Conditionals and Euler diagrams

In this lesson we'll look at how to write conditional statements and how to draw and interpret Euler diagrams.

Conditional statement

A **conditional statement** is an if/then statement where the "if" part is the hypothesis and comes first, and the "then" part is the conclusion and comes second.

You always write a conditional statement like this:

"If A, then B."

This kind of conditional statement tells you that if A is true, then B must also be true. It says nothing about the truth of B in the case where A is false.

Let's look at an example.

Example

Write the statement as a conditional statement.

"All dogs have fur."

We need to create a hypothesis and a conclusion from the statement "All dogs have fur.", and write it as an if/then statement. In this statement, the hypothesis is "It's a dog" and the conclusion is "it has fur". This makes the conditional statement

"If it's a dog, then it has fur."

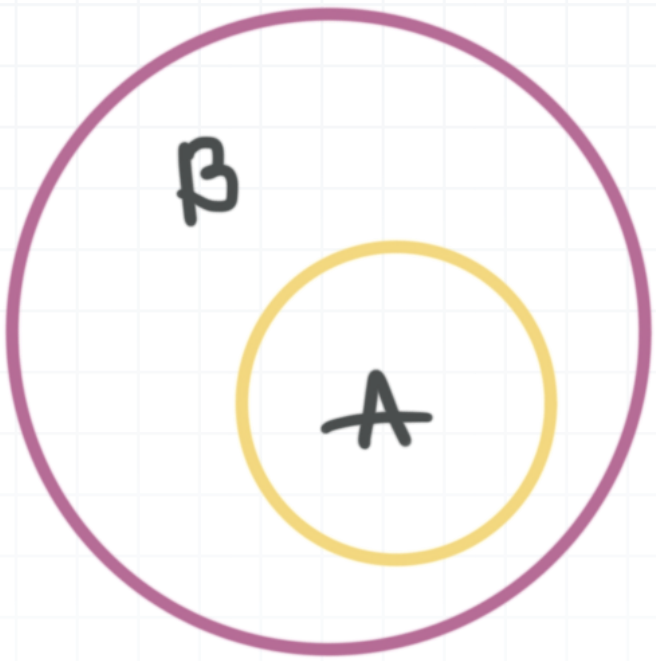
Because we were told that all dogs have fur, we know that if something is a dog, then it must have fur.

Euler diagrams

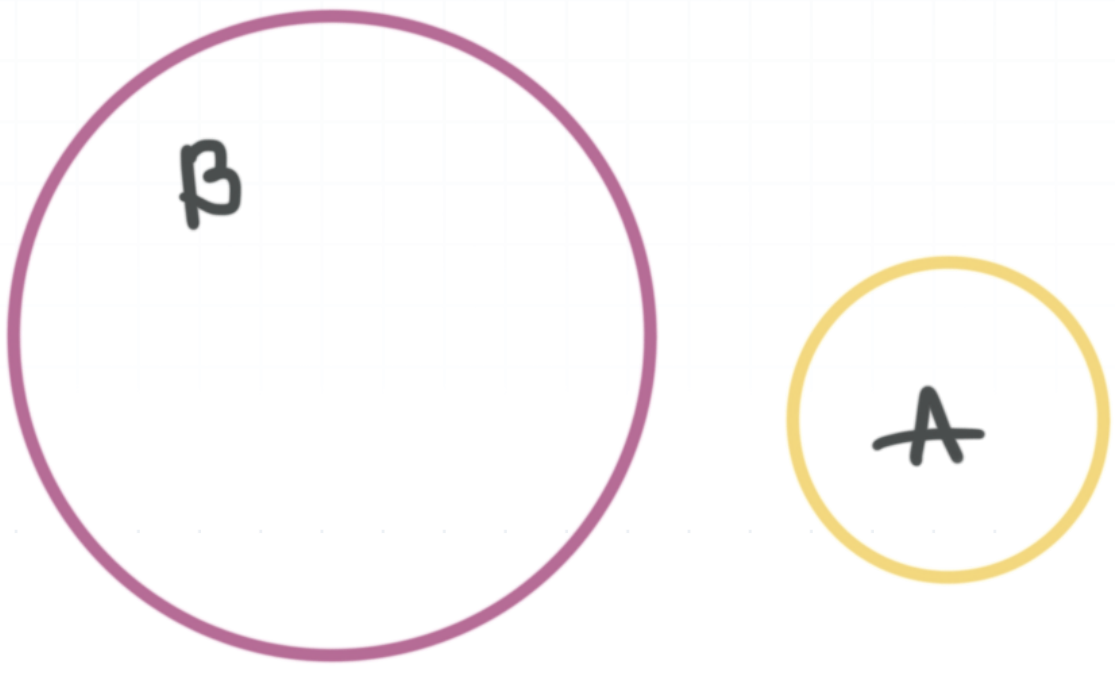
An **Euler diagram** shows the exact relationship described in a conditional statement. It's different from a Venn diagram, because a Venn diagram would show all of the possibilities, including the ones not described in the conditional statement.

The conditional statement and corresponding Euler diagram often take one of the following two forms:

"If A, then B."



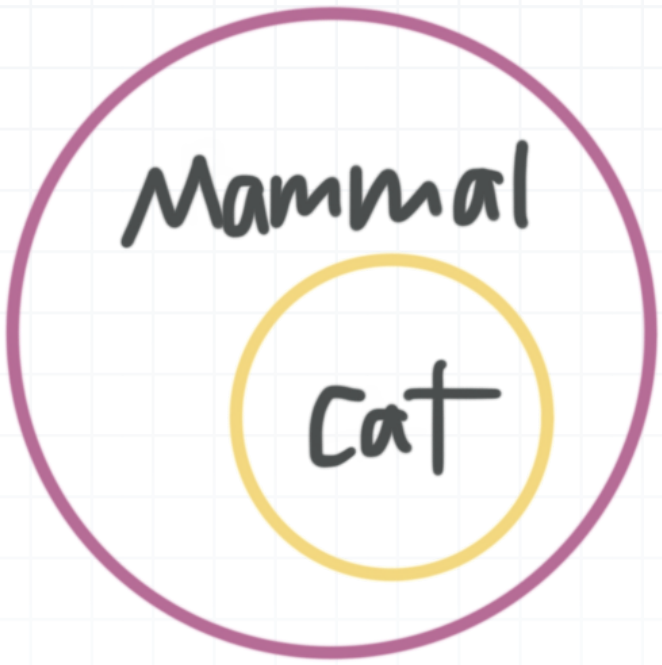
"If A, then not B."



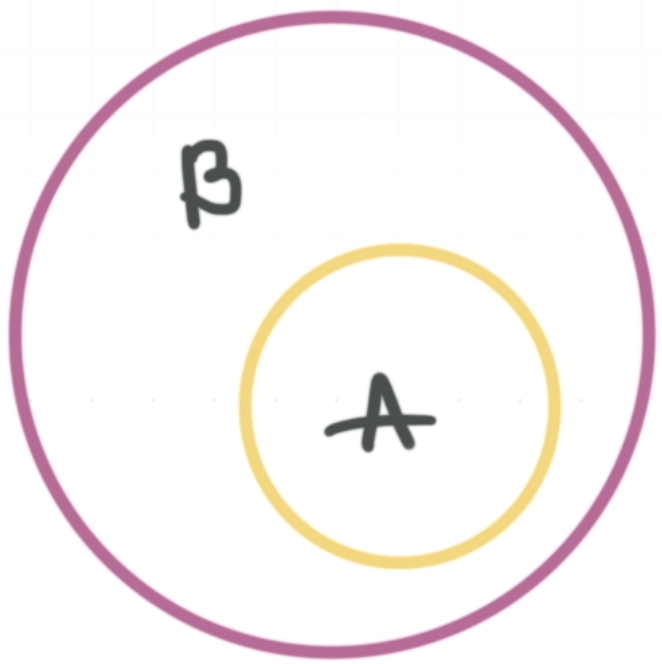
Let's look at an example.

Example

What is the conditional statement represented by the Euler diagram?



The conditional statement will have the form "If A, then B."



So we replace A and B with the words from the diagram, and we write

"If it's a cat, then it's a mammal."

Let's tie the ideas of conditional statement and Euler diagram together.

Example

Write the following statement as a conditional statement and draw the corresponding Euler diagram.

> "I get my allowance when I do my homework."

Let's think about which action comes first. First, the homework gets done. Then the allowance is received. This makes the conditional statement

> "If I do my homework, then I get my allowance."

A represents doing the homework, and B represents getting the allowance, which makes the Euler diagram