Question

A continuous random variable X was measured 21 times. The sorted measurements are shown below.

50.80	59.40	62.00	62.57	63.05	64.04	65.92
66.25	66.34	66.61	67.21	67.53	67.65	67.95
68.18	68.48	68.79	69.37	69.42	69.75	69.85

Create a boxplot representing these measurements.

Solution

The sample size, n, is 21. We determine the indeces and values of Q1, Q2, and Q3.

Quartile	Formula for i	i	x
Q1	$\lceil 0.25 \times 21 \rceil$	6	64.04
Q2	$\lceil 0.5 \times 21 \rceil$	11	67.21
Q3	$\lceil 0.75 \times 21 \rceil$	16	68.48

We determine the IQR.

$$\begin{aligned} \text{IQR} &= \text{Q3} - \text{Q1} \\ &= 68.48 - 64.04 \\ &= 4.44 \end{aligned}$$

We determine the outlier boundaries.

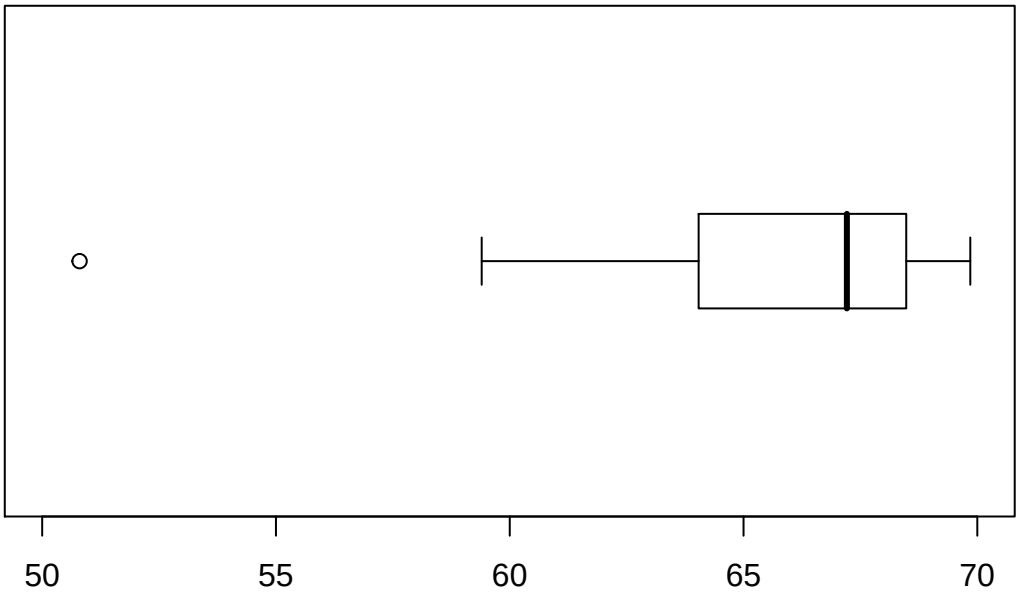
$$\begin{aligned} \text{lower boundary} &= \text{Q1} - 1.5 \times \text{IQR} \\ &= 64.04 - 1.5 \times 4.44 \\ &= 57.38 \end{aligned}$$

$$\begin{aligned} \text{upper boundary} &= \text{Q3} + 1.5 \times \text{IQR} \\ &= 68.48 + 1.5 \times 4.44 \\ &= 75.14 \end{aligned}$$

We determine the outliers.

$$\text{outliers} = \{50.8\}$$

We identify the ends of the whiskers: 59.4 and 69.85. We plot the boxplot.



Meta-information

extype: string exsolution: make the boxplot exname: boxplot