Chapter 5: Exploring Data: Distributions

Section 5.5 Describing Variability: The Quartiles

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- Include Spread and Center to Better Describe a Distribution
  - Range – Measures the spread of the set of observations.
    - Subtract the smallest observation from the largest observation
  - Quartiles – The center and the middle of the top and bottom halves.
- Calculating the Quartiles

1. Arrange the observations in increasing order and locate the median ***M*** in the ordered list of observations.
   - If n = even, split group in half and use all the numbers.
   - If n = odd, circle the median and do not use it in finding quartiles.
2. The first quartile, $\boldsymbol{Q_1}$ is the median of the observations whose position in the ordered list is to the left of the overall median *(midpoint of lower half)*.
3. The third quartile, $\boldsymbol{Q_3}$ is the median of the observations whose position in the ordered list is to the right of the overall median *(midpoint of upper half)*.
   - First quartile, $\boldsymbol{Q_1}$ is larger than 25% of the observation.
   - Third quartile, $\boldsymbol{Q_3}$ is larger than 75% of the observations.
   - Second quartile, $\boldsymbol{Q_2}$ is the median, and larger than 50% of observations.

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Example 1:

Data: 20 25 25 27 28 31 33 34 36 37 44 50 59 85 86

n = 15

$Q_1 = 27$ Q_2 = Median = 34 $Q_3 = 50$ Range = 86-20 = 66

Example 2:

Data: 5 7 10 14 18 19 25 29 31 33

n = 10
$Q_1 = 10$ Q_2 = Median = (18+19)/2 = 18.5 $Q_3 = 29$
Range = 33-5 = 28

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