

Logical Operators

* Proposition

- declarative sentence that is true or false, not both
- proposition variables - variables that can represent a statement
- p and q - notation $p \wedge q$
- p or q - $p \vee q$
- negation - $\sim p$

* Predicate

- if $P(x)$, then
- $P(x)$ is a predicate or propositional function
- $P(x) : x \in \mathbb{Z} < 8$
- $P(9) = F$ $P(1) = T$

* Universal quantifier

- for all x , $P(x) = T$
- $\forall x P(x) = T$ or F (proposition)

* Existential quantifier

- There exist a value for x for which $P(x)$ is true
- $\exists x P(x)$
- There has to be a value in the proposition

* Negation quantifier

- $\sim \exists x P(x) \rightarrow$ There does not exist for which $P(x)$ is true
- $\sim \exists x (P_x) = \forall x \sim P(x)$
- $\sim \forall x (P_x) = \exists x \sim P(x)$