

IQR-Interquartile range

IQR is to know the outlier range present in the dataset.

Calculation method:

- $IQR = Q3 - Q1$
- Greater outlier = $Q3 + (1.5 * IQR)$
- Lesser Outlier = $Q1 - (1.5 * IQR)$

Here the value **1.5 denotes equivalent to ± 2.7 standard deviation**, which acts as a robust filter for data that lies beyond the expected, central 99% of observations

Optimal Threshold (Goldilocks Rule):

- Value $1 * IQR$ is too lenient (identifying roughly 5% as outliers),
- while $2 * IQR$ is too strict.

So value $1.5 * IQR$ is considered the ideal threshold to identify "mild" outliers without over-filtering.

Interquartile Range

a) The Interquartile Range. compare the two interquartile ranges.

b) any outliers in either set.

The five number summary for the day and night classes is

	min	Q1	median	Q3	max.
Day	32	56	74.5	82.5	99
night	25.5	78	81	89	98

$$\text{Day} \Rightarrow IQR = Q_3 - Q_1 = 82.5 - 56 = 26.5$$

$$IQR = 26.5$$

$$1.5 \times IQR = 1.5 \times 26.5 = 39.75$$

$$\text{lesser outliers} = Q_1 - (1.5) \times (IQR) = 56 - 39.75 = 16.25$$

$$\text{greater outlier} = Q_3 + (1.5) \times (IQR) = 82.5 + 39.75 = ~~122.75~~ \\ = 122.25$$

Day \Rightarrow There is no outliers because no day is less than 16.25 and greater than 122.25.

$$\text{Night} \Rightarrow IQR = Q_3 - Q_1 = 89 - 78 = 11$$

$$1.5 \times IQR = 1.5 \times 11 = 16.5$$

$$\text{lesser outlier} = Q_1 - 1.5 \times IQR = 78 - 16.5 = 61.5$$

$$\text{greater outlier} = Q_3 + 1.5 \times IQR = 89 + 16.5 = 105.5$$

Night \Rightarrow however 25.5 is less than 61.5 so replace the value instead of 25.5 and No night is greater than 105.5.