Dungeons and De Morgan's

Cheat Sheet

THIS CHEAT SHEET is designed to aid you in playing the game. It contains the basic logical concepts you will need to understand and prove the lemmas.

Basic definitions

Logical statement. This is a sentence that is either true or false.

> **EXAMPLES**
>
> "All cats are grey" is a statement whereas "What's the next song?" is not a statement.

Truth values. The truth value of a logical statement is the determination of whether it is true or false.

> **EXAMPLES**
>
> The truth value of '2 is the only prime number which is even' is true whereas the truth value of '3 is the only prime number which is odd' is false.

Logical connectives

And (∧). The statement $P \wedge Q$ is true if each of P and Q are true. $P \wedge Q$ is false if at least one of the two statements is false.

$P \wedge Q$ **TRUTH TABLE**

P	Q	$P \wedge Q$
true	true	true
true	false	false
false	true	false
false	false	false

Or (∨). The statement P is true if one of P and Q is true. $P \vee Q$ is false if both two statements are false.

$P \vee Q$ **TRUTH TABLE**

P	Q	$P \vee Q$
true	true	true
true	false	true
false	true	true
false	false	false

Not (¬). The statement $\neg P$ is true if P is false and false otherwise.

$\neg P$ **TRUTH TABLE**

P	$\neg P$
true	false
false	true

Implies (→). The conditional statement $P \rightarrow Q$ is false if P is true and Q is false. In all other cases $P \rightarrow Q$ is true.

$P \rightarrow Q$ **TRUTH TABLE**

P	Q	$P \rightarrow Q$
true	true	true
true	false	false
false	true	true
false	false	true

Notes:

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