```
Temporal logic

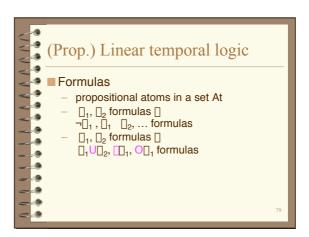
Varieties of temporal logic

- Linear time vs branching time

- Points vs intervals

- Discrete vs continuous (dense)

- Past vs future
```



```
(P)LTL: semantics

Models: linear-time structures

M = (S, □, □) where

- S is a set of states

- □: N □ S is an infinite sequence of states

- □: S □ P(At): truth assigment function

Notation: □<sub>i</sub> = □(i) and
□' is the suffix < □<sub>i</sub>, □<sub>i+1</sub>, ...>
```

```
PLTL semantics

Given M = (S, □, □),

M, □ ⊨ P □ P □ □(□₀) (P □ At)

M, □ ⊨ ¬□ □ M, □ ⊭ □

M, □ ⊨ □₁ □₂ □ M, □ ⊨ □₁ or M, □ ⊨ □₂

M, □ ⊨ □□ □ M, □¹ ⊨ □

M, □ ⊨ □□ □ M, □¹ ⊨ □

M, □ ⊨ □□ □ M, □¹ ⊨ □
```

```
PLTL semantics

M, \Box \models \Box_1 \cup \Box_2 \Box

- (a) exists k \ge 0 s.t. M, \Box^k \models \Box_2 and for all 0 \le j < k: M, \Box^j \models \Box_1, or

- (b) for all j \ge 0: M, \Box^j \models \Box_1 (weak until)
```