The universal quantifier Predicate logic

Prof Hans Georg Schaathun

Høgskolen i Ålesund

Autumn 2013 – Part 2/Session 3/Video 2 Recorded: 15th August 2013



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Two important quantifiers

Existential a suitable x exists in the universe

$$\exists x \in U, P(x)$$

Universal every x is suitable

$$\forall x \in U, P(x)$$

Image: A matrix

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$$s :=$$
 for every integer $m, m^2 > m$



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We proved the statement false by finding one value of *m*, such that $m^2 \leq m$.

Principle (Proof by counter-example)

To show that a statement with universal quantifier, it is sufficient to identify one value of the variable that gives a false statement.



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The universal quantifier

Consider two statements

- every student passed the exam
- some student failed the exam

Define predicate symbols and formulate the two statements in symbolic form.

Is there an implication between the statements? Are they equivalent?



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