Doctorate	Y	
12	EZYV13	Asia	Bachelor's	Y	
...	...	...	...	...	
25465	EZYV25466	North America	High School	N	
25466	EZYV25467	Europe	Bachelor's	Y	
25470	EZYV25471	North America	Master's	Y	
25473	EZYV25474	Asia	Bachelor's	Y	
25474	EZYV25475	Africa	Doctorate	N	

12740 rows × 12 columns

In [48]:
```
# between 25p  to   50p
# between 34k  to   70k
# >25p and <50p
p_wage=visa_df['prevailing_wage']
p_25=np.percentile(p_wage,25)
p_50=np.percentile(p_wage,50)

# between 25p  to   50p

con1=p_wage>p_25
con2=p_wage<p_50

visa_df[con1&con2]

#visa_df[(visa_df['prevailing_wage']>34015)&(visa_df['prevailing_wage']<700
```

Out[48]:

	case_id	continent	education_of_employee	has_job_experience	requires_job_traini
6	EZYV07	Asia	Bachelor's	N	
9	EZYV10	Europe	Doctorate	Y	
22	EZYV23	Asia	Master's	Y	
28	EZYV29	Asia	Master's	Y	
38	EZYV39	Asia	Bachelor's	Y	
...	...	...	...	...	
25449	EZYV25450	Asia	Bachelor's	Y	
25454	EZYV25455	Asia	Bachelor's	N	
25456	EZYV25457	Asia	Bachelor's	Y	
25459	EZYV25460	Asia	High School	Y	
25474	EZYV25475	Africa	Doctorate	N	

6308 rows × 12 columns

In [45]:
```
till 50 =12740
till 25 =6370
between 25 to 50 = 12740-6370=6370
```

Out[45]: 6370

In [49]:
```
p_wage =visa_df['prevailing_wage']
p_25 = np.percentile(p_wage,25)
p_75 = np.percentile(p_wage,75)
con_1 = p_wage<p_25
con_2 = p_wage>p_75
visa_df[con_1 | con_2]
```

Out[49]:

	case_id	continent	education_of_employee	has_job_experience	requires_job_traini
0	EZYV01	Asia	High School	N	
2	EZYV03	Asia	Bachelor's	N	
4	EZYV05	Africa	Master's	Y	
7	EZYV08	North America	Bachelor's	Y	
12	EZYV13	Asia	Bachelor's	Y	
...	...	...	...	...	
25469	EZYV25470	North America	Master's	Y	
25470	EZYV25471	North America	Master's	Y	
25473	EZYV25474	Asia	Bachelor's	Y	
25476	EZYV25477	Asia	High School	Y	
25477	EZYV25478	Asia	Master's	Y	

12740 rows × 12 columns

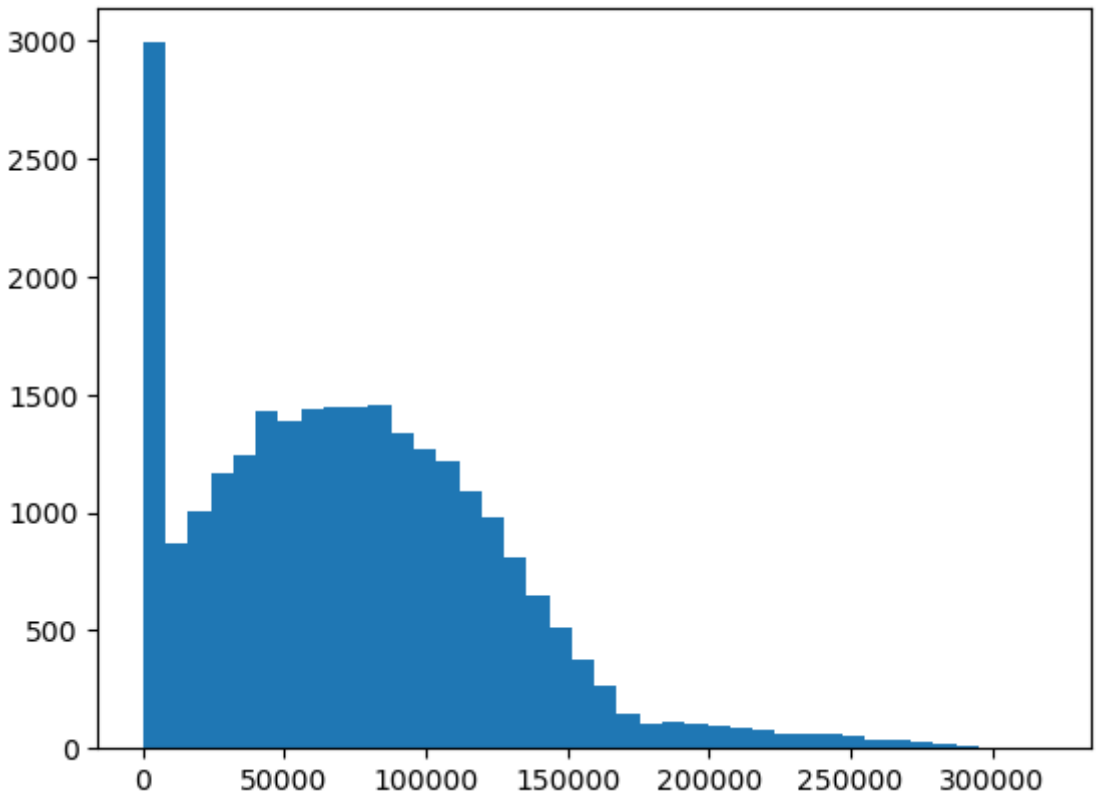
In [ ]:
```
# You are good at writing the conditions
```

Histogram

- From raw data will make class intervals
- Will count the observations in each class intervals
- Freqiency distribution table
- Plot of Frequency distribution table is Hitogram

In [62]:
```
p_wage=visa_df['prevailing_wage']
freq,interval,n=plt.hist(p_wage,bins=40)
freq,interval
```

Out[62]:
```
(array([2992.,  871., 1005., 1170., 1242., 1434., 1385., 1443., 1444.,
        1445., 1457., 1335., 1268., 1217., 1088.,  978.,  807.,  645.,
         509.,  373.,  264.,  144.,  105.,  111.,  107.,   99.,   88.,
          79.,   65.,   64.,   58.,   53.,   33.,   33.,   29.,   19.,
           7.,    3.,    6.,    5.]),
 array([2.13670000e+00, 7.98234003e+03, 1.59625434e+04, 2.39427467e+04,
        3.19229500e+04, 3.99031534e+04, 4.78833567e+04, 5.58635600e+04,
        6.38437634e+04, 7.18239667e+04, 7.98041700e+04, 8.77843734e+04,
        9.57645767e+04, 1.03744780e+05, 1.11724983e+05, 1.19705187e+05,
        1.27685390e+05, 1.35665593e+05, 1.43645797e+05, 1.51626000e+05,
        1.59606203e+05, 1.67586407e+05, 1.75566610e+05, 1.83546813e+05,
        1.91527017e+05, 1.99507220e+05, 2.07487423e+05, 2.15467627e+05,
        2.23447830e+05, 2.31428033e+05, 2.39408237e+05, 2.47388440e+05,
        2.55368643e+05, 2.63348847e+05, 2.71329050e+05, 2.79309253e+05,
        2.87289457e+05, 2.95269660e+05, 3.03249863e+05, 3.11230067e+05,
        3.19210270e+05]))
```



In [61]:
```
2.13670000e+00  #  2.13
7.98234003e+03  #  7982
```

Out[61]:
```
7982.34003
```

In [65]:
```
#2.13    to    7982.34003     (2992)

p_wage=visa_df['prevailing_wage']
con1=p_wage>2.13
con2=p_wage<7982.34003
len(visa_df[con1&con2])
```

Out[65]:
```
2992
```

In [66]:
```
p_wage=visa_df['prevailing_wage']
con1=p_wage>7.98234003e+03
con2=p_wage<1.59625434e+04
len(visa_df[con1&con2])
```

Out[66]:
```
871
```

In [75]:
```
# Histogram
# what do you want represent in graphical way

p_wage.values

# raw observations
# 25480 observations
# we are dividng into 40 intervals

l1=sorted(p_wage.values)
l1.index(2.1367) #0
l1.index()  #  2991   2992
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
Cell In[75], line 12
     10 l1=sorted(p_wage.values)
     11 l1.index(2.1367)
---> 12 l1.index(7.98234003e+03)

ValueError: 7982.34003 is not in list
```

In [76]:
```
freq
```

Out[76]:
```
array([2992.,  871., 1005., 1170., 1242., 1434., 1385., 1443., 1444.,
       1445., 1457., 1335., 1268., 1217., 1088.,  978.,  807.,  645.,
        509.,  373.,  264.,  144.,  105.,  111.,  107.,   99.,   88.,
         79.,   65.,   64.,   58.,   53.,   33.,   33.,   29.,   19.,
          7.,    3.,    6.,    5.])
```

In [77]:
```
interval
```

Out[77]:
```
array([2.13670000e+00, 7.98234003e+03, 1.59625434e+04, 2.39427467e+04,
       3.19229500e+04, 3.99031534e+04, 4.78833567e+04, 5.58635600e+04,
       6.38437634e+04, 7.18239667e+04, 7.98041700e+04, 8.77843734e+04,
       9.57645767e+04, 1.03744780e+05, 1.11724983e+05, 1.19705187e+05,
       1.27685390e+05, 1.35665593e+05, 1.43645797e+05, 1.51626000e+05,
       1.59606203e+05, 1.67586407e+05, 1.75566610e+05, 1.83546813e+05,
       1.91527017e+05, 1.99507220e+05, 2.07487423e+05, 2.15467627e+05,
       2.23447830e+05, 2.31428033e+05, 2.39408237e+05, 2.47388440e+05,
       2.55368643e+05, 2.63348847e+05, 2.71329050e+05, 2.79309253e+05,
       2.87289457e+05, 2.95269660e+05, 3.03249863e+05, 3.11230067e+05,
       3.19210270e+05])
```

In [80]:
```
pd.DataFrame(zip(freq,interval),columns=["Frequency","Intervel"])
```

Out[80]:

	Frequency	Intervel
0	2992.0	2.136700
1	871.0	7982.340033
2	1005.0	15962.543365
3	1170.0	23942.746698
4	1242.0	31922.950030
5	1434.0	39903.153363
6	1385.0	47883.356695
7	1443.0	55863.560028
8	1444.0	63843.763360
9	1445.0	71823.966693
10	1457.0	79804.170025
11	1335.0	87784.373358
12	1268.0	95764.576690
13	1217.0	103744.780023
14	1088.0	111724.983355
15	978.0	119705.186688
16	807.0	127685.390020
17	645.0	135665.593353
18	509.0	143645.796685
19	373.0	151626.000018
20	264.0	159606.203350
21	144.0	167586.406683
22	105.0	175566.610015
23	111.0	183546.813348
24	107.0	191527.016680
25	99.0	199507.220013
26	88.0	207487.423345
27	79.0	215467.626678
28	65.0	223447.830010
29	64.0	231428.033343
30	58.0	239408.236675
31	53.0	247388.440008
32	33.0	255368.643340
33	33.0	263348.846673
34	29.0	271329.050005
35	19.0	279309.253338
36	7.0	287289.456670
37	3.0	295269.660002
38	6.0	303249.863335

	Frequency	Intervel
39	5.0	311230.066668

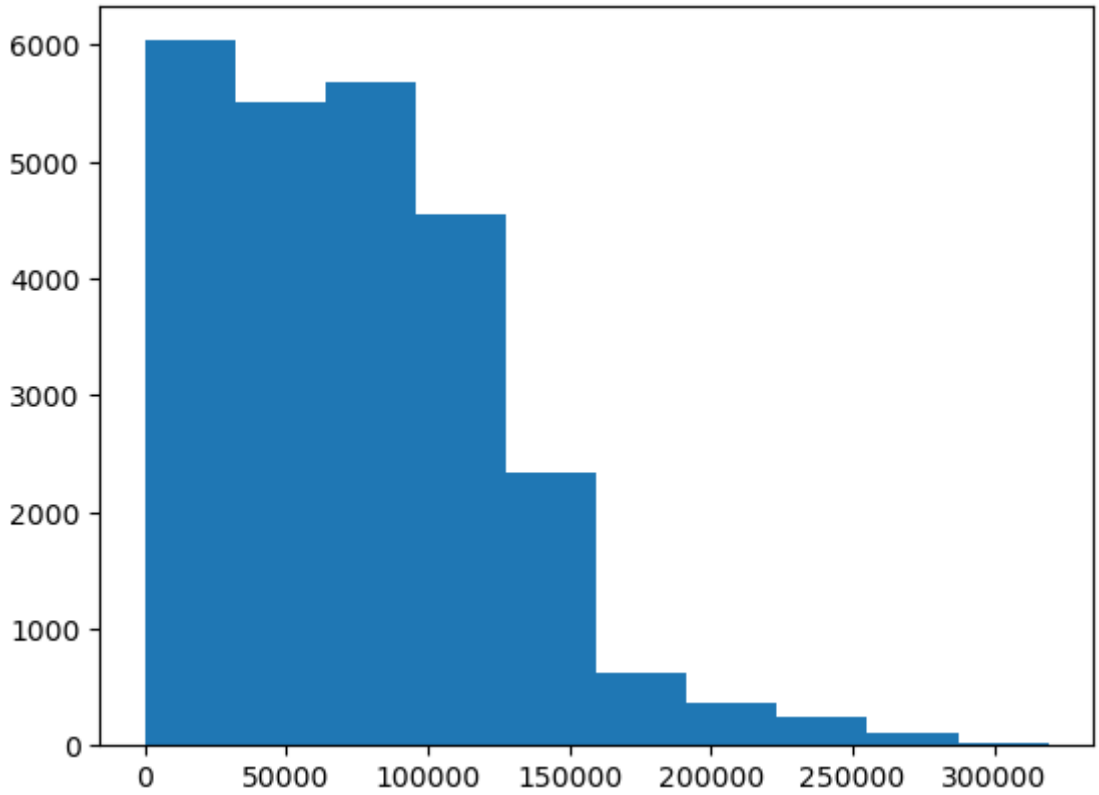
In [81]:
```
visa_df.describe()
```

Out[81]:

	no_of_employees	yr_of_estab	prevailing_wage
count	25480.000000	25480.000000	25480.000000
mean	5667.043210	1979.409929	74455.814592
std	22877.928848	42.366929	52815.942327
min	-26.000000	1800.000000	2.136700
25%	1022.000000	1976.000000	34015.480000
50%	2109.000000	1997.000000	70308.210000
75%	3504.000000	2005.000000	107735.512500
max	602069.000000	2016.000000	319210.270000

In [82]:
```
plt.hist(p_wage)
```

Out[82]:
```
(array([6038., 5504., 5681., 4551., 2334.,  624.,  373.,  240.,  114.,
         21.]),
 array([2.13670000e+00, 3.19229500e+04, 6.38437634e+04, 9.57645767e+04,
        1.27685390e+05, 1.59606203e+05, 1.91527017e+05, 2.23447830e+05,
        2.55368643e+05, 2.87289457e+05, 3.19210270e+05]),
 <BarContainer object of 10 artists>)
```



In [ ]: