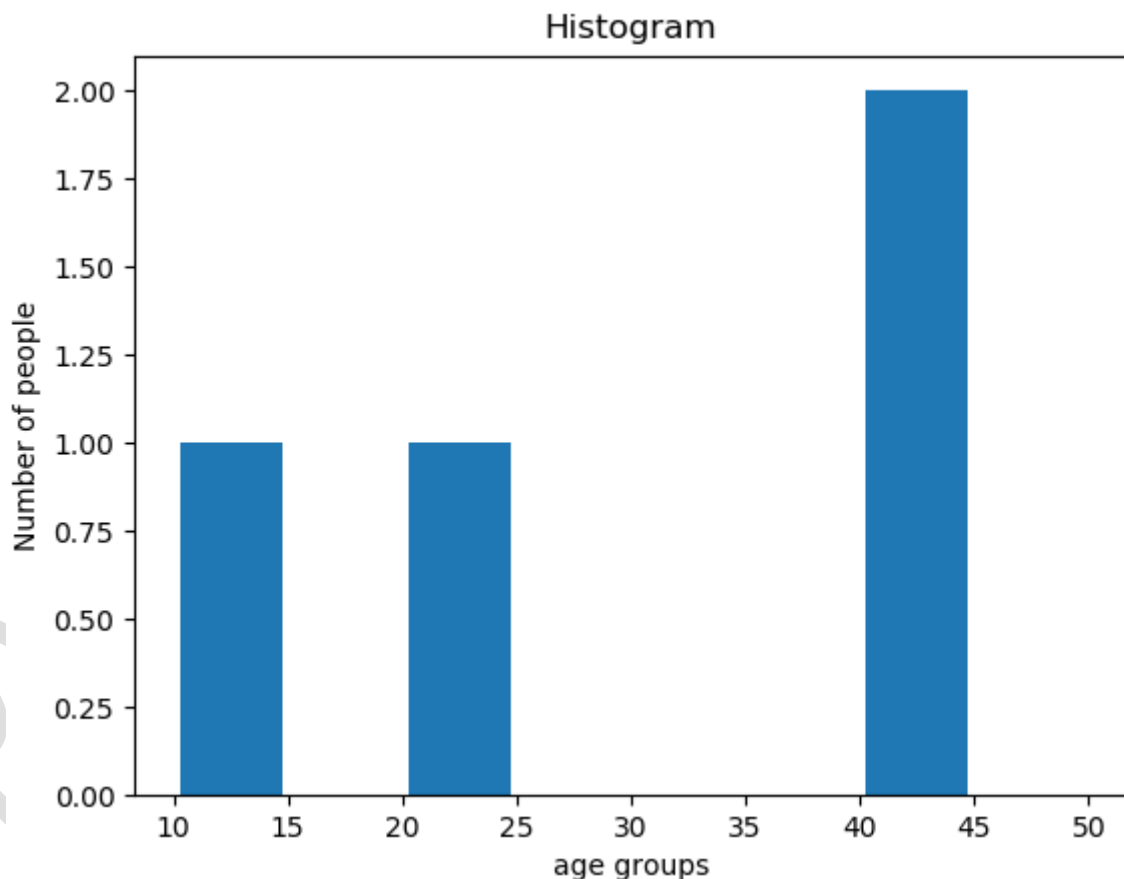


# HISTOGRAM AND QUANTILES

## PROGRAMS

#Histogram with bars for age group[10,15,20,25,30,35,40,45,50] and  
avarage\_age\_of\_population = [10,20,40,40]

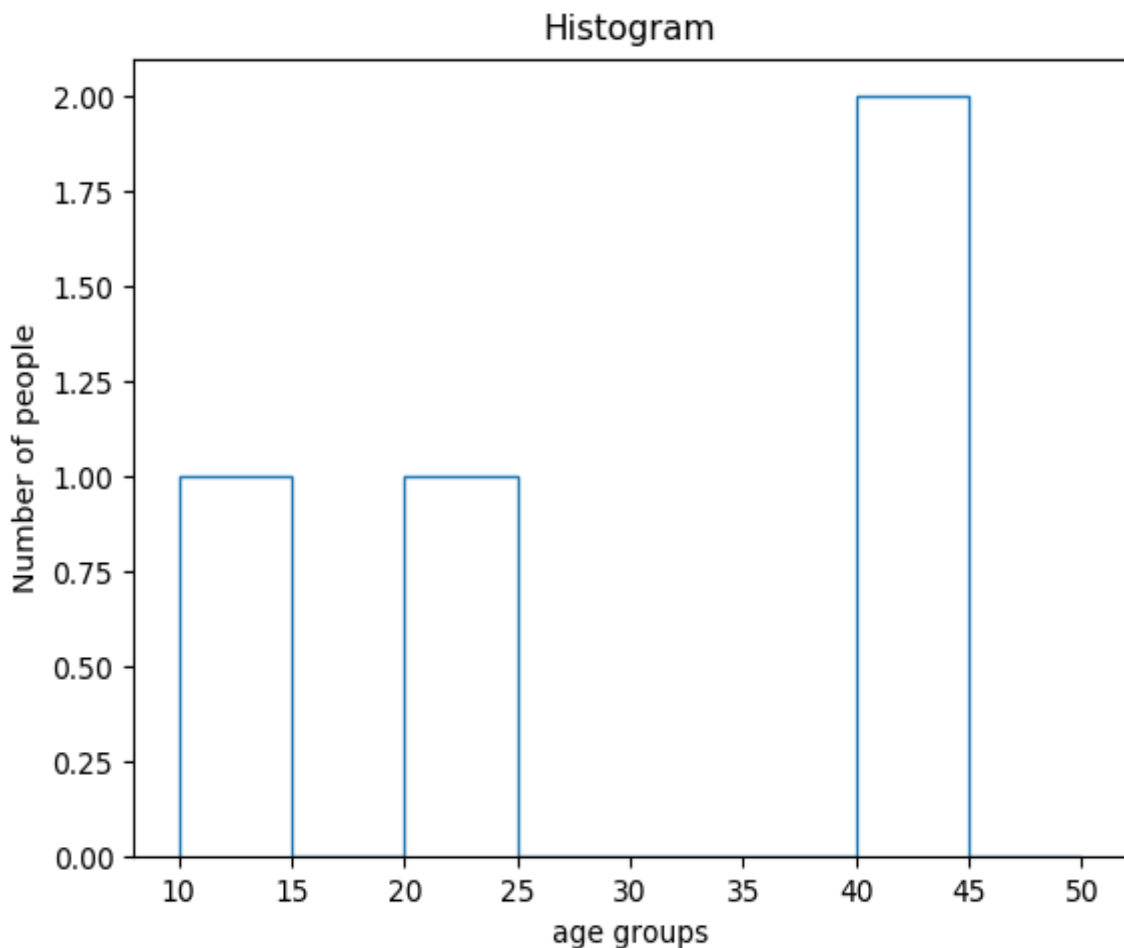
```
import matplotlib.pyplot as xyz
avarage_age_of_population = [10,20,40,40]
bins = [10,15,20,25,30,35,40,45,50]
xyz.hist(avarage_age_of_population, bins, histtype='bar',rwidth=0.9)
xyz.xlabel('age groups')
xyz.ylabel('Number of people')
xyz.title('Histogram')
xyz.show()
```



Note : above histogram is drawn with bars as per bins already decided for age group [10,15,20,25,30,35,40,45,50] and height of bars as 1 point for 10 and 20 because these values are for one time only and 2 point for 40 because it is for two times.

#Histogram with steps for age group[10,15,20,25,30,35,40,45,50]  
and avarage\_age\_of\_population = [10,20,40,40]

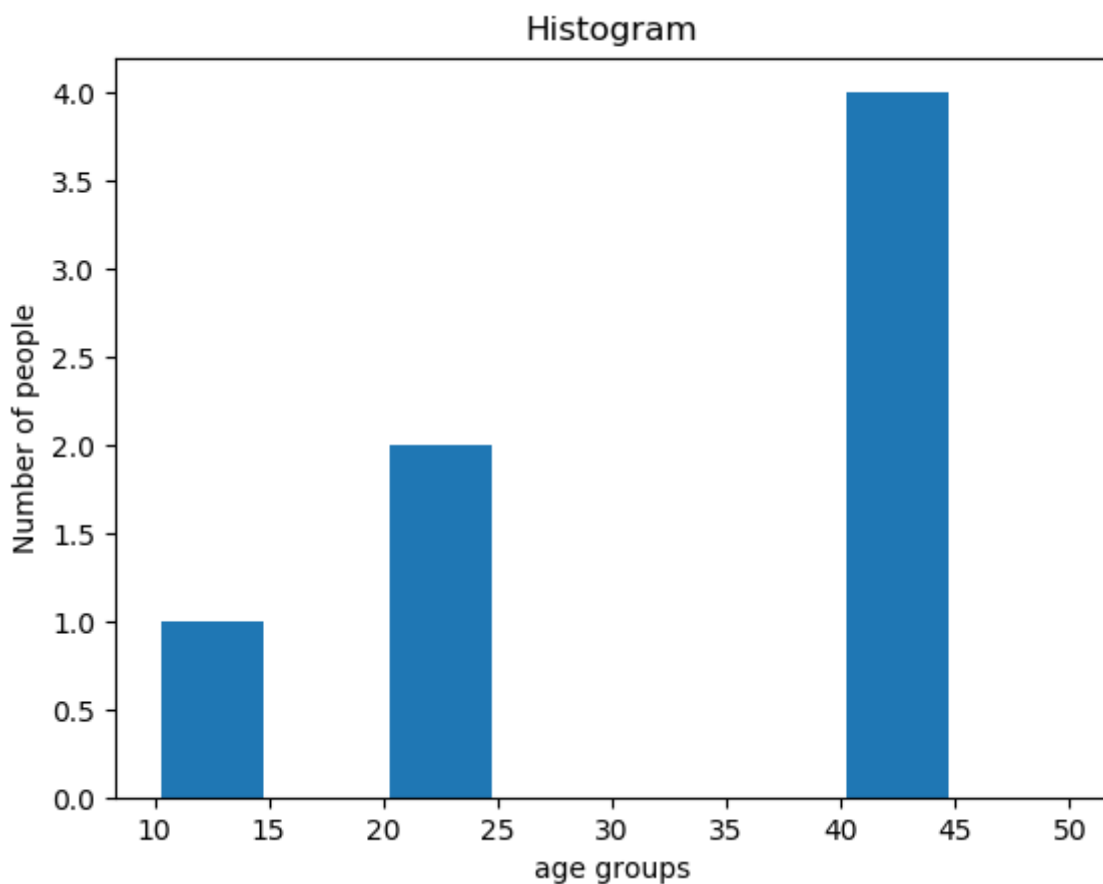
```
import matplotlib.pyplot as xyz
avarage_age_of_population = [10,20,40,40]
bins = [10,15,20,25,30,35,40,45,50]
xyz.hist(avarage_age_of_population, bins, histtype='step',rwidth=0.9)
xyz.xlabel('age groups')
xyz.ylabel('Number of people')
xyz.title('Histogram')
xyz.show()
```



Note : above histogram is drawn with steps as per bins already decided for age group [10,15,20,25,30,35,40,45,50] and height of bars as 1 point for 10 and 20 because these values are for one time only and 2 point for 40 because it is for two times.

Type of histtypes are histtype : {'bar', 'barstacked', 'step', 'stepfilled'}

```
#Histogram with bars for age group[10,15,20,25,30,35,40,45,50] and
avarage_age_of_population = [10,20,20,40,40,40,40]
import matplotlib.pyplot as xyz
avarage_age_of_population = [10,20,20,40,40,40,40]
bins = [10,15,20,25,30,35,40,45,50]
xyz.hist(avarage_age_of_population, bins, histtype='bar',rwidth=0.9)
xyz.xlabel('age groups')
xyz.ylabel('Number of people')
xyz.title('Histogram')
xyz.show()
```



Note : above histogram is drawn with bars as per bins already decided for age group [10,15,20,25,30,35,40,45,50] and height of bars as 1 point for 10 as 10 is one time only , 2 points for 20 because these values are for two time and 4 points for 40 because it is for four times.

#Program in python to find 0.25 quantile of series[1, 10, 100, 1000]

```
import pandas as pd
import numpy as np
s = pd.Series([1, 10, 100, 1000])
r=s.quantile(.25)
print(r)
```

Solution steps

1.  $q=0.25$  (0.25 quantile)     $n = 4$  (no of elements in series)

$$=(n-1)*q+1$$

$$=(4-1)*0.25+1$$

$$=3*0.25+1$$

$$=0.75+1$$

$$=1.75$$

2. Now integer part is  $a=1$  and fraction part is 0.75 and T is term.

Now formula for quantile is

$$=T1+b*(T2-T1)$$

$$=1+0.75*(10-1)$$

$$=1+0.75*9$$

$$=1+6.75$$

$$=7.75$$

Quantile is 7.75

**Note:-** That in series [1, 10, 100, 1000] 1 is at 1 position 10 is at 2, 100 is at 3 and so on. Here we are choosing T1 as 1 because at 1 position ( integer part of 1.75 is 1) value is 1(T1). here we are choosing value and then next fraction part is between 1 to 10, that is being found by  $0.75*(10-1)$ . Its result is 6.75 next to 1. That's why we are adding 1 with 6.75.