BITS Pilani
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CS/IS F214
Logic in Computer Science

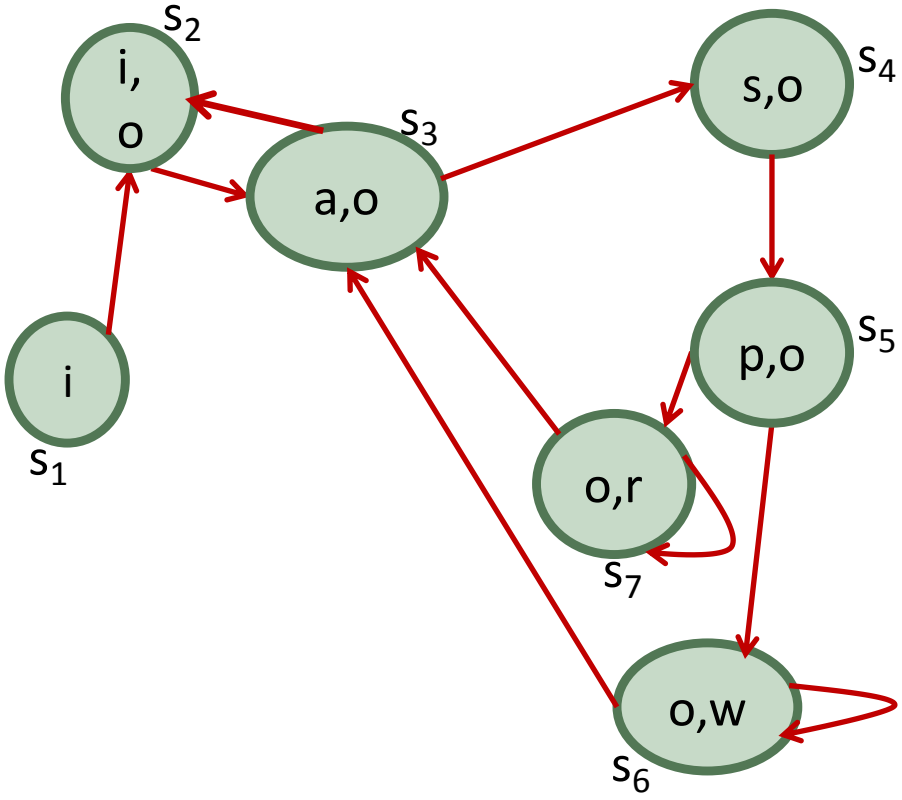
MODULE: **TEMPORAL LOGICS**

LTL: Semantics and Examples

Semantics of LTL formulas

- Let ***M*** **= (S, →, L)** be a model and **s** is a state in **S**.
- Let ϕ be an LTL formula.
- Then we say ***M,*** **s** $\models \phi$ if
  - *for every execution path* π **of** ***M*** *starting at* **s** :
  - $\pi \models \phi$

Examples



What do the following formulas mean?

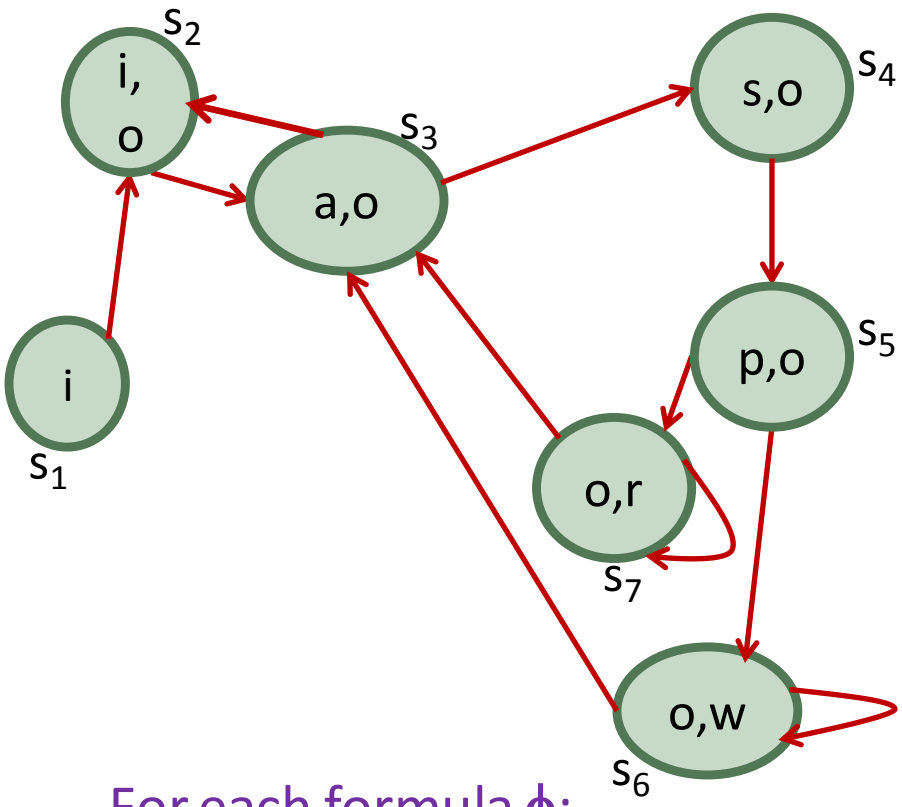
1) **X G o**
2) **F (w ∨ r)**
3) **X (o U w)**
4) **X X (a U w)**
5) **G F s**
6) **G F (w ∨ r)**
7) **G F ((w ∨ r) ∧ (X a))**

For each formula, ϕ argue whether

$$M, s_1 \models \phi$$

holds or not.

Examples



Consider the following formulas:

1) **X G o**
2) **F (w ∨ r)**
3) **X (o U w)**
4) **X X (a U w)**
5) **G F s**
6) **G F (w ∨ r)**
7) **G F ((w ∨ r) ∧ (X a))**

For each formula ϕ:

i. find whether there exists a state s_i such that **M, s_i |= ϕ**

ii. find whether in all states s_i **M, s_i |= ϕ**