CS 512 Formal Methods, Fall 2018	Instructor: Assaf Kfoury
Lecture 5	
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(These lecture notes are **not** proofread and proof-checked by the instructor.)

1 Validity of Propositional Logic

- The term "valid" is a semantic notion. We use the term "valid" in context of semantics.
- It is recommended to use the term "valid" to represent semantic entailment (\models).

2 Classical Propositional logic and Intuitionistic Propositional Logic

- We deal the tableaux (analytic tableaux) method as a decision procedure for classical propositional logic and intuitionistic propositional logic.
- In classical propositional logic and intuitionistic propositional logic, we are not allowed to use the "Law of the Excluded Middle".

3 Tableaux Method

- See expansion rules of the tableaux method on HO10 slide 6
- See an example of the tableaux method on HO10 slide 8
- A heuristic rule to use the tableaux method: "expand conjunctions as much as possible before disjunctions"
- To show a single or a set of wffs is valid, we show its negation is a contradiction.
- If all branches are closed, then it is not satisfiable (contradiction). Otherwise, it is satisfiable.
- Refutation Completeness of Tableaux: For a finite set Γ of propositional wff's, if $\Gamma \models \perp$, then there is a closed tableau for Γ .
- Soundness of Tableaux: For a finite set Γ of propositional wff's, if there is a closed tableau for Γ , then $\Gamma \models \perp$.