Set Theory

Georg Cantor, the founder of set theory

A set is a collection of distinct objects, considered as an object in its own right.

Definition: A set (or class) is an **unordered** collection of objects, which are arranged in a group, The set with any numbers use the symbol braces { }, and will be denoted by Capital letters A, B, C,…..

The objects in a set are called the **elements**, or **members** of the set. A set is said to contain its elements. The objects comprising the set are called its elements or members and will be denoted by lower case letters a, b, c, …..

Set theory is used heavily in computer science and data mining.

Sets are determined by their elements. The order in which the elements of a given set are listed does not matter.

{1, 2, 3} and {3, 1, 2} are the same set.

Order is not important S = {a, b. c, d} = {b, c, a, d}.

It also does not matter whether some elements of a given set are listed more than once. For instance, {1, 2, 2, 2, 3, 3} is still the set {1, 2, 3}.

If S is a set and x is an element of S, then we write $x \in S$.

x is not an element of S, then we write $x \notin S$.

Special symbols for some sets:

$\mathbf{B} = \text{Boolean values} = \{\text{true}, \text{false}\}$

$\mathbf{N} = \text{natural numbers} = \{0,1,2,3,\ldots..\}$

$\mathbf{Z} = \text{integers} = \{\ldots\ldots.., -3, -2, -1, 0, 1, 2, 3, \ldots.\}$

$\mathbf{Z}^+ = Z \geq 1 = \text{positive integers} = \{1, 2, 3, \ldots\ldots\}$

$\mathbf{R} = \text{set of real numbers}$

$\mathbf{R}^+ = R > 0 = \textit{set of positive real numbers}$

C = set of complex numbers

Q= set of rational numbers