SOEN331: Introduction to Formal Methods for Software Engineering
Assignment 2 on Extended Finite State Machines

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1 Driver-less car system formal specification

The EFSM of the driver-less car system is the tuple $S = (Q, \Sigma_1, \Sigma_2, q_0, V, \Lambda)$, where

$Q = \{Idle\ (Parked), Manual\ Mode, Cruise\ Mode, Panic\ Mode\}$

$\Sigma_1 = \{State\ engine, shut\ off\ engine, drive\ signal, parked\ signal, cruise\ signal, manual\ signal,$
$car\ arrived\ at\ destination, panic\ mode\ off, unforeseen\ event\ or\ panic\ signal\}$

$\Sigma_2 = \{beep, stop\ car, turn\ on, hazard\ lights, turn\ off\ hazard\ lights\}$

$q_0 : Idle\ (Parked)$

$V : \{\}$

Λ: Transition specifications

1. $\rightarrow Idle\ (Parked)$
2. $Idle\ (Parked) \xrightarrow{\text{cruise signal [destination is set]}} Cruise\ Mode$
3. $Idle\ (Parked) \xrightarrow{\text{drive signal}} Manual\ Mode$
4. $Manual\ Mode \xrightarrow{\text{cruise signal [destination is set]}} Cruise\ Mode$
5. $Cruise\ Mode \xrightarrow{\text{car arrived at destination}} Idle\ (Parked)$
6. $Idle\ (Parked) \xrightarrow{\text{cruise signal [destination is not set] / beep}} Idle\ (Parked)$
7. $Manual\ Mode \xrightarrow{\text{parked signal [car is stopped]}} Idle\ (Parked)$
8. $Cruise\ Mode \xrightarrow{\text{unforeseen event or panic signal / stop car ; turn on hazard lights}} Panic\ Mode$
9. $Panic\ Mode \xrightarrow{\text{panic mode off / turn off hazard lights}} Idle\ (Parked)$
10. $Manual\ Mode \xrightarrow{\text{cruise signal [destination is not set] / beep}} Manual\ Mode$
11. $Cruise\ Mode \xrightarrow{\text{manual signal}} Manual\ Mode$
12. $Idle\ (Parked) \xrightarrow{\text{shut off engine}} Exit$

2 UML state diagrams