Exercise : Range and IQR

Percentile Range

"Percentile" is in ordinary use, however, there is no all-inclusive definition for it. The most widely recognized meaning of a percentile is where a specific level of scores fall beneath that number. You may realize that you scored 67 out of 90 on a test. In any case, that figure has no genuine importance except if you recognize what percentile you fall into. On the off chance that you realize that your score is in the 90th percentile, that implies you scored superior to anything 90% of individuals who stepped through the examination.

Let's Calculate different percentiles in python.

```python
import numpy as np

arr = [20, 2, 7, 1, 34]
print("arr : ", arr)
print("50th percentile of arr : ", np.percentile(arr, 50))
print("25th percentile of arr : ", np.percentile(arr, 25))
print("75th percentile of arr : ", np.percentile(arr, 75))
```

Output:

```
arr :  [20, 2, 7, 1, 34]
50th percentile of arr :  7.0
25th percentile of arr :  2.0
75th percentile of arr :  20.0
```

```python
import numpy

values = [13,21,21,40,42,48,55,72]

x = numpy.quantile(values, [0,0.25,0.5,0.75,1])

print(x)
```

Output:
```
[13.    21.    41.    49.75 72.   ]
```

IQR (Interquartile range)

- A third measure of spread is the interquartile range (IQR).
- The IQR is calculated using the boundaries of data situated between the 1st and

the 3rd quartiles.
- The interquartile range (IQR) can be calculated as follows:- IQR = Q3 – Q1
- In the same way that the median is more robust than the mean, the IQR is a more robust measure of spread than variance and standard deviation and should therefore be preferred for small or asymmetrical distributions.
- It is a robust measure of spread.

Calculate IQR

```python
# Import the numpy library as np
import numpy as np

data = [32, 36, 46, 47, 56, 69, 75, 79, 79, 88, 89, 91, 92, 93, 96, 97,
        101, 105, 112, 116]

# First quartile (Q1)
Q1 = np.median(data[:10])

# Third quartile (Q3)
Q3 = np.median(data[10:])

# Interquartile range (IQR)
IQR = Q3 - Q1

print(IQR)
```

Output: `34.0`