Software Design, Modeling, and Analysis in UML

http://swt.informatik.uni-freiburg.de/teaching/WS2016-17/sdmauml

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Exercise Sheet 6.A

Early submission: Monday, 2017-01-16, 12:00   Regular submission: Tuesday, 2017-01-17, 8:00

Note: there will be an Exercise Sheet 6.B available early next year (with extended submission time) for the second half of the 20 points.

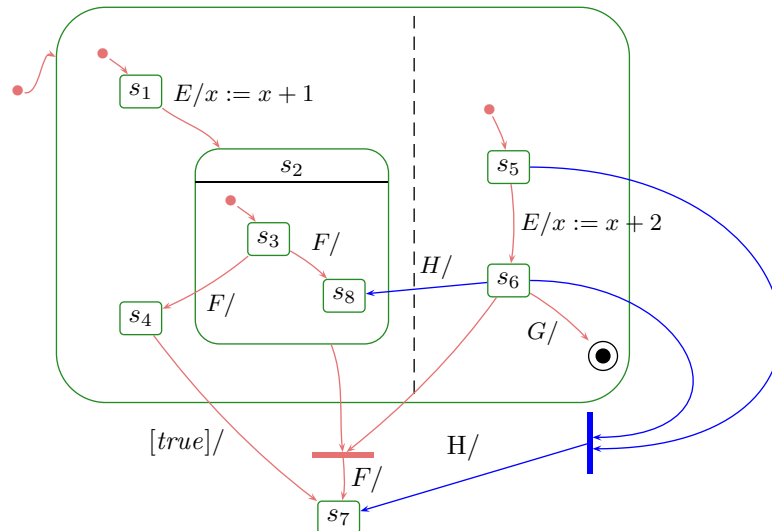## Exercise 1   (10/10 Points)

Figure 1: Hierarchical State Machine.

Consider the hierarchical state machine shown in Figure 1.

(i) Provide the mathematical representation of the diagram in Figure 1.   (2)

(ii) Point out an example of a basic, composite, OR-, AND-, and final state, and one pseudo-state.   (2)

(iii) Are the blue transitions legal or not? Explain in convincing detail why.   (2)

  Consider all legal transitions in the following tasks.

(iv) Assume the considered state machine belongs to class C with attribute $x : Int$ and we have one instance u of C in σ with $\sigma(u)(x) = 0$ and a global, shared ether

$$\varepsilon = \underline{(u, E_1)}.(u, E_2)$$

  where $E_1 \in \mathscr{D}(E)$ and $E_2 \in \mathscr{D}(F)$.

  Which behaviour is possible from (σ, ε)?

  Explain briefly, which transition(s) are taken why.   (2)

(v) Which behaviour is possible from (σ, ε) if $E_2 \in \mathscr{D}(G)$?
Will the object be alive at the end of all possible evolutions? (1)

(vi) Which behaviour is possible from (σ, ε) if $E_2 \in \mathscr{D}(H)$? (1)