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5.5 Testing during OOA



CRC Cards

◆ CRC

Class-Responsibility-Collaboration

CRC Cards



◆ Weakness

- Domain expertise is needed for OOA modeling

◆ Strength

- Powerful tool for highlighting missing or incorrect items ---- for **testing**

CRC Cards

- ◆ **For each class, fill in a card showing**
 - **Name of Class**
 - **Functionality (Responsibility)**
 - **List of classes it invokes (Collaboration)**



Testing during OOA

CLASS
Elevator Controller
RESPONSIBILITY
<ol style="list-style-type: none">1. Turn on elevator button2. Turn off elevator button3. Turn on floor button4. Turn off floor button5. Move elevator up one floor6. Move elevator down one floor7. Open elevator doors and start timer8. Close elevator doors after timeout9. Check requests10. Update requests
COLLABORATION
<ol style="list-style-type: none">1. Class Elevator Button2. Class Floor Button3. Class Elevator



CRC Cards

◆ Consider responsibility

- *1. Turn on elevator button*

◆ Problem

- **Totally unacceptable for object-oriented paradigm**
- **Responsibility-driven design ignored**
- **Information hiding ignored**

◆ Responsibility

- 1. Turn on elevator button*

should be

- 1. Send message to ElevatorButton to turn itself on*

CRC Cards

- ◆ A class has been overlooked
 - *ElevatorDoors* have a *state* that changes during execution (class characteristic)
 - Add class *ElevatorDoor*

CLASS

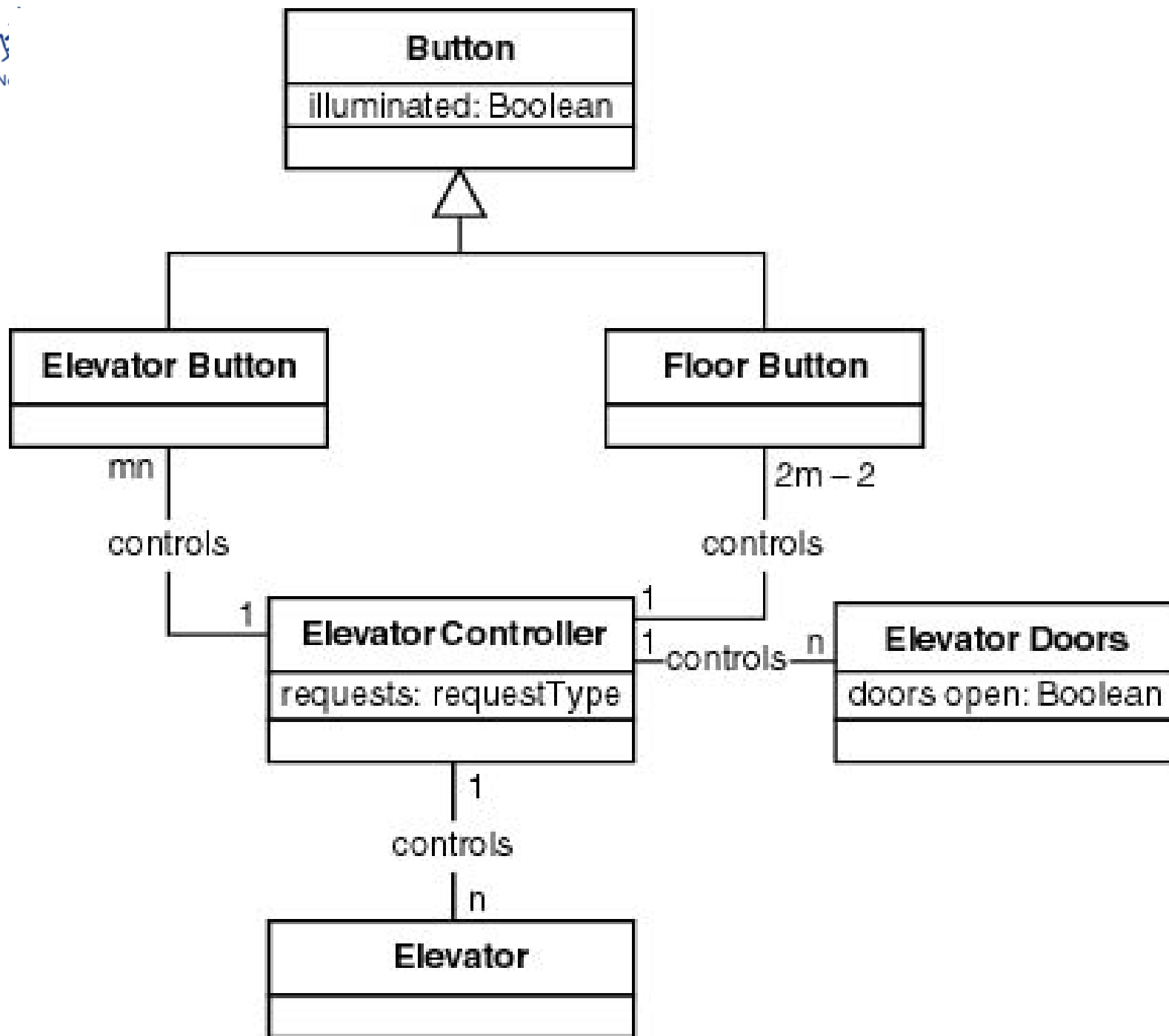
Elevator Controller

RESPONSIBILITY

1. Send message to **Elevator Button** to turn on button
2. Send message to **Elevator Button** to turn off button
3. Send message to **Floor Button** to turn on button
4. Send message to **Floor Button** to turn off button
5. Send message to **Elevator** to move up one floor
6. Send message to **Elevator** to move down one floor
7. Send message to **Elevator Doors** to open
8. Start timer
9. Send message to **Elevator Doors** to close after timeout
10. Check requests
11. Update requests

COLLABORATION

1. Subclass **Elevator Button**
2. Subclass **Floor Button**
3. Class **Elevator Doors**
4. Class **Elevator**



Elevator Problem: OOA

- ◆ Now, we have got correct class diagram for elevator system.
- ◆ So, the use case diagram and state diagram must be re-examined to see if they need further refinement.
- ◆ The use case diagram clearly still is adequate.
- ◆ The set of state diagrams must be extended to include the additional class **Elevator Door**.

Elevator Problem: OOA

- ◆ All three models are now fine.
- ◆ We should rather say:
 - All three models are fine *for now* .
- ◆ We may need to return to the object-oriented analysis phase during the object-oriented design phase.