HOPE AI

IQR(Interquartile Range) Document

1) **IQR: (Interquartile Range):**
    - To find the outliers present in the data which differs significantly from other observations.
    - Measures the spread of the middle half of the data.
    - It is the range for the middle 50% of the sample.
        - Formula: IQR = Q3(75%) - Q1(25%)

Outliers arise due to,

➔ Changes in system behavior

➔ Fraudulent behavior

➔ Human error

➔ Instrument error or

➔ Simply through natural deviations in populations

2) **Why “1.5” in IQR method of outlier detection?**
    - It controls the sensitivity of the range and hence the decision rule.
    - A bigger scale would make the outliers to be considered as data points, while a smaller one would make some of the data points to be perceived as outliers
    - Lesser bund outliers:Q1-1.5*IQR
    - Greater bound outliers:Q3+1.5*IQR

IQR Problem to be solved:

A. The interquartile range. Compare the two interquartile ranges.

B. Any outliers in either set?

	Min	Q1	Median	Q3	Max
Day	32	56	74.5	82.5	99
Night	25.5	78	81	89	98

A) The interquartile range. Compare the two interquartile ranges.

- For day:
  - The interquartile range(IQR): Q3-Q1 = 82.5-56 = 26.5
  - For day, the IQR = 26.5
- For night:
  - The interquartile range(IQR): Q3-Q1 = 89-78 = 11
  - For the night, the IQR = 11

B) Inorder to find the outliers in the given data, initially we need to find the lesser bound outliers & greater bound outliers:

1) For day:
   - Lesser bound outliers: Q1-(1.5*IQR) = 56-(1.5*26.5) = 56-39.75 = 16.25
   - Greater bound outliers: Q3+(1.5*IQR) = 82.5+(1.5*26.5) = 82.5+39.75 = 122.25
2) For night:
   - Lesser bound outliers: Q1-(1.5*IQR) = 78-(1.5*11) = 78-16.5 = 61.5
   - Greater bound outliers: Q3+(1.5*IQR) = 89+(1.5*11) = 89+16.5= 105.5

Result:

The obtained informations from the given data set:

	IQR value	Lesser bound outliers range	Greater bound outliers range
Day	26.5	16.25	122.25
Night	11	61.5	105.5

Hence the outliers in the given data are as follows:

From the data:

- For Day:
  - Lesser bound outlier: Nil
  - Greater bound outlier: Nil
- For Night:
  - Lesser bound outlier: 32 (as 32<61.5 (Lesser bound outliers range))
  - Greater bound outlier: Nil