Lecture 1

Examples

- $2+2=4$ (true proposition)
- Is maths fun? (not a proposition)
- $x+2=1$ (neither true nor false) — x is not specified
- $2+2=5$ (false proposition)
- $3<5$ (true proposition)

Negation: $\neg(3<5)$ is false.

Logical and: $(0>2) \wedge (2+2=4)$ is false

Logical or: $(0>2) \vee (2+2=4)$ is true

Logical implication

- Political promises: if you elect me, then I will do this ...
- $(0>2) \Longrightarrow (2+2=4)$ (true implication)

I may take the train	I have a train ticket	(may take the train $\Rightarrow$ I have a ticket
T	T	T
T	F	F
F	T	T
F	F	T

Logical bi-implication

$(0 \neq 2) \Leftrightarrow (2+2=4)$ false

Exclusive or $(0>2) \oplus (2+2=4)$ true