EX: A company manufacturing inexpensive analog function generators measures the frequency they produce when set to 1 kHz. They measure the following values in Hz:

$f_1 = 998$ $f_2 = 997$ $f_3 = 1003$ $f_4 = 1001$ $f_5 = 999$ $f_6 = 1001$

$f_7 = 998$ $f_8 = 1002$ $f_9 = 1000$ $f_{10} = 1001$ $f_{11} = 1000$

Find the median and mode of the measured values.

SOL'N: A list in numerical order facilitates identification of the median and mode:

997,	998,	998,	999,	1000,	1000,	1001,	1001,	1001,	1002,	1003
1	2	3	4	5	6	7	8	9	10	11

The median is the number in middle. That is, the median is the 6th number:

median = 1000

NOTE: If the number it data points is even, the median is the numerical value halfway between the data values just before and after the midpoint of the sorted list. Equivalently, the median in this case is the average of the data values just before and after the midpoint of the sorted list.

The mode is the data value that occurs most often. The value 1001 appears 3 times in the list—more than any other value.

mode = 1001

NOTE: If more than one value appears most often in the list of data values, the mode may arbitrarily be equated with the smaller of the two values.

NOTE: For a continuous probability density function, the mode is the outcome with the highest probability density—the value of x where the peak of $f(x)$ occurs. When we measure outcomes from continuous random variables, we never expect to see exactly the same outcome value twice. To find the mode in this case, we might place the outcome values in bins, as in a histogram, and pick the bin with the highest population.