Welcome to OSA Training 2015
Statistics Part I

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QUALITATIVE DATA

- DEALS WITH DESCRIPTIONS
- DATA CAN BE OBSERVED BUT NOT MEASURED
- COLORS, TEXTURES, SMELLS, TASTES, APPEARANCE, BEAUTY, ETC.

QUANTITATIVE DATA

- DEALS WITH NUMBERS
- DATA WHICH CAN BE MEASURED
- LENGTH, HEIGHT, AREA, VOLUME, WEIGHT, SPEED, TIME, TEMPERATURE, SOUND LEVELS, COSTS, MEMBERS, AGES, ETC.

ORGANIZING AND SUMMARIZING DATA

- **NOMINAL SCALE:** CATEGORIES SUCH AS MALE, FEMALE; DEMOCRAT, REPUBLICAN, INDEPENDENT
- **ORDINAL SCALE:** RANKING MEASURE SUCH AS PRIVATE, CORPORAL, SERGEANT; FIRST, SECOND, THIRD PLACE
- **INTERVAL SCALE:** TRUE NUMERICAL MEASUREMENT SUCH AS DEGREES IN TEMPERATURE, POUNDS FOR WEIGHT, FEET FOR HEIGHT

CENTRAL TENDENCY

- MEAN
- MEDIAN
- MODE

MEAN

- MEAN IS THE AVERAGE
- MEAN = SUM OF THE SCORES
- TOTAL NUMBER OF SCORES

- FIND THE MEAN FOR THESE TEST SCORES:

70, 90, 80, 85, 75, 60, 75, 95, 90, 80, 85

885/11= 80.45

MEDIAN

- MEDIAN IS THE NUMBER IN THE MIDDLE. PUT THE VALUES FROM LOWEST TO HIGHEST. THEN FIND THE NUMBER EXACTLY IN THE MIDDLE.
- WHEN IT IS AN **ODD** NUMBER OF VALUES IT IS IN THE MIDDLE.

  FIND THE MEDIAN: 100, 70, 60, 85, 90

WHEN IT IS AN **EVEN** NUMBER OF VALUES, TAKE THE TWO MIDDLE MOST NUMBERS AND ADD THEM UP AND DIVIDE THE SUM BY 2.

FIND THE MEDIAN: 90, 90, 100, 80, 90, 85

90

MODE

- MODE IS THE VALUE THAT OCCURS THE MOST OFTEN.
- FIND THE MODE FOR THESE WEIGHTS: 110, 140, 130, 160, 120, 180, 140
- FIND THE MODE FOR THESE TEST SCORES: 90, 80, 60, 75, 90, 100, 85

RANGE

- THE DIFFERENCE BETWEEN THE HIGHEST VALUE AND THE LOWEST VALUE.
- FIND THE RANGE FOR TEMPERATURES IN NYC: 68, 55, 72, 49, 53, 64, 58

DREAM AGES

- FIND THE MEAN, MEDIAN, MODE, AND RANGE FOR OUR SET OF DREAM AGES.

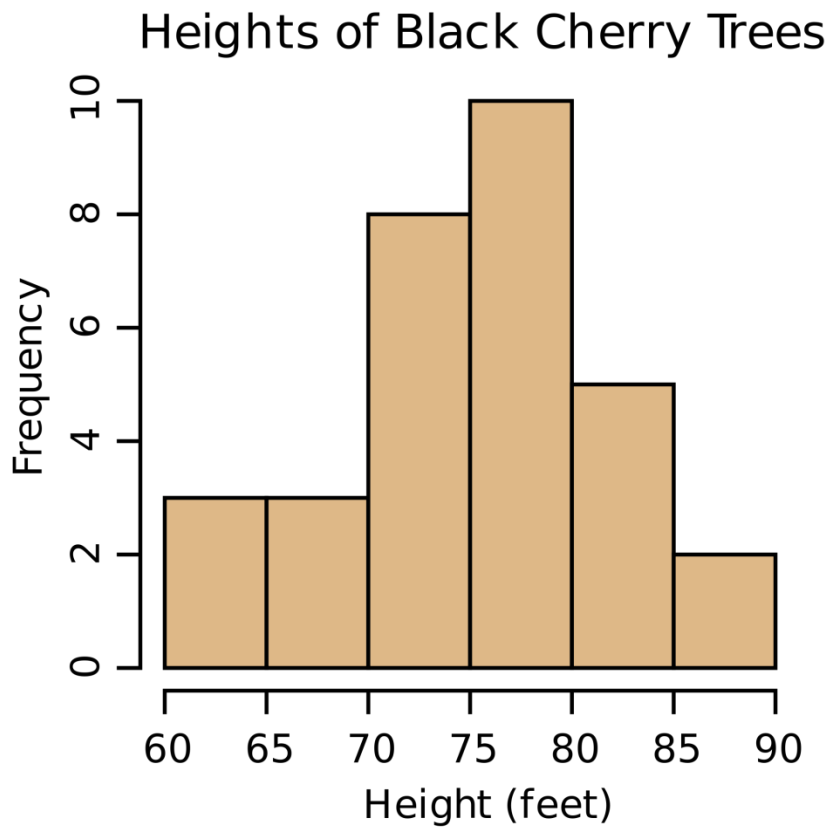
FREQUENCY DISTRIBUTION

- THE NUMBER OF TIMES A GIVEN QUANTITY OCCURS IN A SET OF DATA. THE NUMBER OF METROCARDS SOLD AT THE 23RD STREET AND LEXINGTON AVENUE SUBWAY STATION OVER THE LAST 5 DAYS: 200, 350, 200, 175, 350

METRO CARDS SOLD	**FREQUENCY**
100	0
150	0
175	1
200	2
350	2

Histograms

A Histogram is a bar-type graph without spaces between the bars



- Using the histogram to the left, how many trees are taller than 75 feet?

Example: Histograms

The Fahrenheit temperature readings on 30 April mornings in Stormville, New York, are shown below.

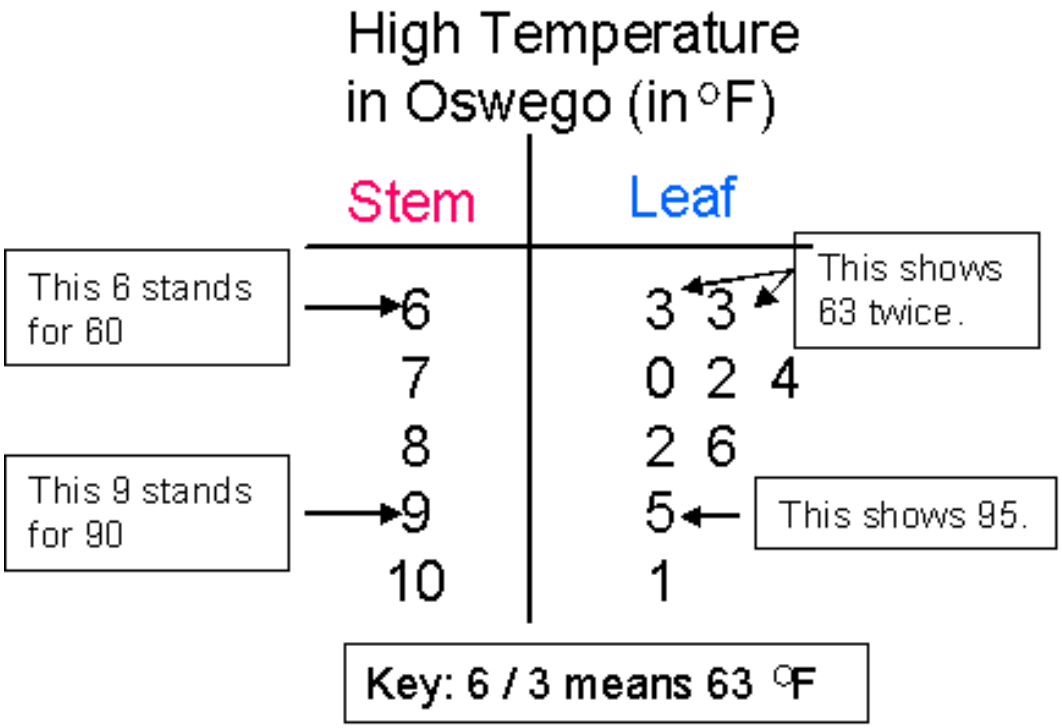
41° , 58° , 61° , 54° , 49° , 46° , 52° , 58° , 67° , 43° ,
47° , 60° , 52° , 58° , 48° , 44° , 59° , 66° , 62° , 55° ,
44° , 49° , 62° , 61° , 59° , 54° , 57° , 58° , 63° , 60°

- Using the data, complete the frequency table below.

Create a frequency Histogram

Interval	Tally	Frequency
40–44		
45–49		
50–54		
55–59		
60–64		
65–69		

Stem and Leaf Plots



Sample STANDARD DEVIATION & VARIANCE

Sample Variance

$$s^2 = \frac{\sum(x - \bar{x})^2}{n - 1}$$

Sample Standard Deviation

$$s = \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}}$$

Example

- I need ten volunteers state their ideal weights.
- We are now going to find the standard Deviation of your ideal weights of the ten of you.