Basic statistics

Mode

What Is the Mode?

The mode is the value that appears most frequently in a data set. A set of data may have one mode, more than one mode, or no mode at all. Other popular measures of central tendency include the mean, or the average of a set, and the median, the middle value in a set.

In statistics, the mode is the most commonly observed value in a set of data.

For the normal distribution, the mode is also the same value as the mean and median.

In many cases, the modal value will differ from the average value in the data.

Understanding the Mode

In statistics, data can be distributed in various ways. The most often cited distribution is the classic normal (bell-curve) distribution. In this, and some other distributions, the mean (average) value falls at the midpoint, which is also the peak frequency of observed values

For such a distribution, the mean, median, and mode are all the same values. This means that this value is the average value, the middle value, and also the mode—the most frequently occurring value in the data.

Examples

For example, in the following list of numbers, 16 is the mode since it appears more times in the set than any other number:

3, 3, 6, 9, 16, 16, 16, 27, 27, 37, 48

A set of numbers can have more than one mode (this is known as bimodal if there are two modes) if there are multiple numbers that occur with equal frequency and more times than the others in the set.

3, 3, 3, 9, 16, 16, 16, 27, 37, 48

In the above example, both the number 3 and the number 16 are modes as they each occur three times and no other number occurs more often.

If no number in a set of numbers occurs more than once, that set has no mode:

3, 6, 9, 16, 27, 37, 48

1. A set of numbers with two modes is **bimodal**,
2. a set of numbers with three modes is **trimodal**,
3. and any set of numbers with more than one mode is **multimodal**.

Mode Formula in Statistics (Ungrouped Data)

The value occurring most frequently in a set of observations is its mode. In other words, the mode of data is the observation having the highest frequency in a set of data. There is a possibility that more than one observation has the same frequency, i.e. a data set could have more than one mode. In such a case, the set of data is said to be multimodal.

Let us look into an example to get a better insight.

Example:

The following table represents the number of wickets taken by a bowler in 10 matches. Find the mode of the given set of data.

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Match No.	1	2	3	4	5	6	7	8	9	10
No. of Wickets	2	1	1	3	2	3	2	2	4	1

It can be seen that 2 wickets were taken by the bowler frequently in different matches. Hence, the mode of the given data is 2.

Mode Formula For Grouped Data

In the case of grouped frequency distribution, calculation of mode just by looking into the frequency is not possible. To determine the mode of data in such cases we calculate the modal class. Mode lies inside the modal class. The mode of data is given by the formula:

$$Mode = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$$

Where,

L = lower limit of the modal clas

H = size of the class interval

F1 = frequency of the modal clas

F0 = frequency of the class preceding the modal class

F2 = frequency of the class succeeding the modal class

Let us take an example to understand this clearly.

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Example :

Find the mode of the given data set: 3, 3, 6, 9, 15, 15, 15, 27, 27, 37, 48.

Solution: In the following list of numbers,

3, 3, 6, 9, 15, 15, 15, 27, 27, 37, 48

15 is the mode since it is appearing more number of times in the set compared to other numbers.

Example :

Find the mode of 4, 4, 4, 9, 15, 15, 15, 27, 37, 48 data set.

Solution: Given: 4, 4, 4, 9, 15, 15, 15, 27, 37, 48 is the data set.

As we know, a data set or set of values can have more than one mode if more than one value occurs with equal frequency and number of time compared to the other values in the set.

Hence, here both the number 4 and 15 are modes of the set.

Example

Let's try another example using a set of temperatures recorded over a week: 72°F, 75°F, 78°F, 72°F, 72°F, 80°F, 78°F.

 In this case, the mode is 72°F because it appears three times,

which is more frequent than any other temperature in the dataset.