SOEN331: Introduction to Formal Methods for Software Engineering
Assignment 1 on extended finite state machines

Author's name

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1 Washing Machine formal specification

The EFSM of the washing machine is the tuple $S = (Q, \Sigma_1, \Sigma_2, q_0, V, \Lambda)$, where

$Q = \{off, on\}$

$\Sigma_1 = \{powerOn, powerOff\}$

$\Sigma_2 = \{beep; lightOff\}$

$q_0 : off$

$V : \{\}$

Λ: Transition specifications

1. $\rightarrow off$
2. $off \xrightarrow{\text{powerOn}} on$
3. $on \xrightarrow{\text{powerOff / beep; lightOff}} off$

As *on* is a composite state, it is defined as the tuple $S = (Q, \Sigma_1, \Sigma_2, q_0, V, \Lambda)$, where

$Q = \{operating, service\}$

$\Sigma_1 = \{service[idle], serviceDone\}$

$\Sigma_2 = \{10secBlink; longBeep\}$

$q_0 : operating$

$V : \{\}$

Λ: Transition specifications

1. $\xrightarrow{\text{/10secBlink;longBeep}} operating$
2. $operating \xrightarrow{\text{service [idle]}} service$
3. $service \xrightarrow{\text{serviceDone}} operating$

As *operating* is a composite state, it is defined as the tuple $S = (Q, \Sigma_1, \Sigma_2, q_0, V, \Lambda)$, where

$Q = \{idle, standby, active\}$

$\Sigma_1 = \{start - finish, cancel[setting], cancel, powerLost, regainPower\}$

$\Sigma_2 = \{lightOn, unlock, clearSettings\}$

$q_0 : idle$

$V : \{\}$

Λ: Transition specifications

1. $\xrightarrow{\text{/lightOn}} idle$
2. $idle \xrightarrow{\text{start-finish}} active$
3. $active \xrightarrow{\text{cancel}} idle$
4. $active \xrightarrow{\text{/unlock}} idle$
5. $active \xrightarrow{\text{cancel [setting] / clearSettings}} idle$
6. $active \xrightarrow{\text{powerLost}} standby$
7. $standby \xrightarrow{\text{regainPower}} active$

The UML state diagram is shown in Figure 1.

2 UML state diagrams

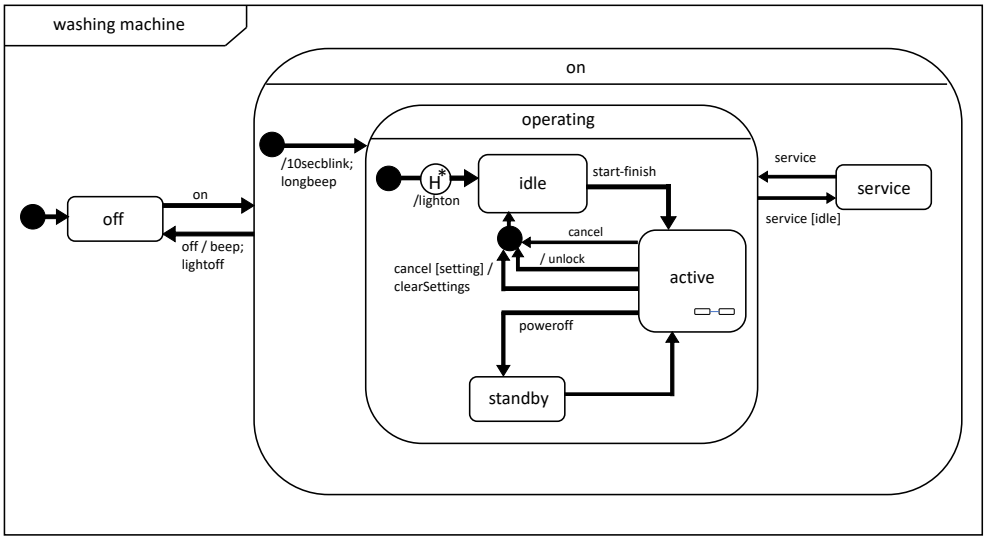

Figure 1: Washing Machine.