

## Lecture-3 Main Points

- Formal definition of a derivation/deduction/proof as a tree.
- Purely syntactic nature of a derivation.
- Derived rules.

- Example: Cut rule

- Intuitionistic Logic (IL)

- Minimal Logic +  $\perp_i$

- Some judgements such as,  $\vdash \neg\neg A \rightarrow A$  and the law of excluded middle,  $\vdash A \vee \neg A$  can't be derived in IL (mentioned without proof).

- Proof by contradiction principle

- $$\frac{\Gamma, \neg A \vdash \perp}{\Gamma \vdash A} \perp_c$$

- Classical Logic (CL)

- IL +  $\perp_c$

- Example derivations in CL.