

Tutorial 02

**To find the quantiles of all following questions, Interpolation method was used*

1. $Q1 = \left[(n+1) * \frac{1}{4} \right] \text{th element}$

Q1=7.25

$Q2 = \left[(n+1) * \frac{1}{2} \right] \text{th element}$

Q2= 11.5

$Q3 = \left[(n+1) * \frac{3}{4} \right] \text{th element}$

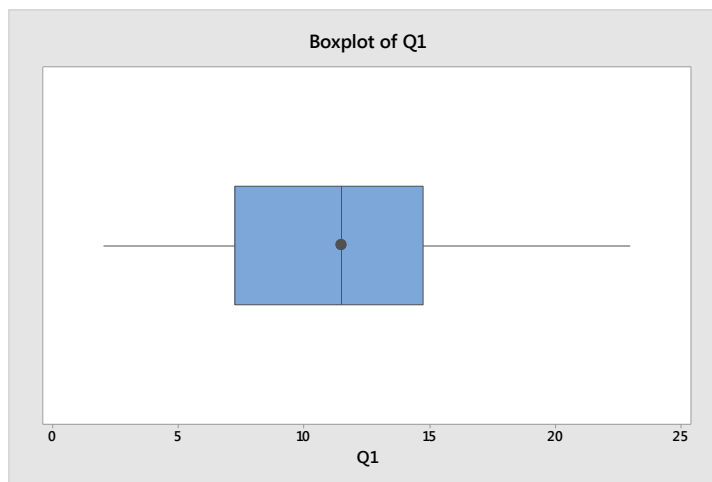
Q3=14.75

$IQR = 14.75 - 7.25 = 7.5$

Lower Bound = $Q1 - 1.5 * IQR = -4$

Upper bound = $Q3 + 1.5 * IQR = 26$

Since all the points lie within -4 and 26, there are no any outliers in the data set.



2.

For dataset 01;

Q1=6

Q2=12

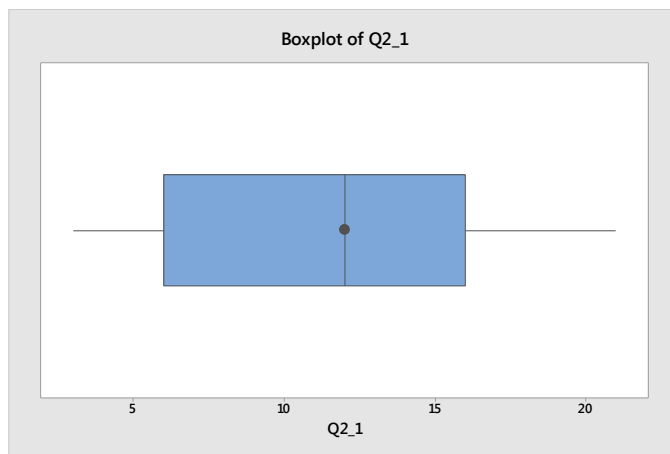
Q3=16

IQR =10

Lower bound = $Q1 - 1.5 * IQR = -9$

Upper Bound = $Q3 + 1.5 * IQR = 31$

Since all the points lie within -9 and 31, there are no any outliers in the data set.



Data set 2 :

Q1=6.5

Q2=13

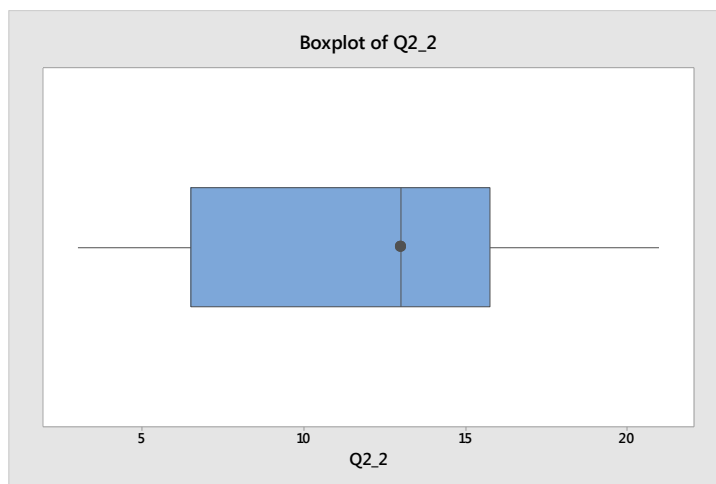
Q3=15.75

IQR =9.25

Lower bound = $Q1 - 1.5 * IQR = -7.375$

Upper Bound = $Q3 + 1.5 * IQR = 29.625$

Since all the points lie within -7.375 and 29.625, there are no any outliers in the data set.



3. According to two box plots, both have same lower whisker, upper whisker, Q2 and Q3 values. Also there are no any outliers in both box plots.

For test 01 marks, the distribution is negative skewed. That indicates, for test 01, more students have scored high marks. But the box plot of test 2 shows positive skewed distribution. That indicates, more students have scored less marks for test 02.

4. First, we have to arrange this data set according to ascending order.

Q1= 23.5

Q2= 28.5

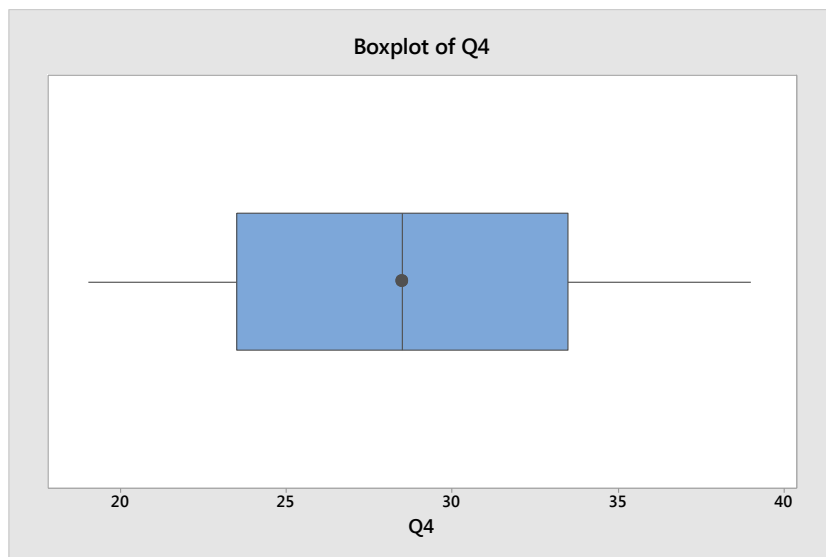
Q3= 33.5

IQR = 10

Lower bound = $Q1 - 1.5 * IQR = 8.5$

Upper Bound = $Q3 + 1.5 * IQR = 48.5$

Since all the points lie within 8.5 and 48.5, there are no any outliers in the data set.



5.

$$Q1 = 14.4$$

$$Q2 = 14.6$$

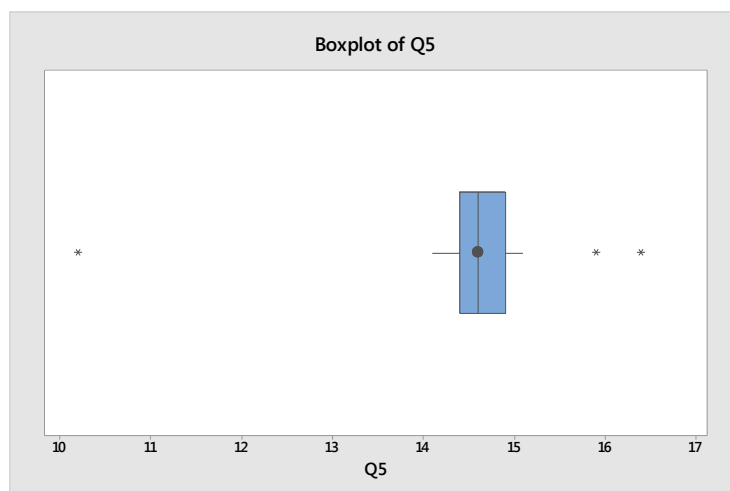
$$Q3 = 14.9$$

$$IQR = 0.5$$

$$\text{Lower bound} = Q1 - 1.5 * IQR = 13.65$$

$$\text{Upper Bound} = Q3 + 1.5 * IQR = 15.65$$

Since the points 10.2, 15.9 and 16.4 lie beyond the range of 13.65 and 15.65, they are outliers in the data set.



6.

$$Q1 = 23$$

$$Q2 = 25$$

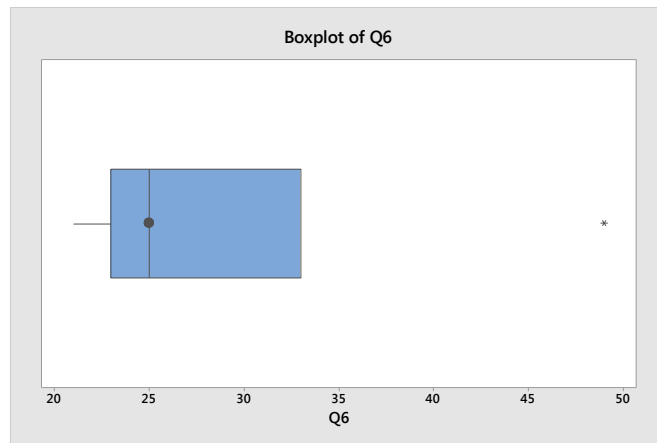
$$Q3 = 33$$

$$IQR = 10$$

$$\text{Lower bound} = Q1 - 1.5 * IQR = 8$$

$$\text{Upper Bound} = Q3 + 1.5 * IQR = 48$$

Since the point 49 lies beyond the range of 8 and 48, it is an outlier in this data set.



7.

$$Q1 = 79.25$$

$$Q2 = 86.50$$

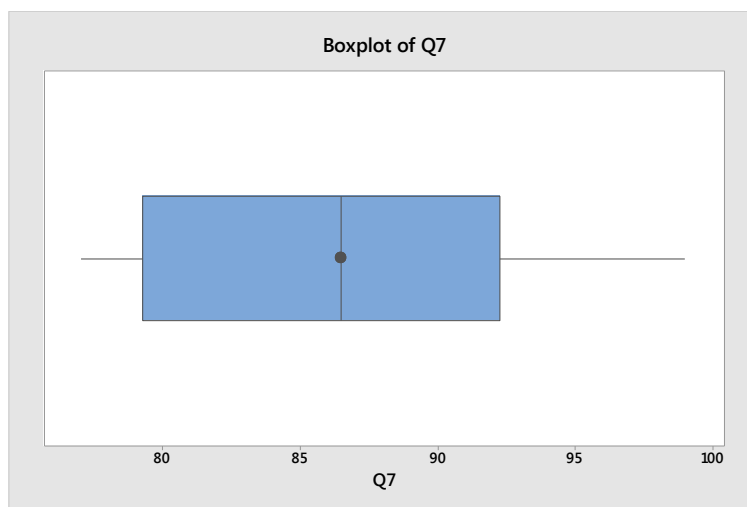
$$Q3 = 92.25$$

$$IQR = 13$$

$$\text{Lower bound} = Q1 - 1.5 * IQR = 59.75$$

$$\text{Upper Bound} = Q3 + 1.5 * IQR = 111.75$$

Since all the points lie within 59.75 and 111.75, there are no any outliers in the data set.



8.

$$\text{Mean} = 7.33$$

$$\text{Median} = 8$$

Stem and leaf plot for the data set

0		23
0		57889
1		04

$$\text{Mode} = 8$$

9.

$$\text{Mean} = 27.25$$

$$\text{Median} = 27$$

Stem and leaf plot for the data set

2		1
2		5689
3		12

Mode= 26

10.

Mean= 4.7225

Median= 4.72

Stem and leaf plot for the data set

471		00
472		000
473		00
474		0

Mode=4.720

11.

Mass of 21 bricks = $21 \times 24.2 = 508.2$ Kg

Mass of 29 bricks = $29 \times 23.6 = 684.4$ Kg

Mass of 50 bricks = $(508.2 + 684.4) = 1193$ Kg

Mean mass of 50 bricks = $1193/50 = \underline{23.852\text{Kg}}$

12.

Mean = 28

Standard Deviation = 4.97

13. Standard deviation = 2.983

14. Standard Deviation = 9.4417

15. Overall mean mark $\geq 80\%$

X = new mark of the 4th quiz (as a percentage)

Sum of marks for three quizzes = $92 + 83 + 71 = 246$

Sum of marks for four quizzes = $92 + 83 + 71 + x$

Mean of marks for all quizzes = $(92 + 83 + 71 + x)/4$

$$\frac{92 + 83 + 71 + x}{4} \geq 80$$

$$X \geq 74$$

Therefore the lowest score (as a percentage) should be at least 74%. Since mark has given out of 200, correct score will be $74 \times 2 = \underline{148}$.