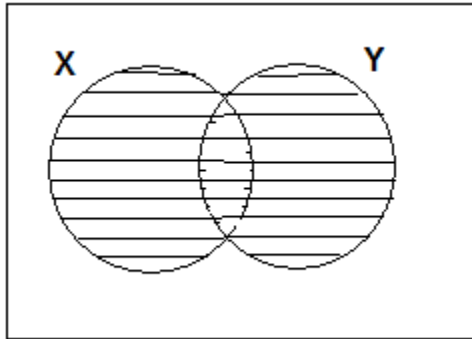### 2.1.1 Union
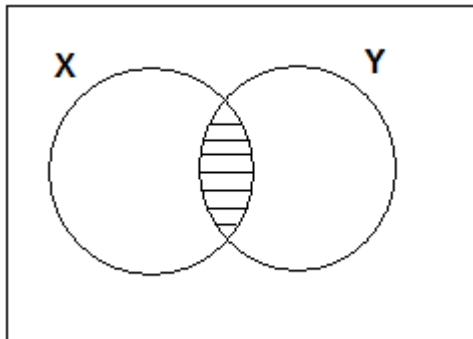The **union** is the set including all the elements in one set and all the elements in another set.

The shaded region in the picture above includes all the elements in set X and all the elements in set Y so it represents the union.
This can be written as **X ∪ Y**.
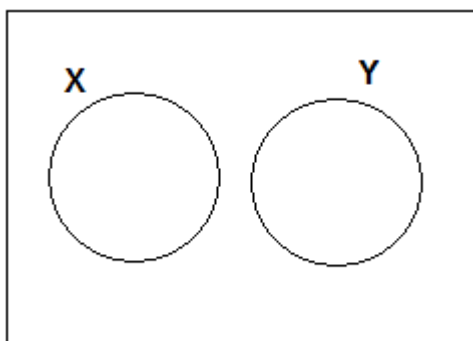
2.1.2 Intersection
The **intersection** is the set of elements that are in all of the given sets at the same time.

The shaded region in the picture above includes only the elements that are in both set X and set Y, the intersection.
This can be written as **X ∩ Y.**

An **empty set** is a set that contains no elements

Neither set X nor set Y have any elements in them. Both are empty sets.
An empty can be written as **Ø.**