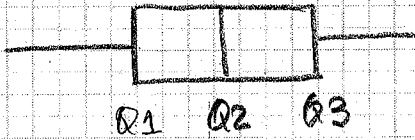


# BOX PLOTS



whiskers

Hinge

FIRST QUANTILE  $Q_1 = P_{25}$

$Q_2 = \text{Median} = P_{50}$

$Q_3 = P_{75}$

174	153	163
75	135	147
162	186	155
149	162	160
177	90	151
156	161	132
161	148	111

$n=21$

75, 90, 111, 132, 135, 147, 148, 149, 151, 153, 155, 156, 160, 161,  
 $x_1$   $x_2$   $x_3$   $x_4$   $x_5$   $x_6$   $x_7$   $x_8$   $x_9$   $x_{10}$   $x_{11}$   $x_{12}$   $x_{13}$   $x_{14}$

161, 162, 162, 163, 174, 177, 186  
 $x_{15}$   $x_{16}$   $x_{17}$   $x_{18}$   $x_{19}$   $x_{20}$   $x_{21}$

$\min = 75$

$\max = 186$



$Q_1 = P_{25}$

$LOC = .25(n+1) = .25(21+1) = 5.5$

$Q_1 = x_5 + .5(x_6 - x_5)$   
 $= 135 + .5(147 - 135) = 141$

$Q_2 = P_{50}$

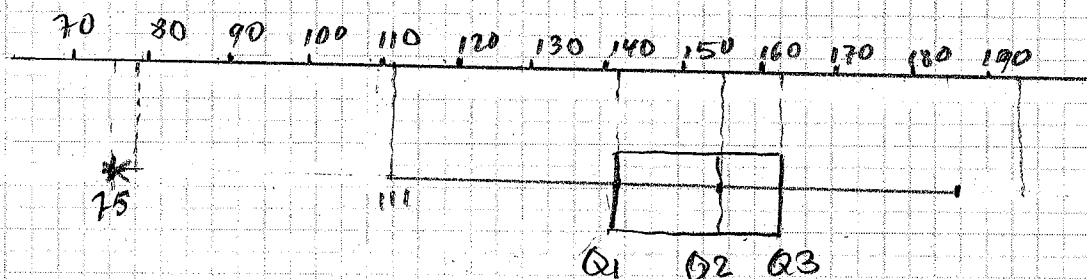
$LOC = .5(21+1) = 11$

$Q_2 = x_{11} = 155$

$Q_3 = P_{75}$

$LOC = .75(21+1) = 16.5$

$Q_3 = x_{16} + .5(x_{17} - x_{16})$   
 $= 162 + .5(162 - 162) = 162$



$$\begin{aligned} \text{IQR} &= \text{Inter Quartile Range} = Q_3 - Q_1 \\ &= 162 - 141 = 21 \end{aligned}$$

$$\begin{aligned} \text{Lower Inner Fence} &= Q_1 - 1.5 \text{IQR} = 141 - 1.5 * 21 = 109.5 \end{aligned}$$

The left whisker is drawn from  $Q_1$  to smallest measurement inside the inner fence.

$$\begin{aligned} \text{Upper Inner Fence} &= Q_3 + 1.5 * \text{IQR} = 162 + 1.5 * 21 = 193.5 \end{aligned}$$

The right whisker is drawn from  $Q_3$  to the largest measurement inside the inner fence.

$$\begin{aligned} \text{Lower Outer Fence} &= Q_1 - 3 * \text{IQR} = 141 - 3 * 21 = 78 \end{aligned}$$

$$\begin{aligned} \text{Upper Outer Fence} &= Q_3 + 3 * \text{IQR} = 162 + 3 * 21 = 225 \end{aligned}$$