Statistics

Definition: Statistics gives meaning to data that has been collected. Each piece of data is a datum (whether it is identical or not).

Quantitative Data: is data consisting of numbers only.

Qualitative Data: is data consisting of words, words with numbers (alphanumerical).

Variables: topics for which data is required.

Values: the different forms that the data take.

Frequency: the number of times the value appears.
  Frequency Table:

Value	Tally	Frequency
████████		12
████████		4

Measures of Central Tendencies: mean, median and mode.

Mean ($\bar{x}$): is the average of a set of data.
    The sum of the data is divided by the number of values added.

Example: {3, 4, 5, 6, 8, 10}

$$\bar{x} = \frac{3+4+5+6+8+10}{6}$$

$$= \frac{36}{6}$$

$$= 6$$

Note: mean is an appropriate measure for certain situations
- Finding the average grade
- To determine the yearly rainfall

Mean can be affected by extreme values.

Mean of Condensed Data: calculated by taking the sum of product of frequency and value and then dividing it by the number of data.

Example:

Value	Frequency
3	2
4	3
5	4
6	2
Total:	11

$$\bar{x} = \frac{(3)(2)+(4)(3)+(5)(4)+(6)(2)}{11}$$

$$= \frac{6+12+20+12}{11}$$

$$= \frac{50}{11}$$

Weighted Mean: takes into account the volume of each data.

Example:

Subject	%	Credits
English	75	2
Math	60	4
French	70	2
History	80	1
	Total:	9

$$\bar{x} = \frac{(75)(2)+(60)(4)+(70)(2)+(80)(1)}{9}$$

$$= \frac{150+240+140+80}{9}$$

$$= \frac{610}{9}$$

$$\approx 67.77$$

Mean of Grouped Classes: the median of each class is multiplied by the class frequency and then divided by the frequency total.

Example:

Class	Frequency
[0,10[	2
[10,20[	3
[20,30[	4
Total:	9

$$\bar{x} = \frac{(5)(2)+(15)(3)+(25)(4)}{9}$$

$$= \frac{10+45+100}{9}$$

$$= \frac{155}{9}$$

$$\approx 17.22$$

Median: the middle number from a set of data that is arranged in increasing order.

Example: {8, 9, 12, 15, 2, 5, 20}

2, 5, 8, 9, 12, 15, 20

median

Example: if there is an even set of numbers in the data you take the average of the two middle numbers.

Data: {8, 9, 12, 15, 2, 5, 20, 1}

1, 2, 5, 8, 9, 12, 15, 20

$$\frac{8+9}{2} = \frac{17}{2}$$

Median = 8.5

Median of Condensed Data: median would be located at half the frequency.

To find the position of the median we follow the formula:

$$position = \frac{n+1}{2}, where\ n = total\ frequency$$

Example:

Value	Frequency
1	3
2	2
5	4
6	2
7	8
Total:	19

10th number located

Median: 6

$$position = \frac{n+1}{2}$$

$$= \frac{19+1}{2}$$

$$= 10$$

The median is located at the 10th number

Mode: the most frequently occurring value in a set of values.

      Example: n = {2, 3, 1, 5, 3, 4}

          Mode: 3

      Example: n = {18, 1, 19, 2, 4, 10}

          Mode: No Mode

      Example: n = {2, 3, 1, 5, 3, 2, 6}

          Mode: 2, 3

Mode of Condensed Data: The value with the highest frequency

Value	Frequency
2	9
3	1
4	2
Total:	12

Mode: 2

Modal Class: it is the grouped in class with the highest frequency

Class	Frequency
[40,50[	3
[50,60[	4
[60,70[	2
[70,80[	5	← Highest frequency
[80,90[	1
Total:	15

Modal class: [70, 80[

Range: difference between the highest and lowest value.

$$Range = Maximum\ Value - Minimum\ Value$$

Example: 12, 19, 14, 3, 9, 7, 6

      $Maximum\ Value$: 19

      $Minimum\ Value$: 3

$$Range = 19 - 3$$
$$= 16$$