Computational Thinking

Discrete Mathematics

Topic 02 : Logic

Number Theory

Logic

Lecture 03 : Quantifiers

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Graphs and
Networks

Discrete Maths

Collections

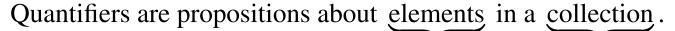Autumn Semester, 2023

Outline

Enumeration — Relations & Functions

Outline

- We use quantifier in everyday speech, but parsing and representing them using symbolic logic takes effort. So we being this topic with some examples to motivate our discussion.
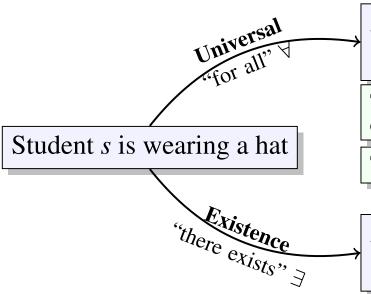
Motivation

vs.

Quantifiers are propositions about $\underbrace{\text{elements}}_{\text{students}}$ in a $\underbrace{\text{collection}}_{\text{class}}$.

Student s is wearing a hat

Universal "for all" $\forall$

All students in this class are wearing hats
$\forall s$ (this class) [Student s is wearing a hat]

To Prove: We NEED to check that proposition is **True** for EVERY element in the collection

To Disprove: We ONLY NEED find ONE EXAMPLE with proposition is **False**

Existence "there exists" $\exists$

At least one student in this class is wearing a hat
$\exists s$ (this class) [Student s is wearing a hat]

To Prove: We ONLY NEED find ONE EXAMPLE with proposition is **True**

To Disprove: We NEED to check that proposition is **False** for EVERY element in the collection