TRIO
- It is a first-order linear-time temporal logic with past and future operators and a quantitative metric on time.
- Used for specification of large, real-life critical real-time systems.
- The language is very expressive but satisfiability is undecidable.
- Verification and Validation activities
  - Testing and simulation
  - Semi-automatic theorem proving techniques
  - Decidable approximations of the specification

Our Goal
- Verification of TRIO specifications using the Srvs model checker
- Dealing with a decidable subset of TRIO:
  - Natural numbers as time domain
  - Quantifiers only range on finite domains
  - Equivalent to LTL with past, but more compact and easier to use

The Model Checking Problem: $M \models \psi$
- Traditionally:
  - $M$ is an operational model
  - $\psi$ is an LTL formula
- Our approach:
  - $M$ is a TRIO specification (one or more axioms)
  - $\psi$ is a TRIO formula (one property)
  - We check for the satisfiability of $\neg(M \rightarrow \psi)$

TRIO formula
$\text{AlwF}(\text{push} \rightarrow \text{Lasts(on, 7)})$

Alternating automaton

Promela code
```
if (on & c < 7) {
  c = 7;
  Lasts;
}
```

References