

Modelling of Complex Systems

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I followed the instructions and made sure all proof obligations were met. I also simulated **machine3** a few times to be sure. The number of states in **ProB** equals 26 which appears to be correct.

Custom constants

I added 2 constants ; one called **first_pass** (to make it easier to enforce that every first pass is unique) and one called **tracks_undirected** making it easier to encode some axiom enforcing symmetry of tracks such that it doesn't have to be done manually.

LTL and CTL assertions

The 4 assertions were encoded as follows :

$$\begin{aligned} & \text{AG} (\text{EF} (\{\text{in_train} = \text{TRUE}\} \ \& \ \text{not}(\text{e}(\text{hop_off}) \text{ or } \text{e}(\text{go_to_next})))) \\ & \quad \text{G} (\{\text{in_train} = \text{TRUE}\} \Rightarrow ([\text{go_to_next}] \text{ U } [\text{hop_off}])) \\ & \quad \quad \text{AF} (\text{AG} ([\text{hop_on}] \text{ or } [\text{hop_off}])) \\ & \text{AG} (\{\text{current_station} = \text{A}\} \Rightarrow \text{not}(\text{E not}(\{\text{current_station} = \text{C}\}) \text{ U } \{\text{current_station} = \text{F}\})) \end{aligned}$$

I worked about 10 hours on the program (without considering the problems with installation & bugs).