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Software Design, Modeling, and Analysis in UML

Exercise Sheet 3

Early submission: Monday, 2015-11-23, 12:00   Regular submission: Tuesday, 2015-11-24, 10:00

Exercise 1   (6/20 Points)

Consider the object diagram shown in Figure 1.

(i) Provide a signature $\mathscr{S}$ and structure such that Figure 1 shows an object diagram of a system of state of $\mathscr{S}$.   (3)

(ii) An object diagram typically does not uniquely determine a corresponding signature. Point out which decisions need further information.

Which questions would you suggest to ask to the customer in order to take good decisions?
                                                                                          (2)

(iii) Present your signature from Task (i) as a class diagram.   (1)

Exercise 2   (5/20 Points)

Consider the set of class diagrams $\mathscr{CD}$ shown in Figure 2. Provide $\mathscr{S}(\mathscr{CD})$.

Exercise 3   (4/20 Points)

Provide a Rhapsody "object model diagram" corresponding to your class diagram from Exercise 1. Please submit an archive (zip, tgz, ...) of your Rhapsody project.

Hints:

- *To use Rhapsody, connect to* archithor.informatik.uni-freiburg.de *with some RDP client.*

- *The host can (for limited number of licences) only run a limited number of parallel instances of Rhapsody. If you don't get a license, please try again later. If the problem persists, tell me.*

- *In a Rhapsody model, classes and their structural relationships are specified by so-called* Object Model Diagrams.
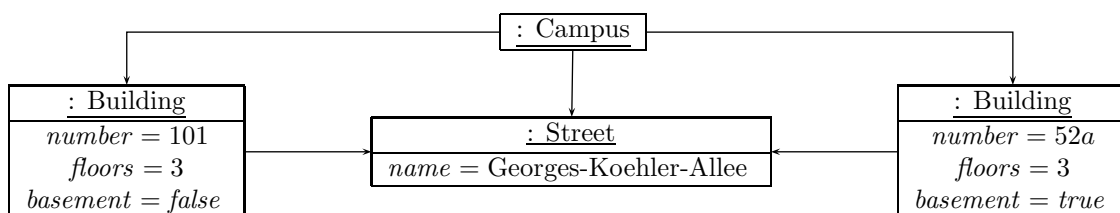

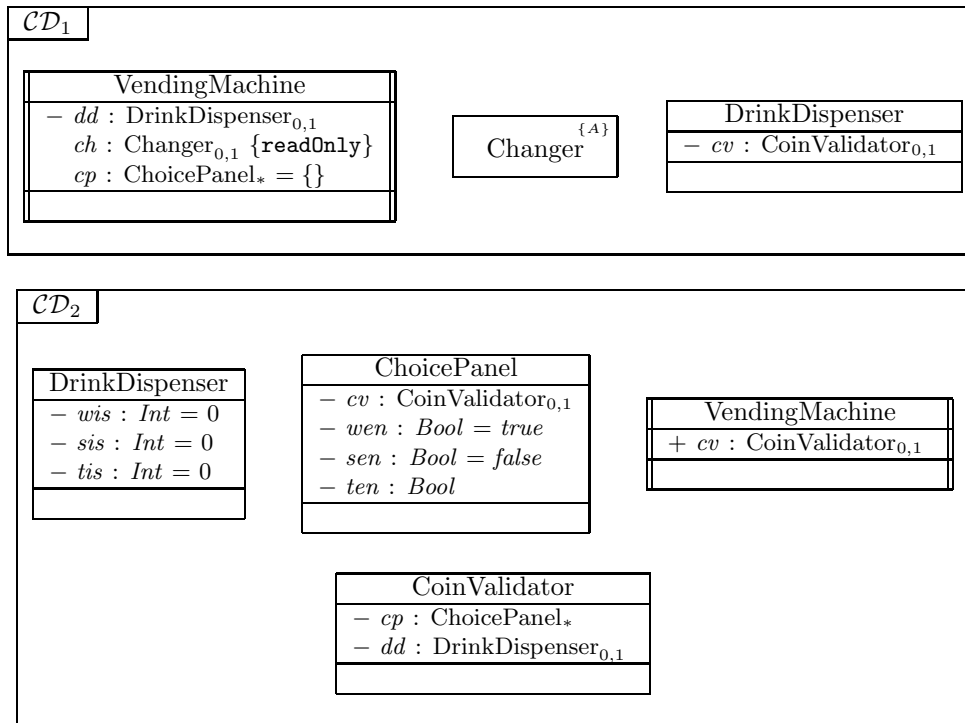Figure 1: Object Diagram for Exercise 1.

$\mathcal{CD}_1$

VendingMachine
− dd : DrinkDispenser$_{0,1}$
 ch : Changer$_{0,1}$ {readOnly}
 cp : ChoicePanel$_*$ = {}

Changer $^{\{A\}}$

DrinkDispenser
− cv : CoinValidator$_{0,1}$

$\mathcal{CD}_2$

DrinkDispenser
− wis : $Int = 0$
− sis : $Int = 0$
− tis : $Int = 0$

ChoicePanel
− cv : CoinValidator$_{0,1}$
− wen : $Bool = true$
− sen : $Bool = false$
− ten : $Bool$

VendingMachine
+ cv : CoinValidator$_{0,1}$

CoinValidator
− cp : ChoicePanel$_*$
− dd : DrinkDispenser$_{0,1}$

Figure 2: Class Diagram for Exercise 2

Exercise 4 (5/20 Points)

For each of the following OCL expressions discuss whether (and why) it is or is not well-formed when considering visibility.

(i) context CoinValidator inv : cp -> size > 0 (1)

(ii) context VendingMachine inv : not oclIsUndefined $(cp.cv)$ (2)

(iii) context VendingMachine inv : $dd.wis \leq 10$ (2)