

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

$Q = \{idle, parked\ mode, manual\ mode, cruise\ mode, marked\ mode, panic\ mode\}$

$\Sigma_1 = \{start, cruise\ signal, switch, arrived, unforeseen, panic\ off, off\}$

$\Sigma_2 = \{lock, unlock, beep\}$

$q_0 : idle$

$V : destination = \{set, no\}$

$\Lambda$ : Transition specifications

1.  $\rightarrow idle$
2.  $idle \xrightarrow{start} parkedmode$
3.  $parked\ mode \xrightarrow{off} off?$
4.  $parked\ mode \xrightarrow{cruise\ signal\ [no\ dest]} manual\ mode$
5.  $parked\ mode \xrightarrow{cruise\ signal\ [set\ dest] / beep} cruise\ mode$

6. *manual mode*  $\xrightarrow{\text{cruise signal [set dest]}}$  *cruise mode*
7. *cruise mode*  $\xrightarrow{\text{switch}}$  *manual mode*
8. *cruise mode*  $\xrightarrow{\text{arrived}}$  *parked mode*
9. *cruise mode*  $\xrightarrow{\text{unforseen}}$  *panic mode*
10. *manual mode*  $\xrightarrow{\text{stop}}$  *marked mode*
11. *panic mode*  $\xrightarrow{\text{panic off / hazard off}}$  *manual mode*

The UML state diagram is shown in Figure 1.

## 2 UML state diagrams

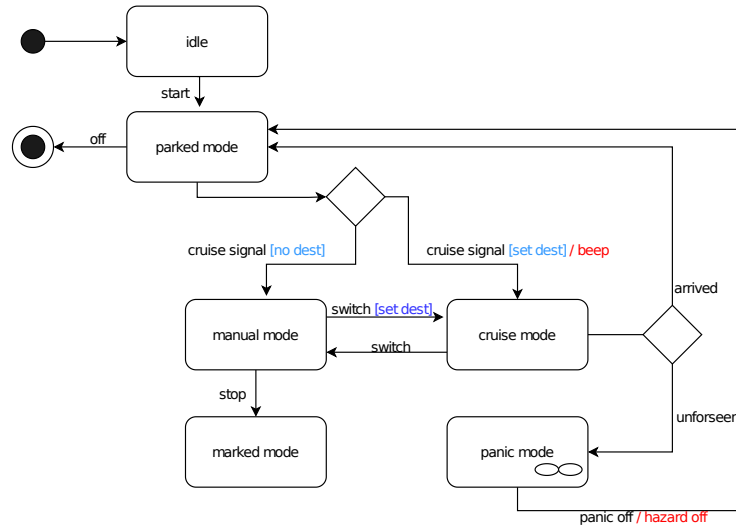


Figure 1: Main System.