BITS Pilani Hyderabad Campus
CS F214 Logic in Computer Science,
I Semester 2021-2022
Lecture Notes
Lecture 20

Proposition: Let ϕ be a formula of propositional logic. Then ϕ is satisfiable iff $\neg\phi$ is not valid.

Proof: Suppose ϕ is satisfiable.
Then there exist a valuation of ϕ, in which ϕ evaluates to true. In this valuation $\neg\phi$ evaluates to false.
$\therefore \neg\phi$ is not valid.

To prove the converse, suppose $\neg\phi$ is not valid. Then, there exists a valuation for which $\neg\phi$ is false.
For the same valuation, we have ϕ evaluates to True.
Since $\phi \equiv \neg\neg\phi$.

$\therefore \phi$ is satisfiable.