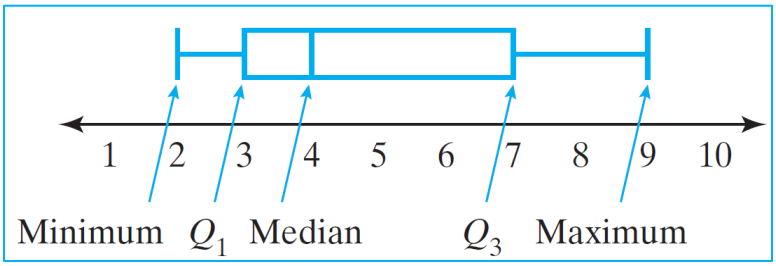
Box-and-Whisker Plots Notes

- ***Box-and-whisker plot*** is a quick way of examining one or more sets of data graphically. It is a graphical representation of what is called the five-number summary of a data set.
    - The numbers in the five-number summary include the minimum value, first quartile (Q1), median, third quartile (Q3), and the maximum value

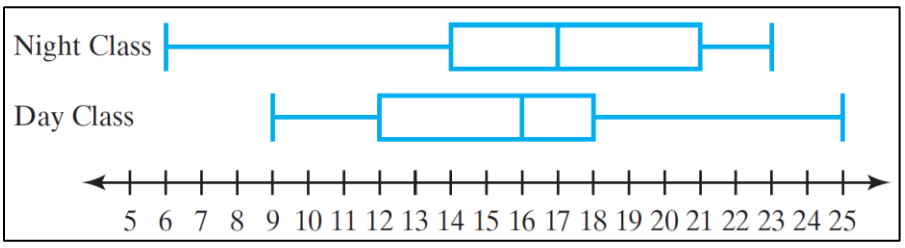
- Draw a box-and-whisker plot of the data set: {2, 3, 3, 3, 4, 6, 6, 8, 9}.
    - First find the five-number summary for this data set. Minimum value = 2
    - *First quartile (Q_1)* = 3 (the median of the lower half of the data set {2, 3, 3, 3})
      Median = 4 (the middle number in the data set)
    - *Third quartile (Q_3)* = 7 (the median of the upper half of the data set {6, 6, 8, 9})

  Maximum value = 9
- To illustrate the five-number summary, we will draw a box-and-whisker plot. Use an equal interval scale and draw a rectangular box with one end at Q_1 (3) and the other end at Q_3 (7).
- Then draw a vertical segment at the median value, 4. Finally, draw two horizontal segments on each side of the box, one left to the minimum value and one right to the maximum value.



    - These segments are called the ***whiskers***
    - The interquartile range for this data set is $Q_3 - Q_1 = 7 - 3 = 4$.

- An ***outlier*** is a data value that is unusually high or low as it relates to the rest of the data set. For example, in the set {1, 2, 2, 3, 100}, the number 100 is an outlier.



- What do these results above tell us about how students in the two classes performed on the 25-question final test?
    - The range of grades from high grade to low grade in the night class was larger than in the day class.
    - The highest grade was earned in the day class with a perfect score of 25.
    - The lowest score achieved by a student was 6 in the night class, but this could be an outlier since it is so far to the left of the majority of the grades in that class.
    - The medians of the two sets of data are very similar, 16 in the day class and 17 in the night class