

Foundations of UML Winter term 2009

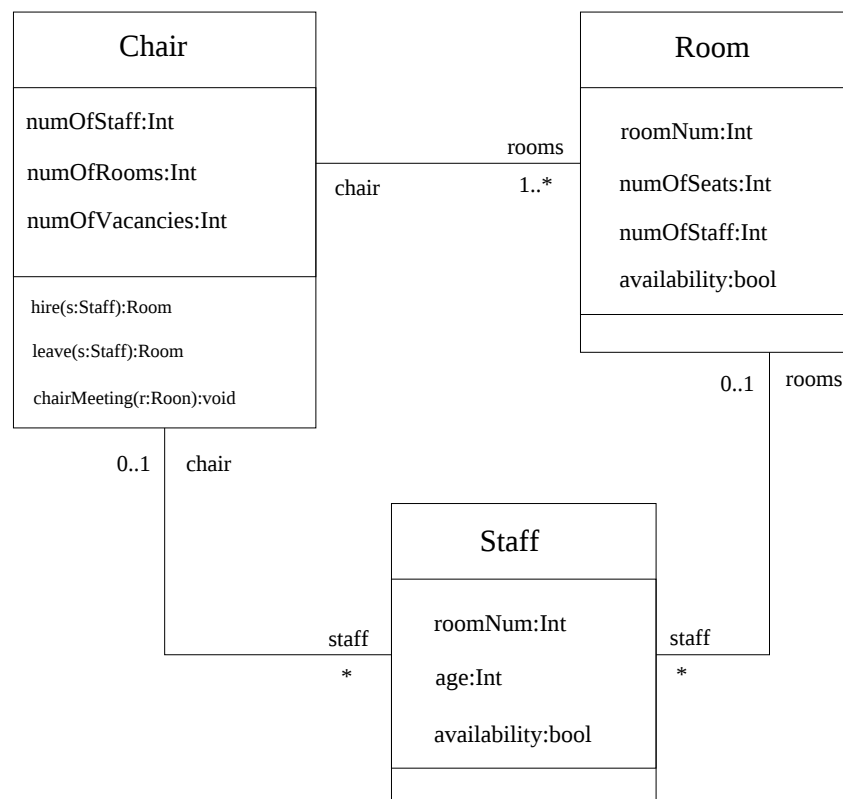
– Assignment 9 –

Hand in the solutions before the exercise class on February 10th.

Exercise 1

(15 points)

Given the following class diagram:



Determine the formal semantics of the following OCL expressions (i.e., translate the OCL expressions into the according temporal expressions).

a) invariant

context Chair

inv: $\text{staff} \rightarrow \text{size} \leq \text{rooms} \rightarrow \text{iterate}(r; y = 0 \mid y + r.\text{numOfSeats})$

b) pre and post condition:

context Chair::chairMeeting(r: Room)

pre: $(\text{staff.allInstance().availability} = \text{tt}) \text{ and } (r.\text{availability} = \text{tt}) \text{ and } (r.\text{numOfSeats} \geq \text{staff} \rightarrow \text{size})$

post: $(\text{staff.allInstance().availability} = \text{ff}) \text{ and } (r.\text{availability} = \text{ff})$

c) pre and post condition:

context Chair::hire(s:Staff)
pre: (numOfVacancies>0) and (not staff $\rightarrow$ includes(s))
post: staff $\rightarrow$ includes(s) and
 staff $\rightarrow$ size = (staff@pre $\rightarrow$ size) + 1 and
 vacancies $\rightarrow$ size = (vacancies@pre $\rightarrow$ size) - 1

Exercise 2

(6 points)

Prove or disprove the following equivalences of the temporal expressions:

a) $\Box\Phi \rightarrow \Diamond\Psi \equiv \Phi\mathbf{U}(\Psi \vee \neg\Phi)$

b) $\Box\Diamond\Phi \rightarrow \Box\Diamond\Phi \equiv \Box(\Phi \rightarrow \Diamond\Psi)$