Discrete and Continuous data

Discrete – Things you count.

Discrete data refers to things you can count and therefore has a specific value which is normally a whole number. Examples include number of people wearing a specific shoe size, the eye colour of a group of people or the number of learners in a class. You cannot have shoes that are between sizes 7 and 7 ½ and you cannot have half a learner, therefore these are examples of discrete data.

Another example might be names. You are Carol, I am Paul; there is no intermediate value between Carol and Paul. If we counted all the Carols and Pauls in the world, we would have a result that is a whole number because you cannot have half a Paul.

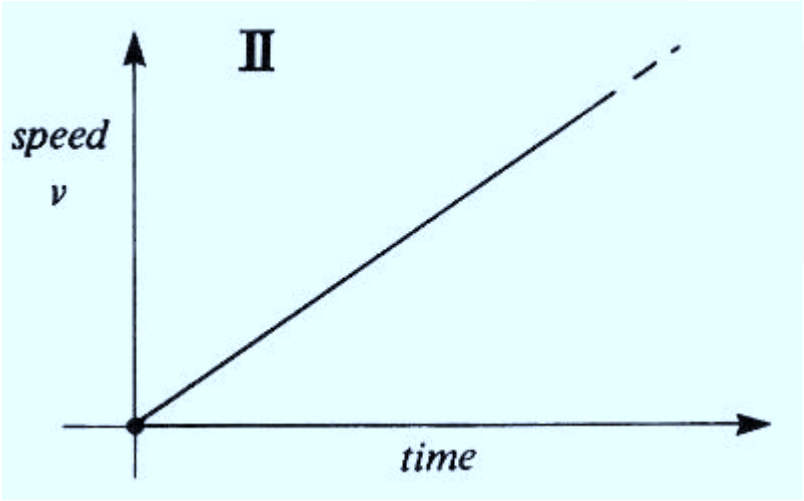
Continuous – Things you measure (but can never really be measured exactly).

Continuous data refers to things which can be measured and therefore the answer depends on how accurately you measure which means you may end up with answers which are not whole numbers. Examples include the speed of a car, length of a piece of carpet, weight of ingredients for a recipe or capacity of a glass. You may be able to measure ingredients for a recipe using a tablespoon, but this could vary, you could measure using a set of balance scales where you add weights to one side and the ingredients to the other until they balance, or you could use a set of digital scales to be more accurate again.

Another example would be if you measure your height with a metre rule, we might say you are 160cm tall. However, if you had a more accurate rule, you might actually find you're 160.362cm tall. You might then take a scanning electron microscope and find your height is 160.3619542646cm. This is because length is continuous and cannot be put into distinct categories. A person's height is not either 160cm or 161cm, it is likely to be somewhere in between.

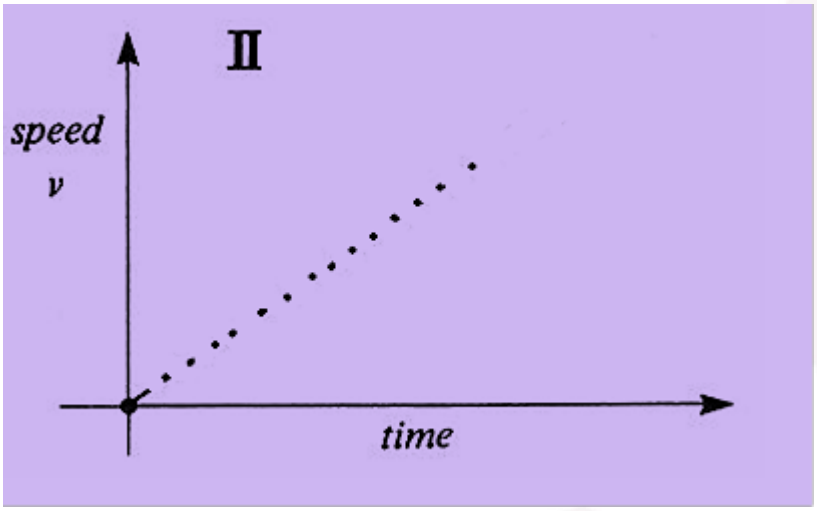
Definitions that include relationships between the data:

Continuous data can be plotted on a line graph. If you measured the speed of a car as it accelerates, you will get a line:



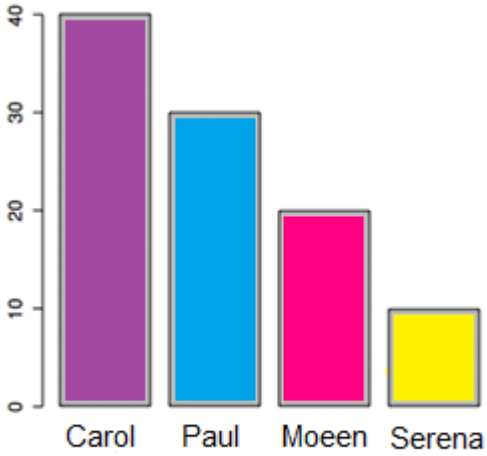
The speed of the car is continuous data because if you measured it, you could do it to increasing degrees of accuracy. You might use a stop watch and measure the speed at 30 miles per hour. A policeman with a RADAR gun might measure the same car at 30.146 miles per hour because his instrument is more accurate. A physicist with a sophisticated light trap may measure it at 30.145862 miles per hour.

The speed of the car as it accelerates also has a relationship with time. As the car speeds up, time increases as well and you get a line such as the one above. If you didn't draw the line in, they would naturally form a pattern such as an upward trend:



On a graph, we normally have two variables. One is called the dependant, and the other the independent. For example speed is dependent on the time, so it is the dependant variable. Time would be the independent variable. If you wanted to measure the speed of the car at a certain point, you would need to know the time.

Discrete data does not have this relationship. If you counted the number of Carols and Pauls in Northamptonshire today, you could not plot it on a line graph. This is because there is no dependent variable. The number of Carols is not dependent on anything. This is why we display discrete data on bar charts, because the two axes on a bar chart are not dependent on each other and neither are the bars themselves.



The bar showing the number of Carols is independent of everything. It's just a count of the number of Carols.