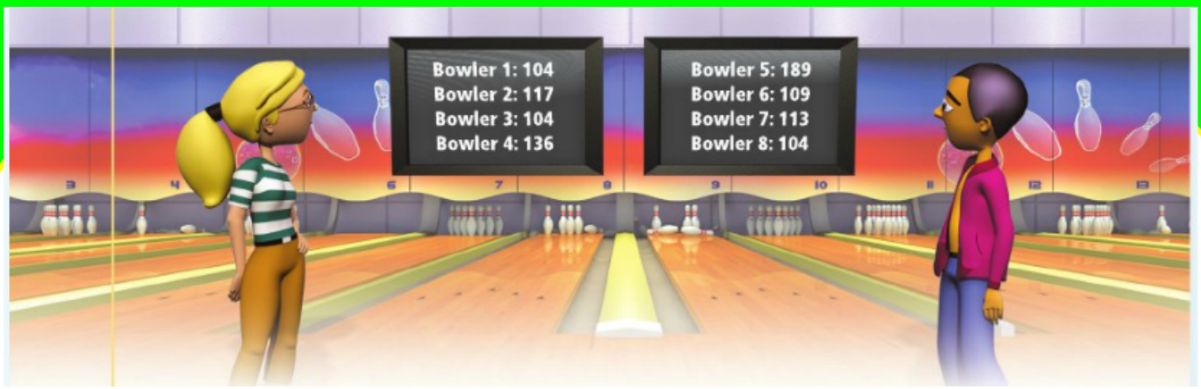


Calculate the following meaures:

Mean:

Median:

Mode:

Range:

Lower Extreme:

Upper Extreme:

Lower Quartile (Q1):

Upper Quartile (Q3):

Interquartile Range:

Box-and-Whisker Plots

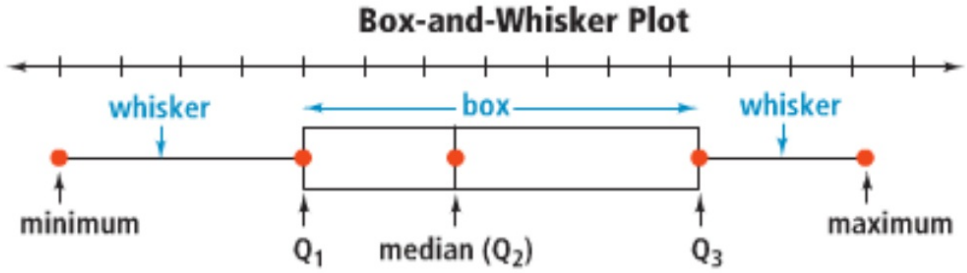
- Separating data into subsets is a useful way to summarize and compare data sets
- A box-and-whisker plot displays the maximum, minimum, and quartiles of the data set.

Q1 Q3

- Be sure to order the data from least to greatest.
- Quartiles are values that divide the data set into four equal parts.

Box-and-Whisker Plots

- The median (or second quartile) separates the data into upper and lower halves.
- The lower quartile is the median of the lower half of the data.
- The upper quartile is the median of the upper half of the data.
- The interquartile range is the difference between the third and first quartiles. Q3-Q1



The left whisker extends from the minimum to the first quartile. It represents 25% of the data.

The box extends from the first quartile to the third quartile and has a vertical line through the median. The length of the box represents the interquartile range. It contains 50% of the data.

The right whisker extends from the third quartile to the maximum. It represents 25% of the data.

Odd

- If the first and third quartiles have an even number of data, calculate the average of the middle two numbers to determine the first and third quartiles

4 5 6 9 11 12 13 21 23

Minimum:
Q_1:
Q_2:
Q_3:
Maximum

Even

- For a data set that has an <u>even</u> number of values, calculate the median by taking the average of the middle two numbers.

- For example,

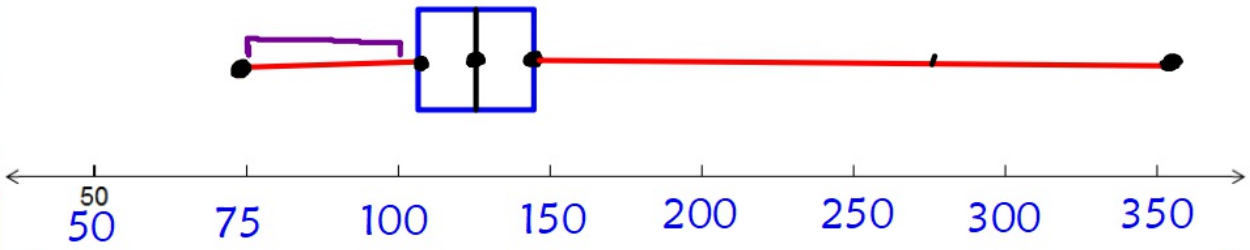
4 5 6 9 11 12 13 21

Minimum:
Q_1:
Q_2:
Q_3:
Maximum

Example:

Create a box and whisker plot using the following data:
125, 80, 140, 135, 126, 140, 350, 75

Minimum: 75
Q1: 102.5
Q2: 130.5
Q3: 140
Maximum: 350
Range: 275
Interquartile Range: 37.5



What percentage of the data is between 102.5 and 130.5?

You Try:

Create a box and whisker plot using the following data:
95, 85, 75, 85, 65, 60, 100, 105, 75, 85, 75

Minimum:
Q1:
Q2:
Q3:
Maximum:
Range:
Interquartile Range:

What percentage of the data is between 95 and 105?

Outliers:

An outlier is a data value that is much higher or lower than the other data values in the set.

For example, in the data set 2, 5, 3, 7, 12, the outlier is 12.

What effect does an outlier have on a box-and-whisker plot?

Outliers

Example: Create a box-and-whisker plot for the following data set:

280, 220, 224, 270, 410, 290, 230, 220

- What value is the outlier in this data set?
- How does it change the shape of the box-and-whisker plot?
- Does it change the center?
- Does is change the spread of the data?

Making Comparisons Using Box-and-Whisker Plots

Create box and whisker plots using the following information:

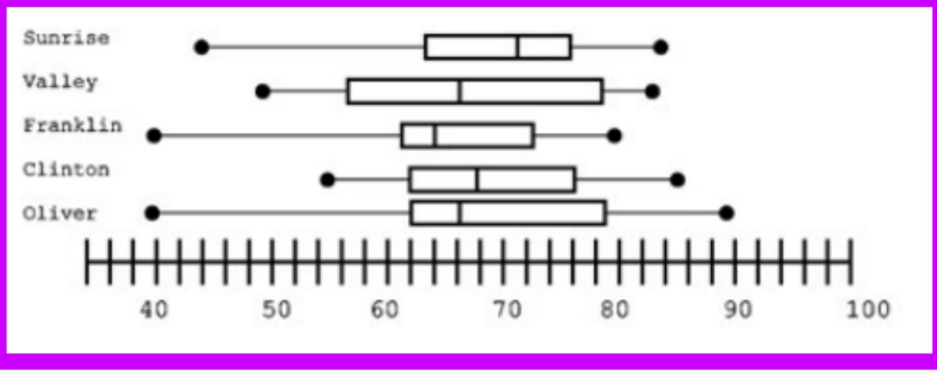
Data Set A -
Minimum: 1.5, Q1: 2.5, Q2: 4.5, Q3: 7.5, Maximum: 8.5

Data Set B -
Minimum: 3, Q1: 5, Q2: 5.5, Q3: 6, Maximum: 7

What do the interquartile ranges tell you about the data sets?
In which data set is distribution less peaked?
In which data set is the data less widely spread?

Making Comparisons Using Box-and-Whisker Plots

The box-and-whisker plots show the Test Scores of five schools that have written a common exam.



Which school has the highest median score?

Which school scored the highest on the common written exam?

At which school are the median and low score the closest?