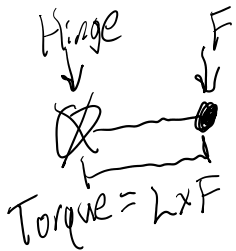


Building intuition for Mean, Standard Deviation, and Median

Data 1: 1, 2, 4, 5, 8

Data 2: 1, 2, 4, 5, 8, 1000

Mean: Algebraic center or balancing point



$$\bar{X} = \frac{1}{n} \sum_{i=1}^n x_i$$

median: 4

$$= \frac{1}{5} (1 + 2 + 4 + 5 + 8) = \frac{20}{5} = 4$$

Left: $3 \times 1 + 2 \times 1 = 5$
Right: $1 \times 1 + 4 \times 1 = 5$

Data 2: $\bar{X} = \frac{1}{6} (1 + 2 + 4 + 5 + 8 + 1000) = \frac{1020}{6} = 170$
median: 4.5



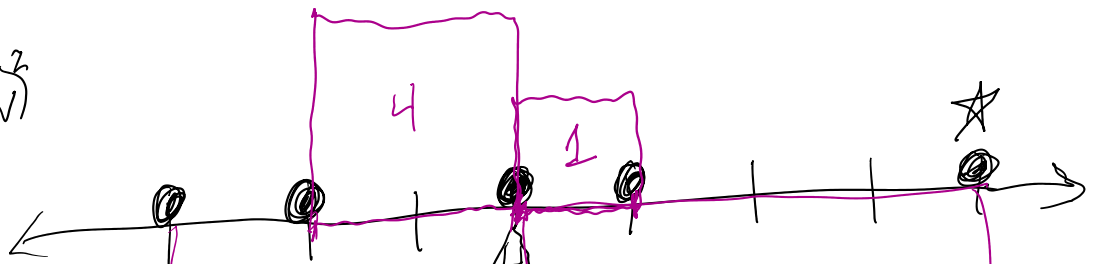
Outliers or extreme values pull the mean toward them
Median is not impacted by extreme values.

Standard Deviation

$$S = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{X})^2}$$

var \approx Average of the areas of each of these squares

variance = $(\text{std dev})^2$



Variance = 4

$$0 + 1 + 4 + 9 + 16 = 30$$

$$s = \sqrt{\frac{1}{4} \times 30} = \sqrt{7.5} = 2.7386$$

