Conditional Statements

If. . . then. . .

Given statements P and Q, we can form a new statement "If P, then Q".

- ▶ If (it is raining), then (it is cloudy).
- ▶ If (a number is divisible by 6), then (it is even).

These are called **conditional statements.**

Symbolically

$$P \implies Q$$

.

If. . . then..

Truth of the first statement forces truth of the second statement.

Alternatives

- If P, then Q
- Q if P
- Q whenever P
- Q, provided that P
- Whenever P, then also Q
- P is a sufficient condition for Q

more alternatives

- ▶ For Q, it is sufficient that P
- ▶ Q is a necessary condition for P
- ▶ For P, it is necessary that Q
- ▶ P only if Q

Example

A matrix is invertible provided that its determinant is non-zero.

Example

An integer is divisible by 8 only if it is divisible by 4.

Example

Being a native born citizen over the age of 35 is sufficient to be
eligible to be elected president of the US.

Example

Being over the age of 35 is necessary to be elected president of the US.