How To Find Outliers.

data = [45, 67, 56, 78, 90, 45, 67, 89, 92, 55, 77, 88, 99, 74, 63, 150, 200].

Step-1 → Sort the data in ascending order.

data = [45, 45, 55, 56, 63, 67, 67, 74, 78, 77, 88, 89, 90, 92, 99, 150, 200].

Step-2 → Find Quartiles & Median (Q_1, Q_2 & Q_3).

Median (Q_2) → $\left(\frac{n+1}{2}\right)^{th}$ term (as n is odd).

→ $\left(\frac{17+1}{2}\right)^{th} = \left(\frac{18}{2}\right)^{th}$ term

= 9^{th} term. = **78**

[# Now median (Q_2) is 78 which is the 9^{th} term of our sorted data.
Now we will find Q_1 & Q_3.

Q_1 ← from first 8 elements of data

Q_3 → from last 8 elements of data.

Q_1 (Median of lower half).

[45, 45, 55, 56, 63, 67, 67, 74].

even number of elements.

$\Rightarrow \left(\frac{n}{2}\right)^{th}$ term $+ \left(\frac{n+1}{2}\right)^{th}$ term

$\Rightarrow \left(\left(\frac{8}{2}\right)^{th} + \left(\frac{8+1}{2}\right)^{th}\right) / 2$

$\Rightarrow \frac{4^{th} + 5^{th}}{2}$

$\Rightarrow \frac{56 + 63}{2} = \boxed{59.5}$

Q_3 (Median of upper half).

[77, 88, 89, 90, 92, 99, 150, 200]

$\Rightarrow \frac{12^{th} \text{ term} + 13^{th} \text{ term}}{2}$

$\Rightarrow \frac{90 + 92}{2} = \boxed{91}$

Ques-3 $\rightarrow$ Calculate Interquartile Range (IQR).

$IQR = Q_3 - Q_1 = 91 - 59.5$

$= \boxed{31.5}$

Step-4 ⇒ Determine Outliers

Lowerbound → $Q_1 - 1.5 \times IQR$

→ $59.5 - 1.5 \times 31.5$

= 12.25

Upperbound → $Q_3 + 1.5 \times IQR$.

→ $91 + 1.5 \times 31.5$

→ 138.25

Identify Outliers

⇒ Data points below 12.25 & above 138.25 are outliers.

Conclusion ⇒ The outliers are 150 & 200.