

A THREE-PART INTERFACE FOR NEXT GENERATION REUSE: VARIATION, CUSTOMIZATION, AND USAGE

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THE VISION

Some years from now...

a software engineer is tasked to build a new application...



She broadly identifies domain-specific and generic concerns

She can access a virtual software engineering bookshelf filled with generic reusable concern units

- Complete set of models from requirements to implementation
- Interactive guidelines
 - Variations of the concern + their implications on system goals



A concern specialist is on call, if help is needed



CONCERN-ORIENTATION

A concern groups related functionality across all software development phases (from requirements models to design models and implementation), and provides three interfaces to facilitate reuse

Variation Interface

Customization Interface

Usage Interface

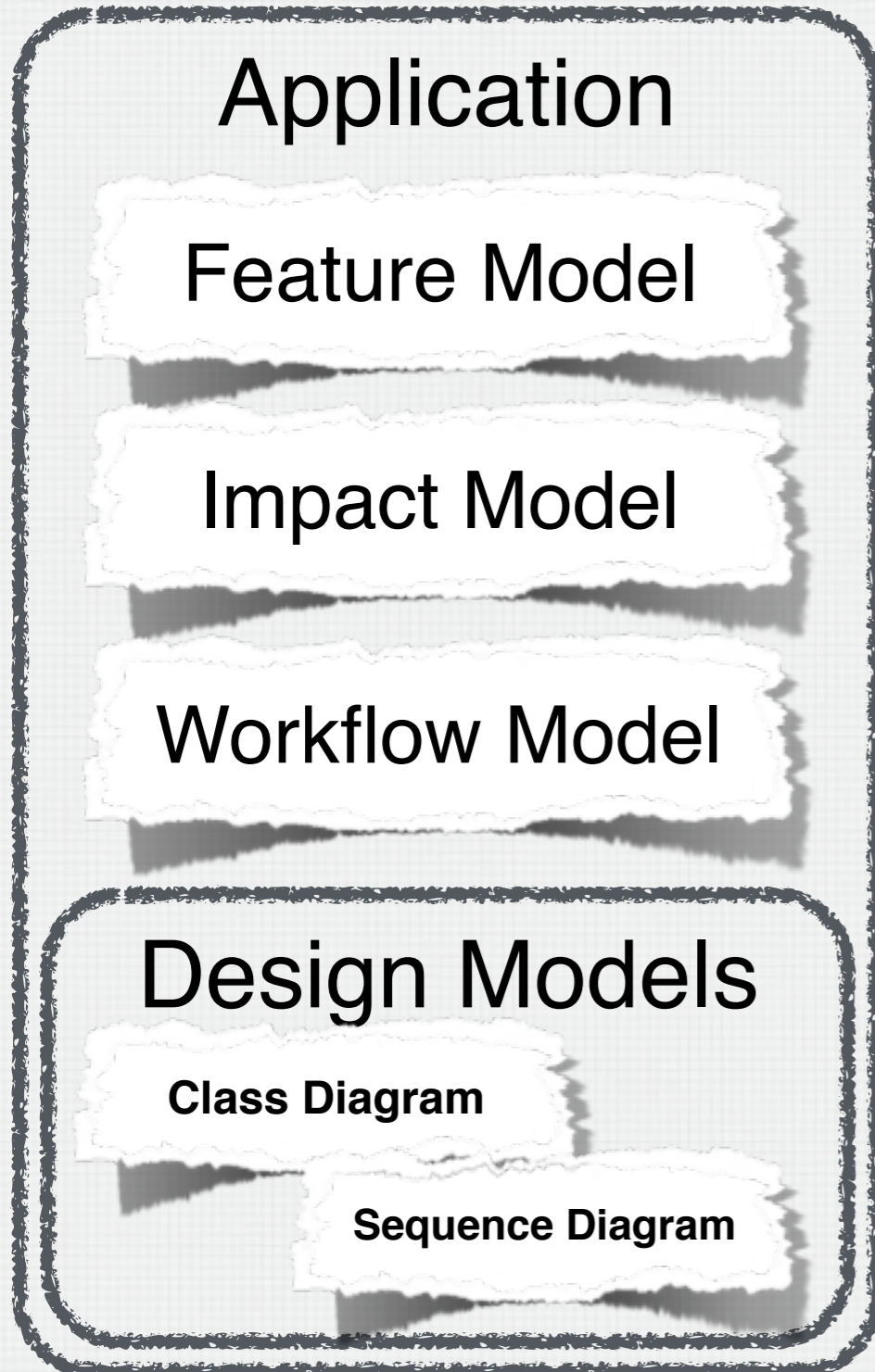
Feature Model and Impact Model

Provided for each notation used to describe concern

EXAMPLE

Provided by Reusable Concern Library

Generic Concern



←→
compose

←→
compose

←→
compose

←→
compose

VI

CI
&
UI

Access Control

Feature Model

Impact Model

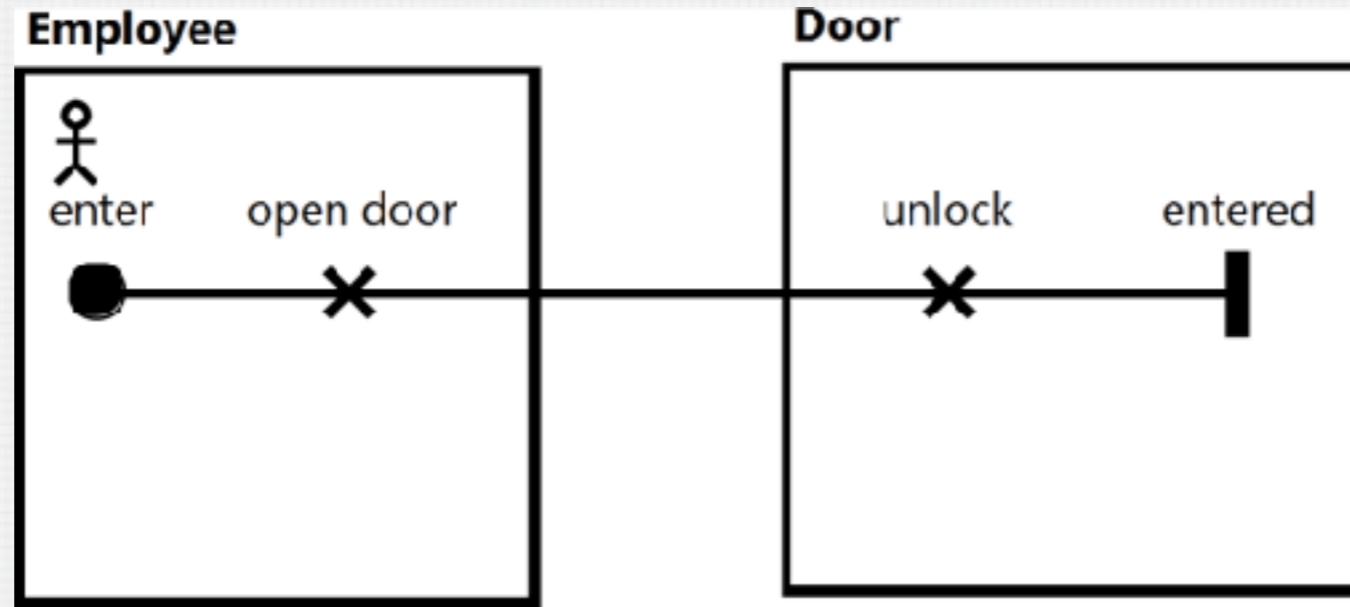
Workflow Model

Design Models

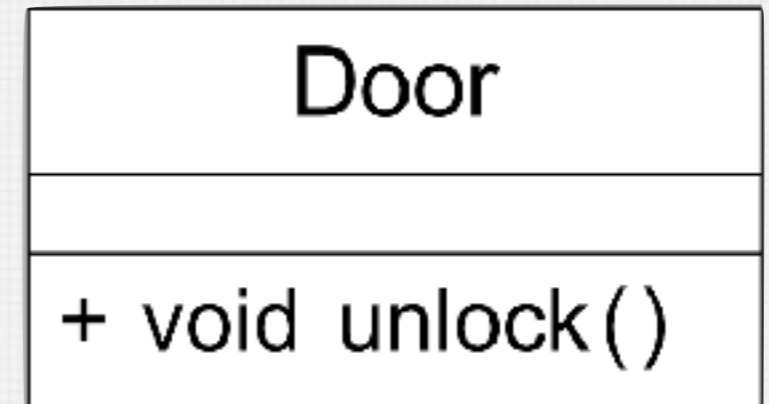
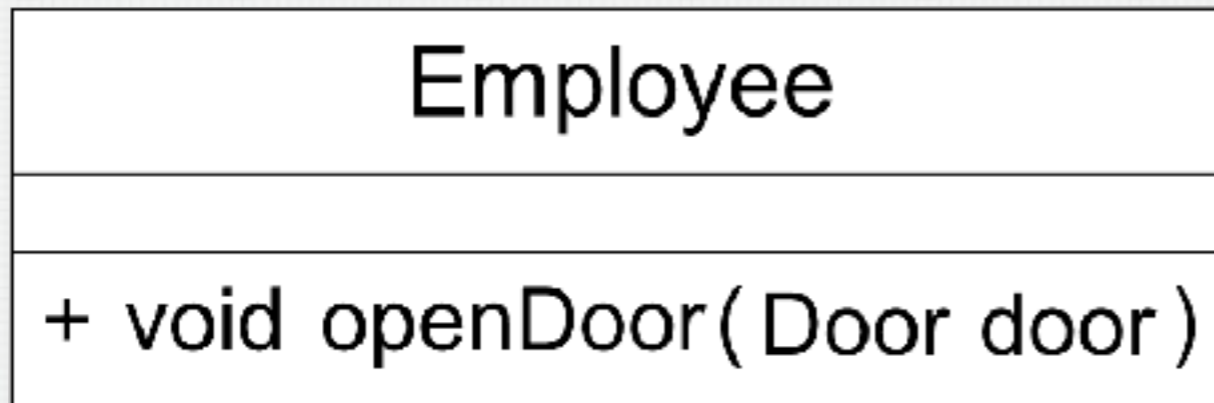
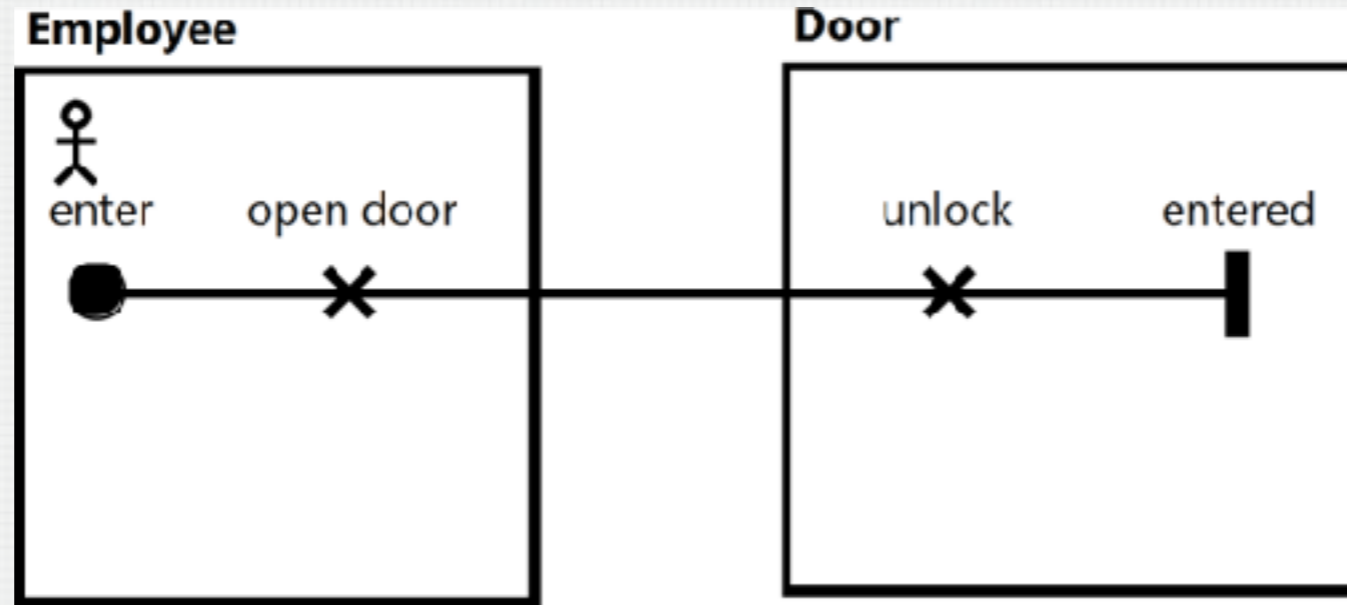
Class Diagram

Sequence Diagram

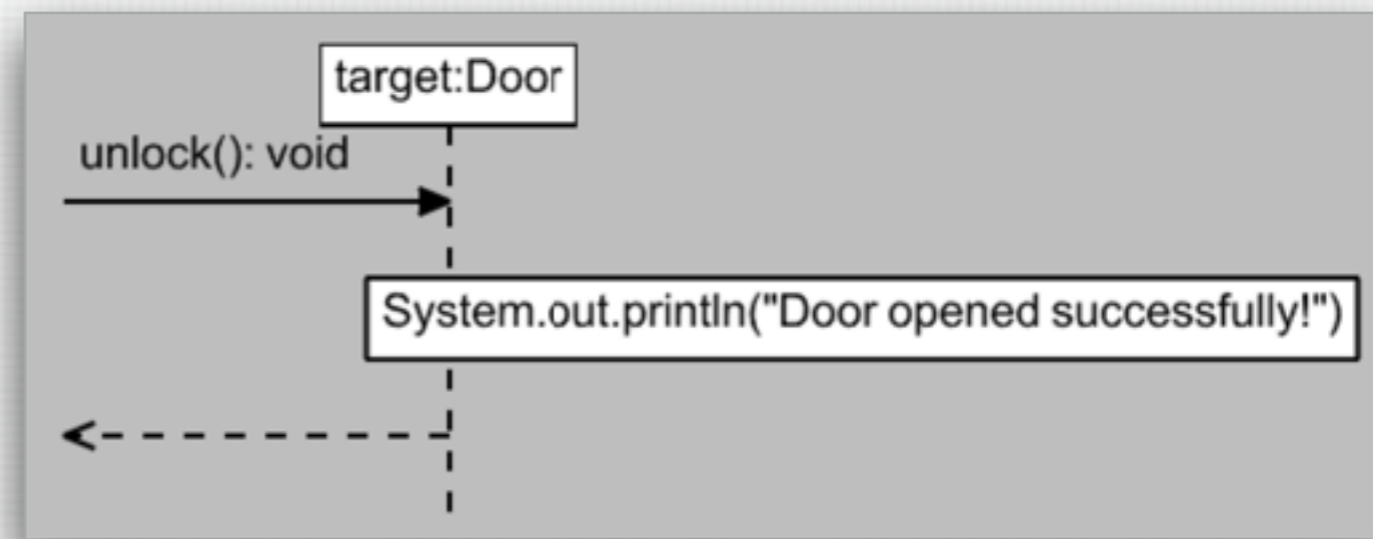
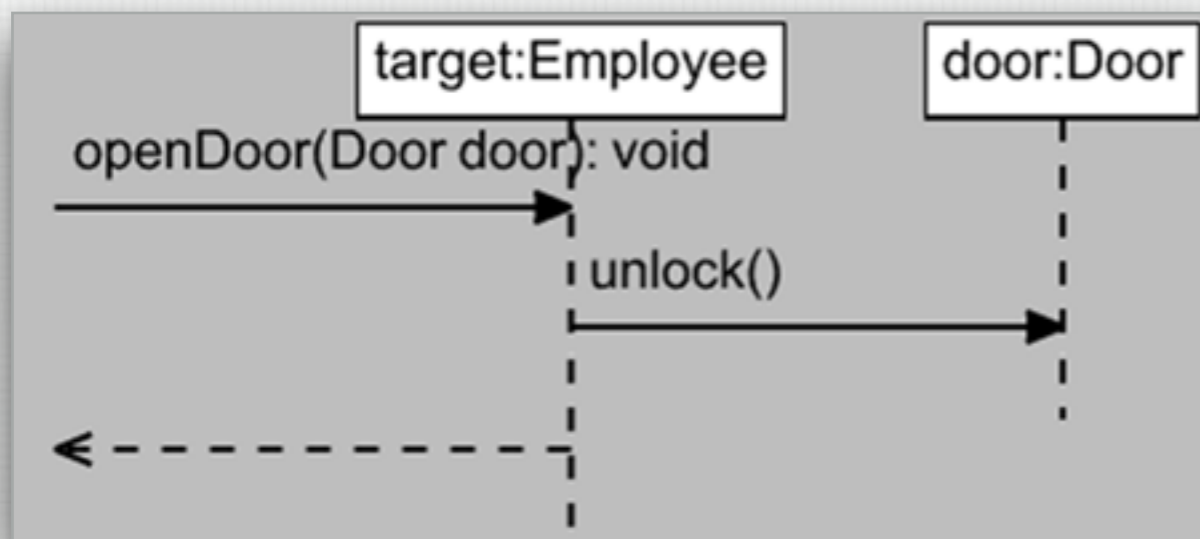
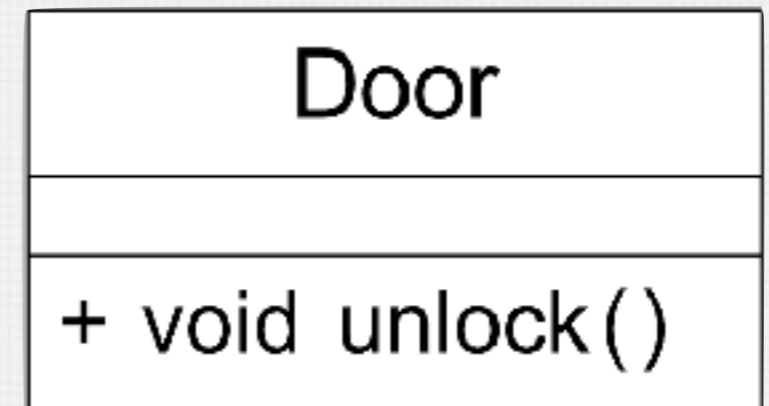
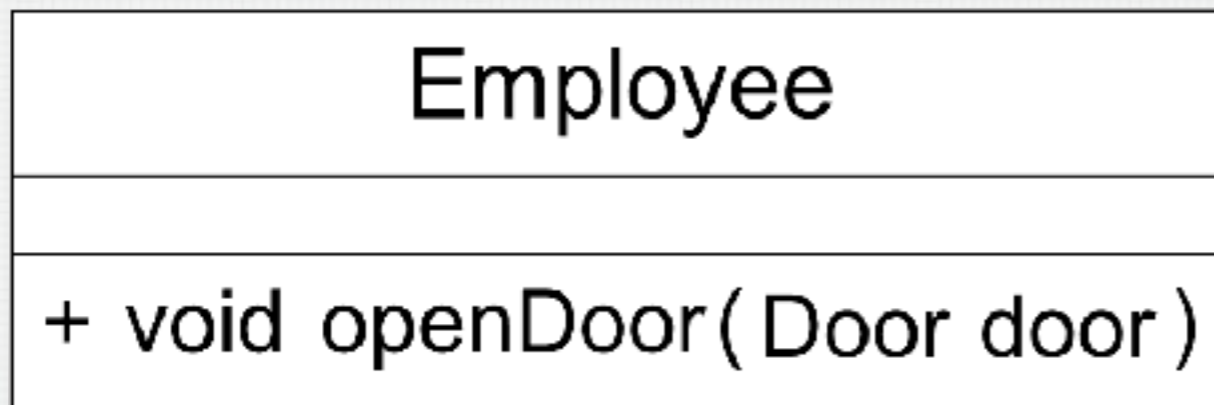
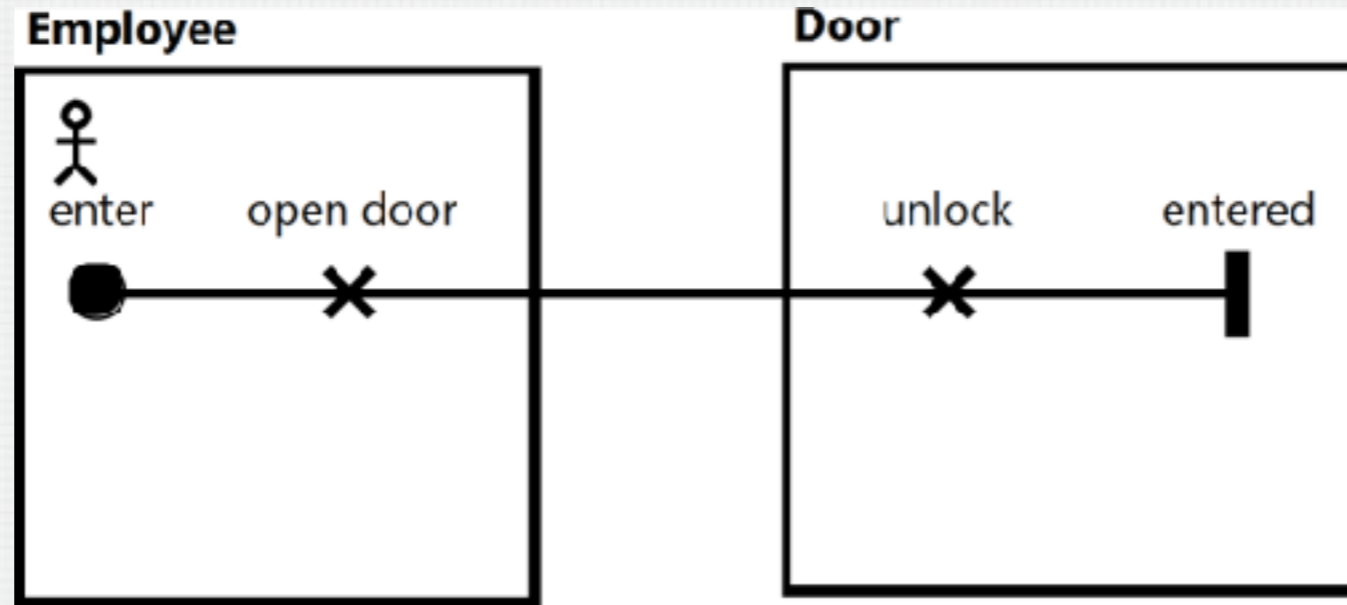
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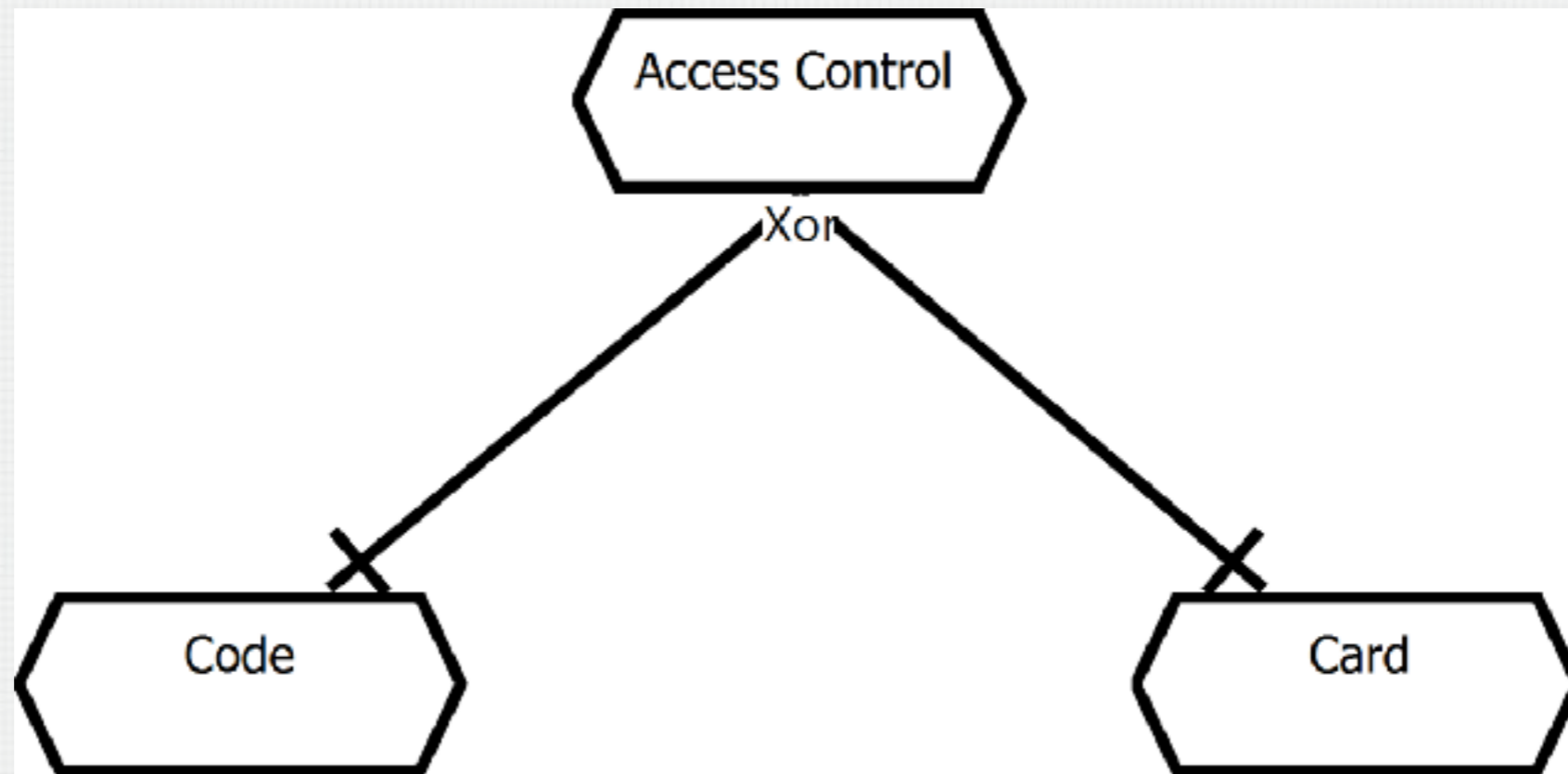
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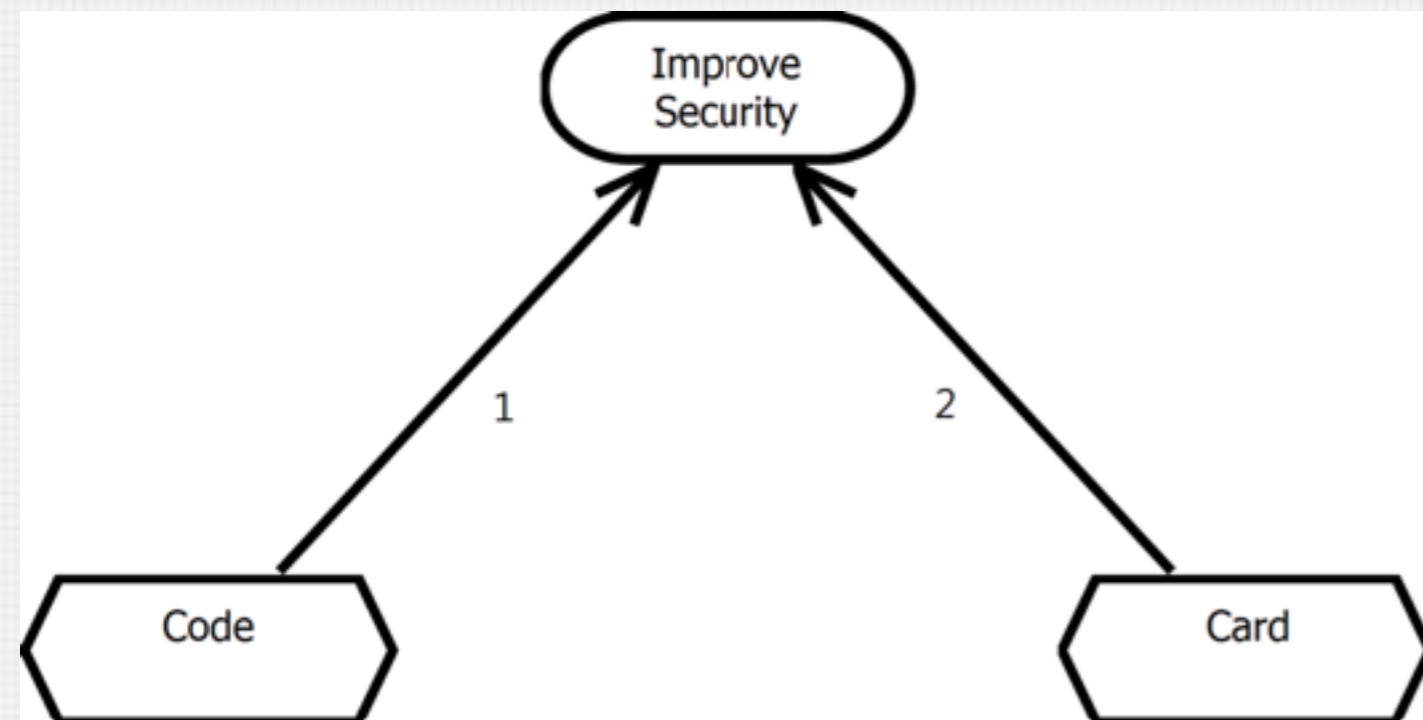
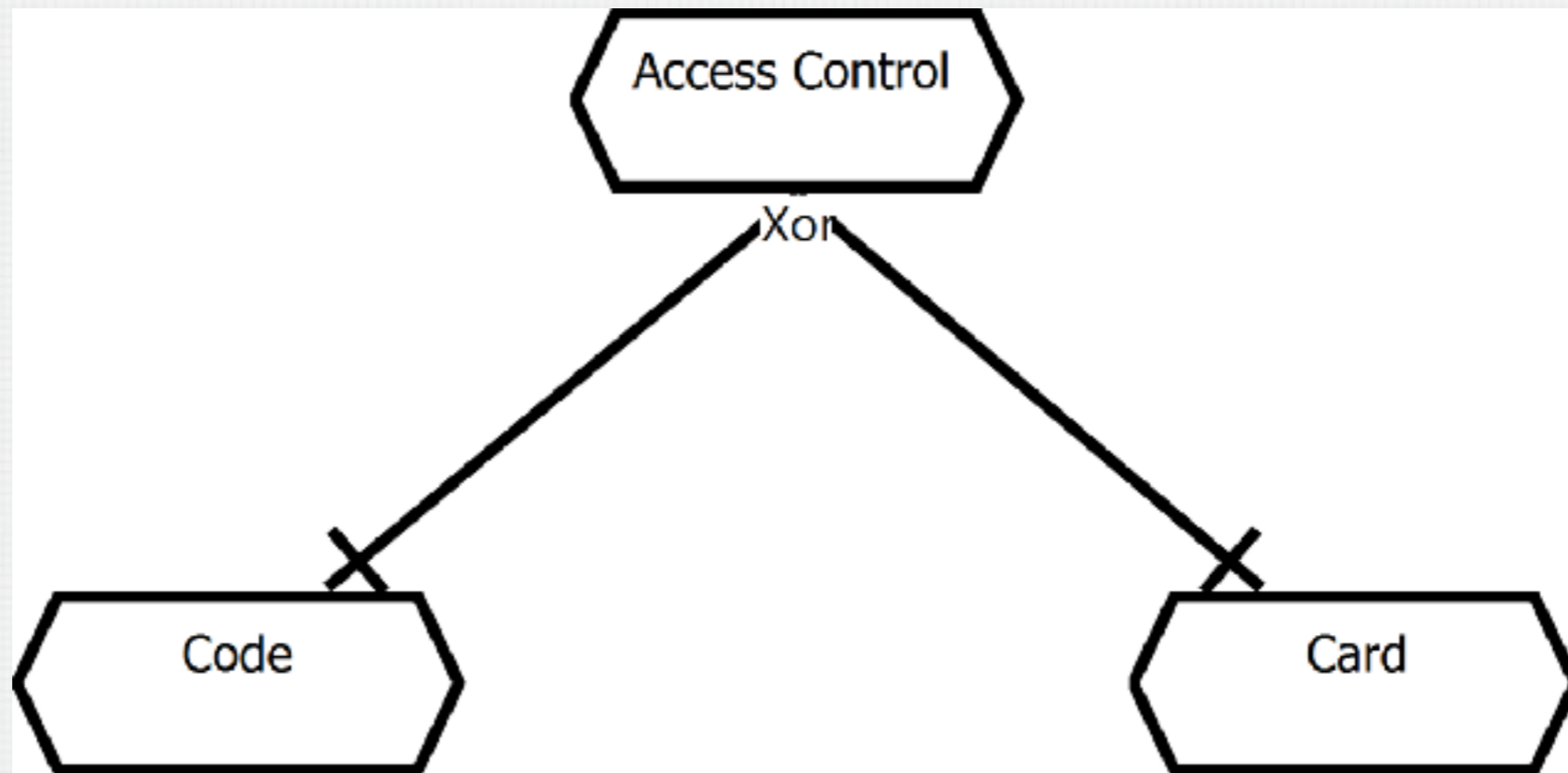
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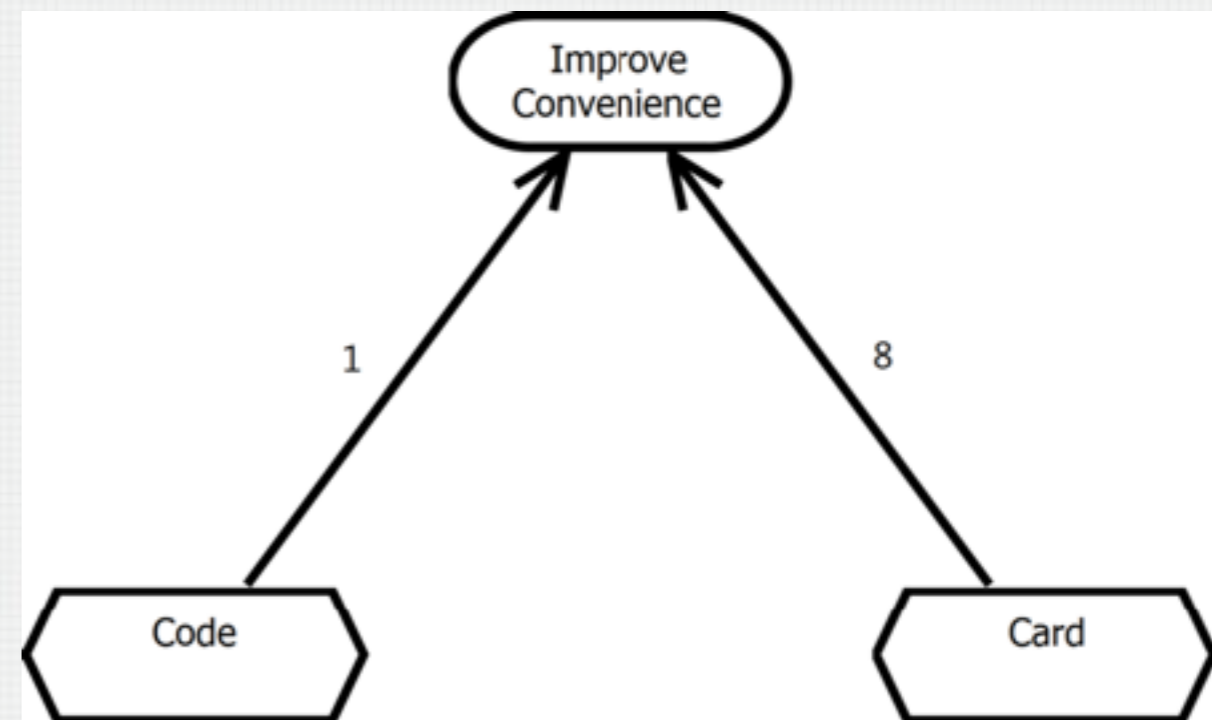
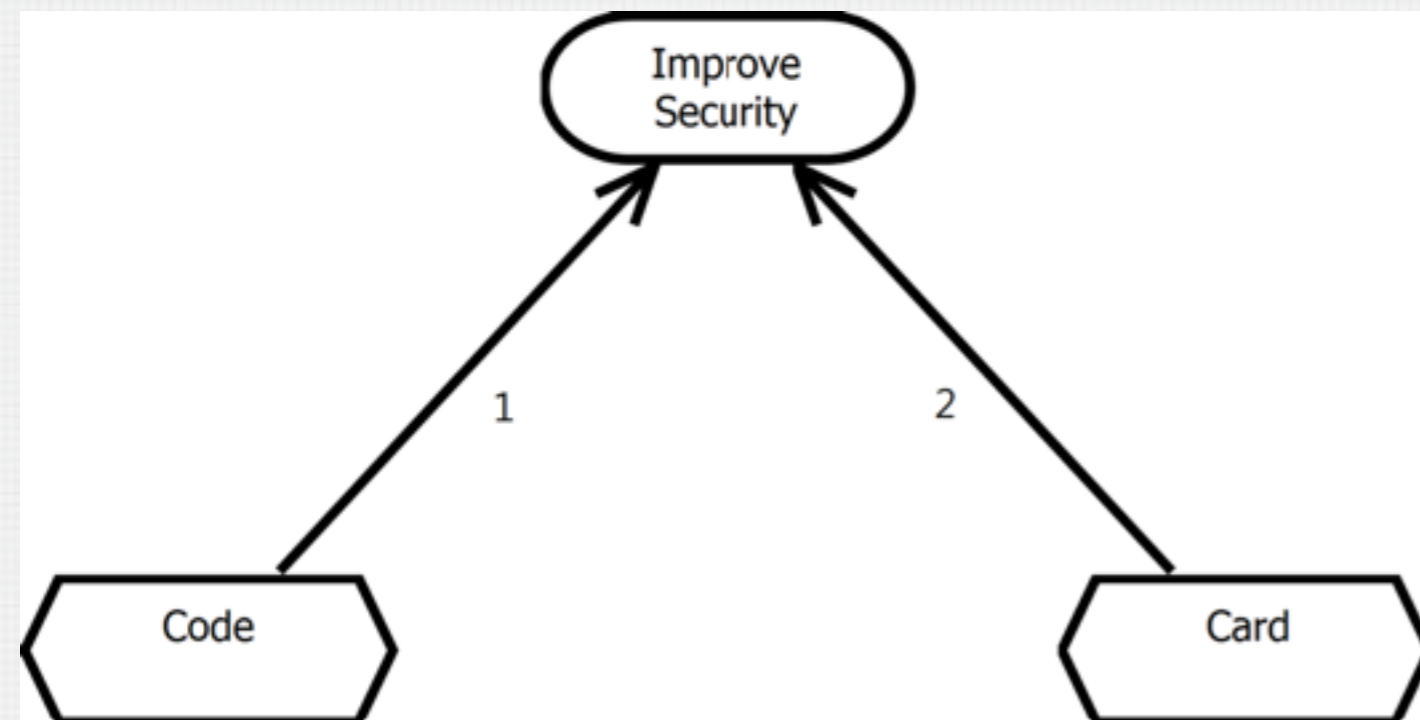
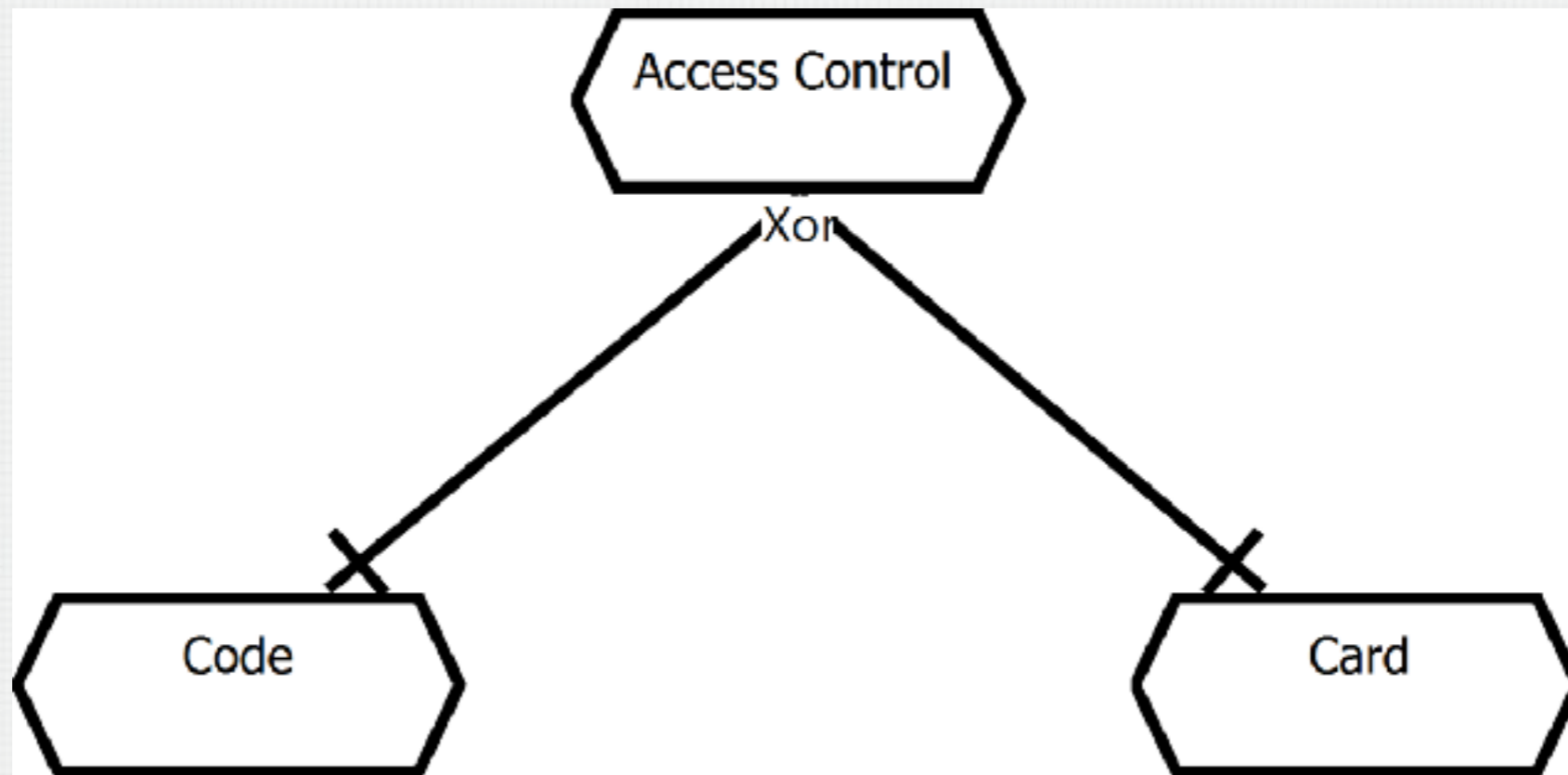
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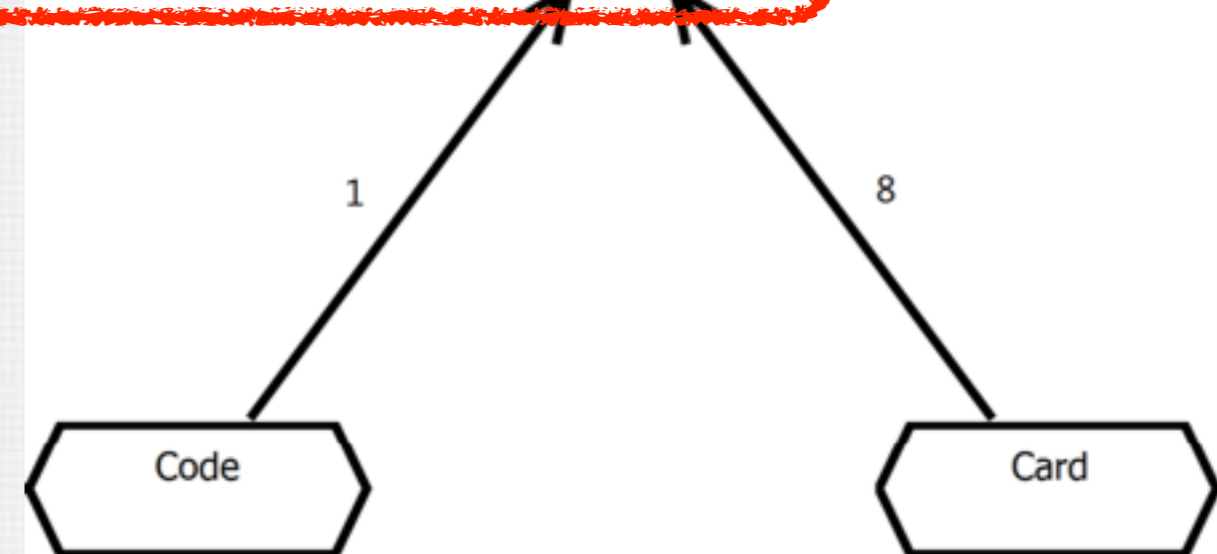
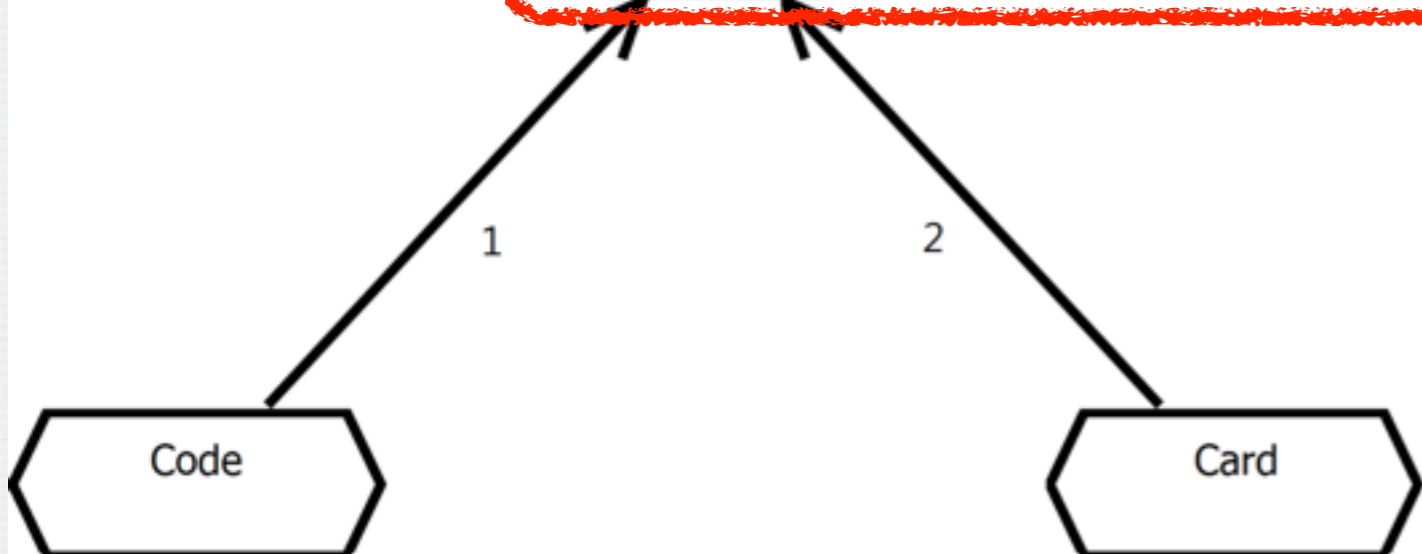
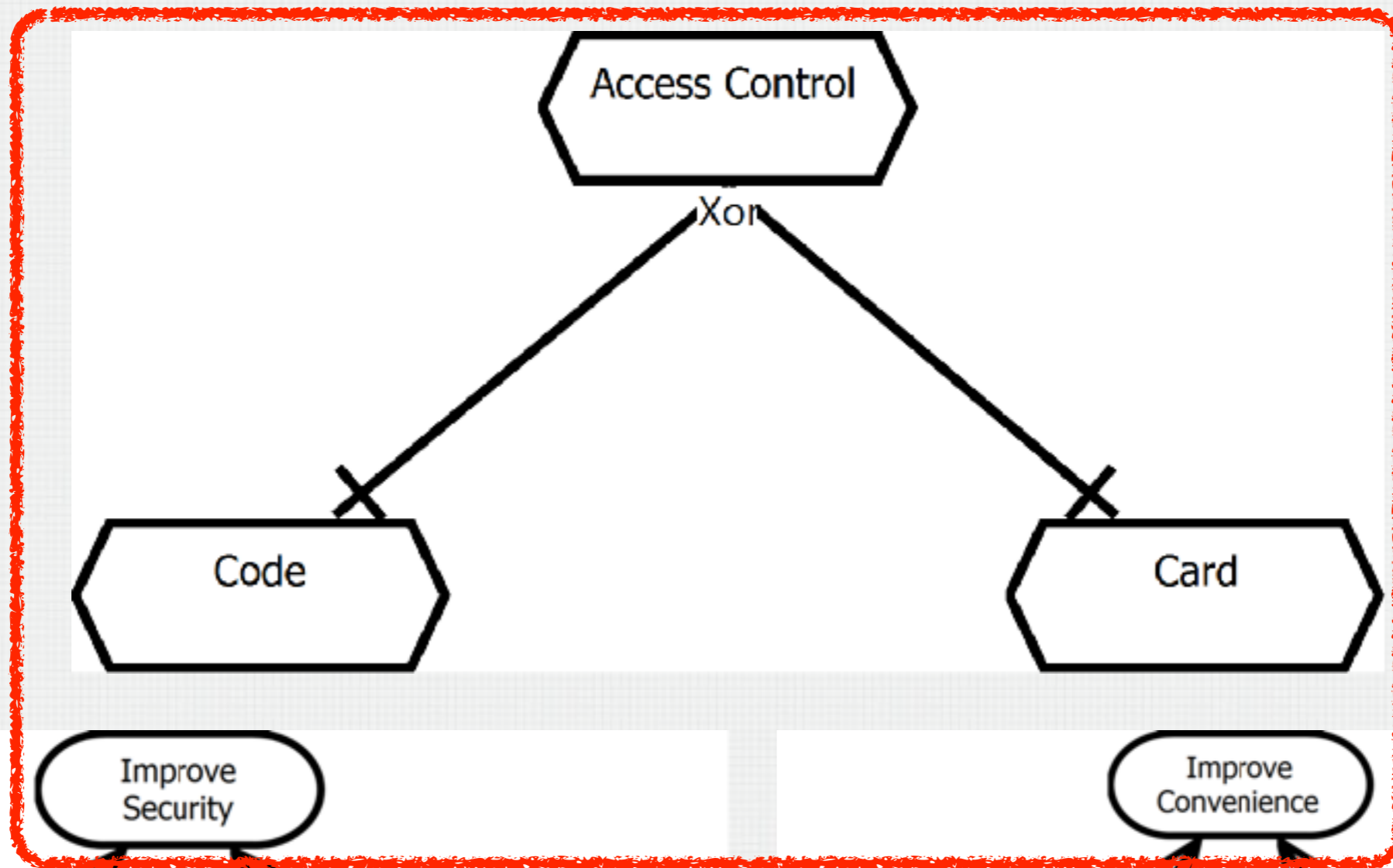
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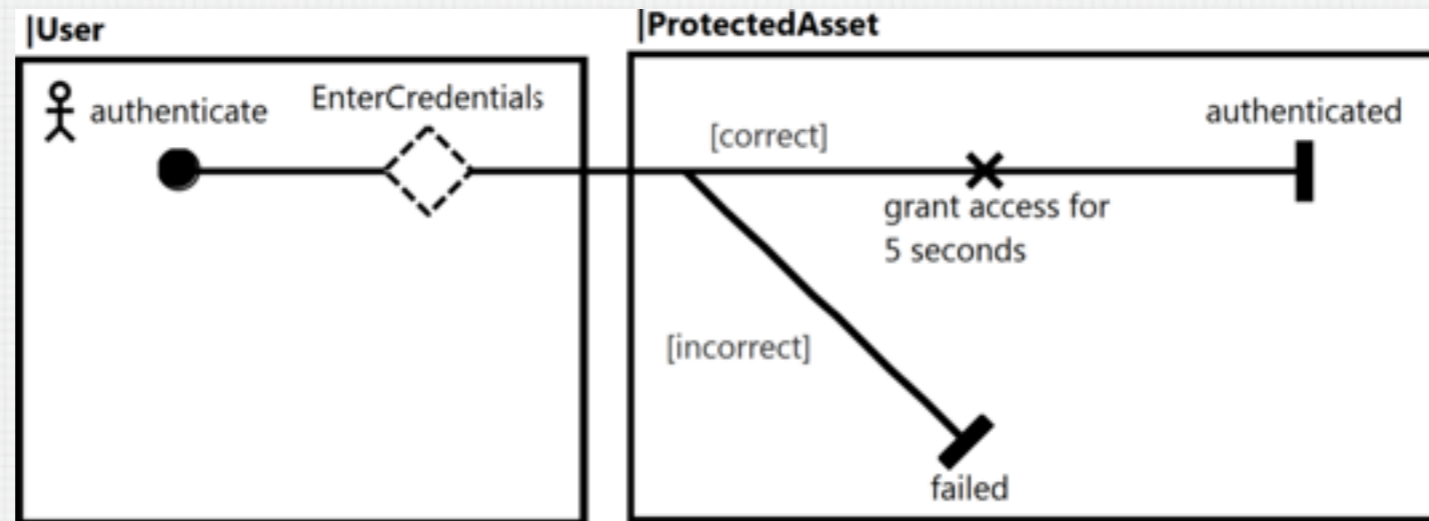
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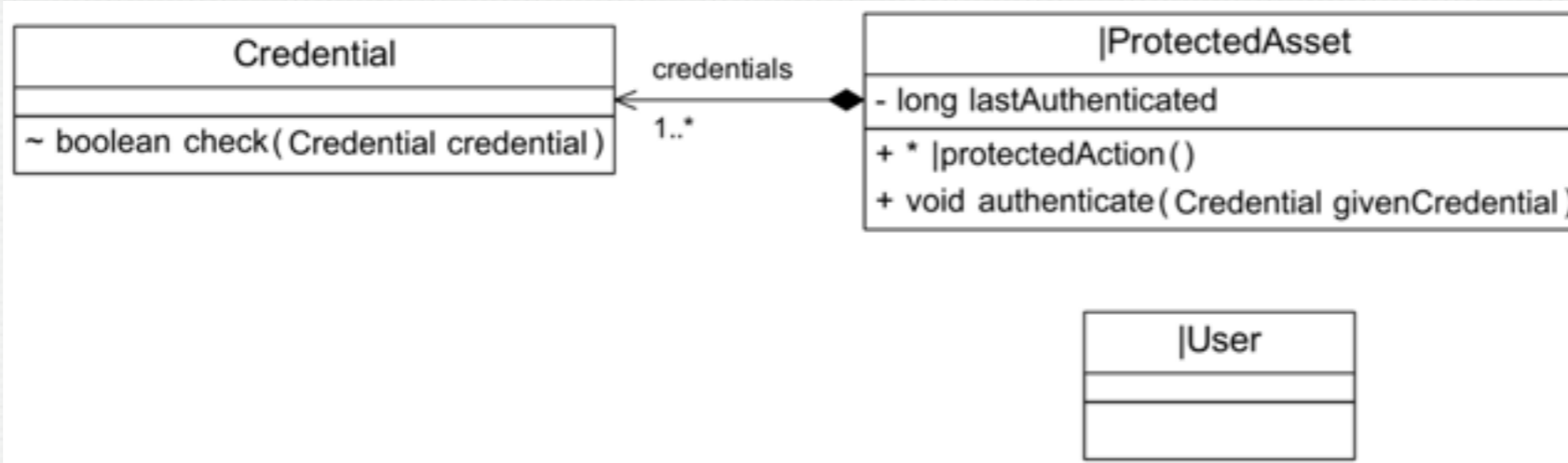
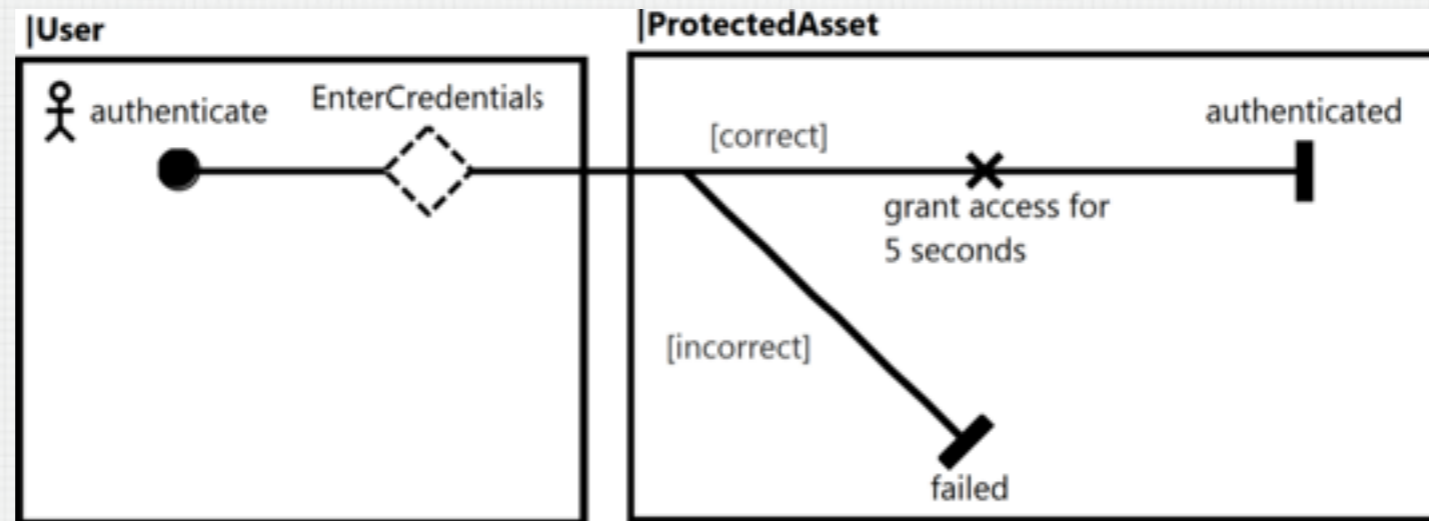
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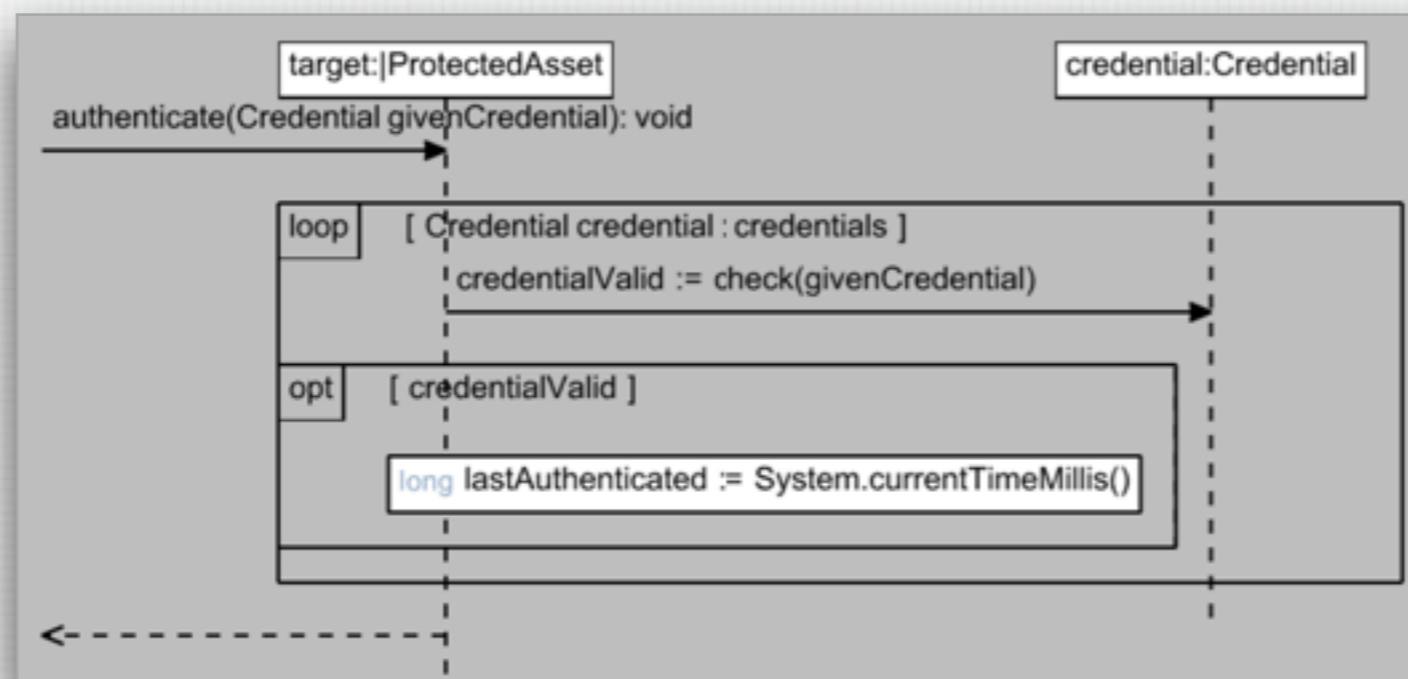
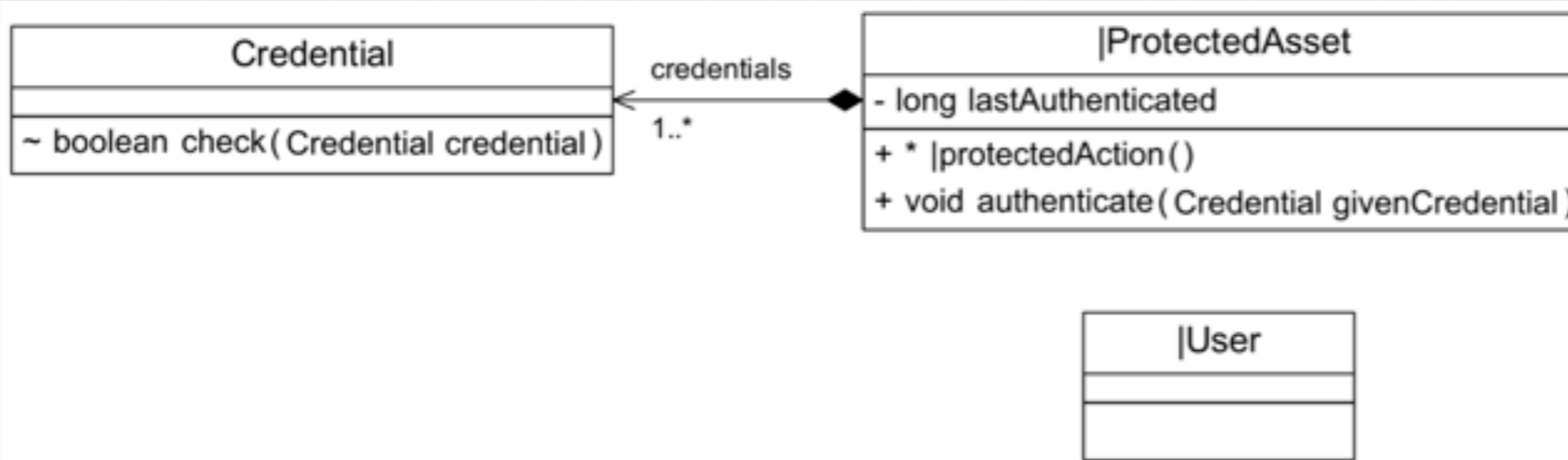
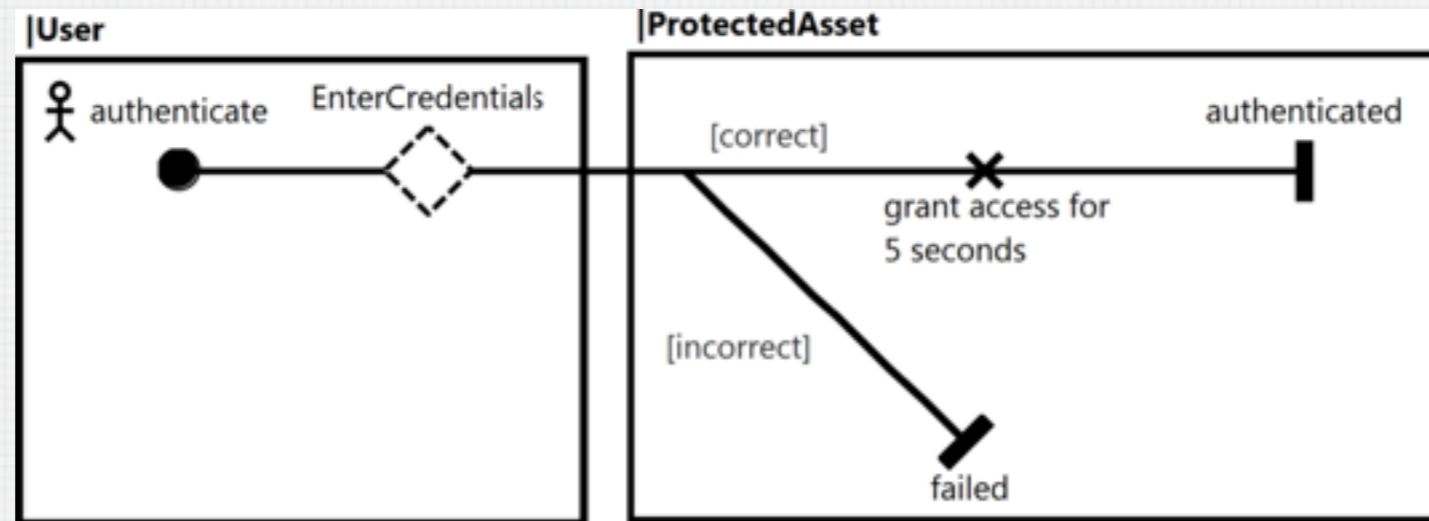
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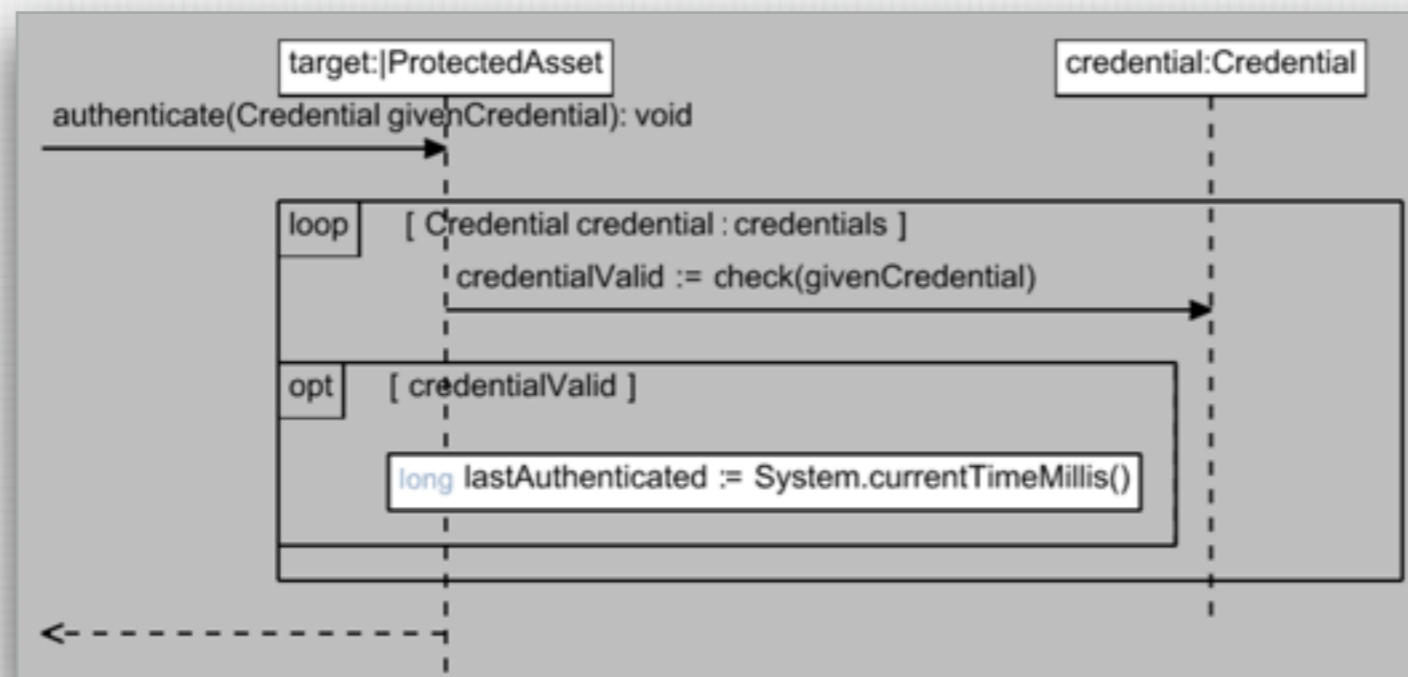
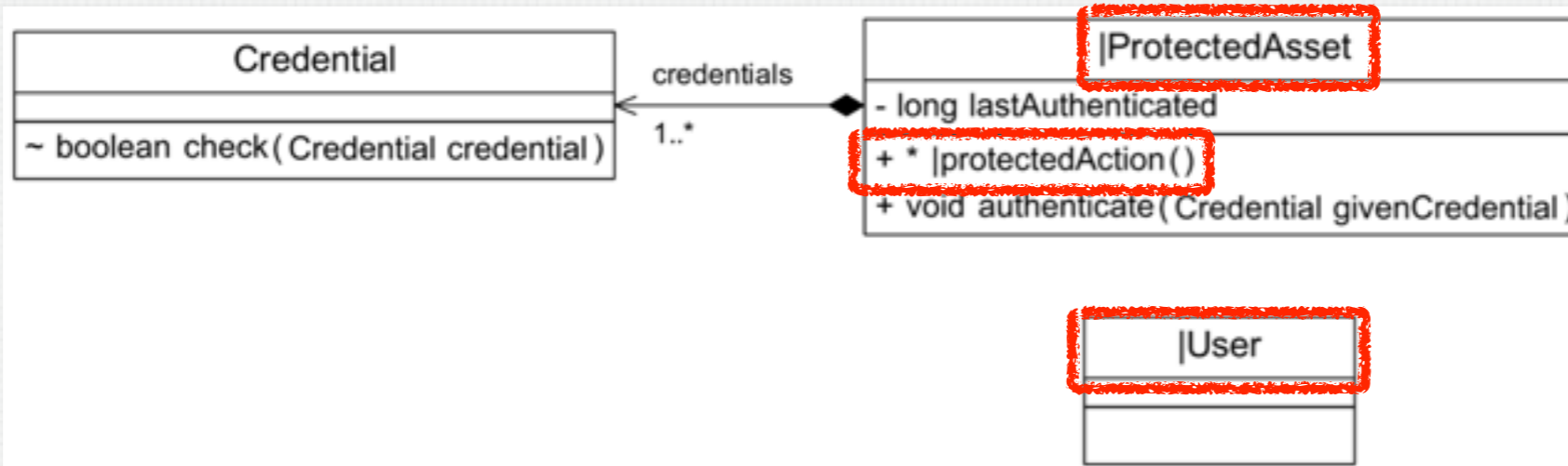
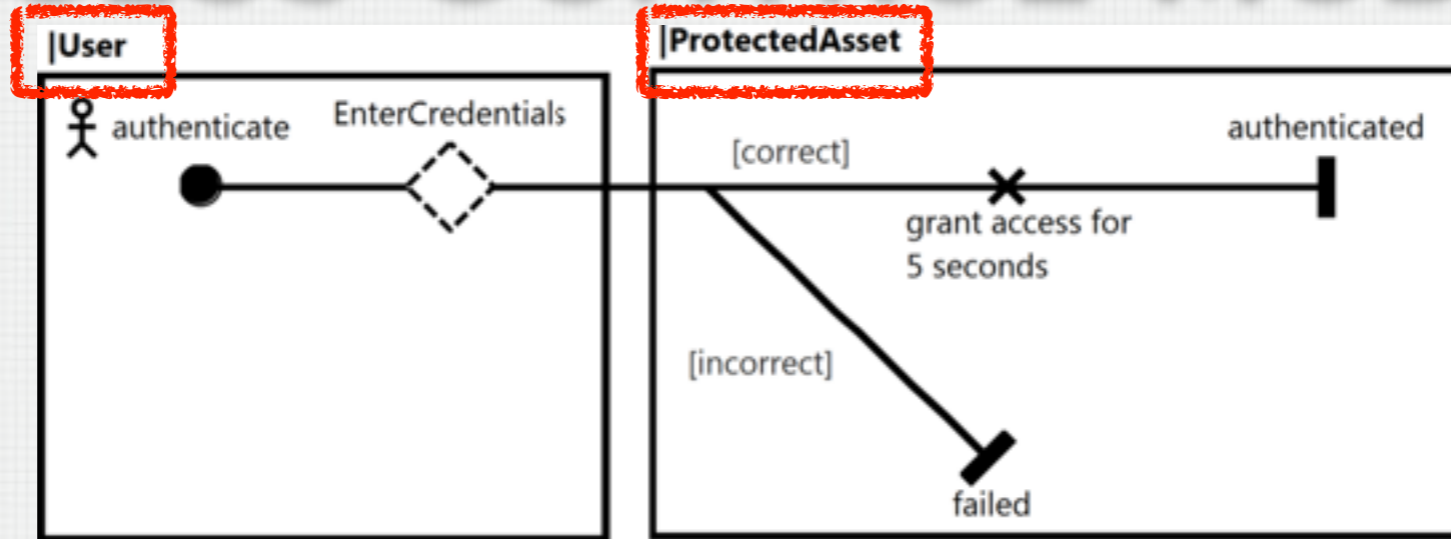
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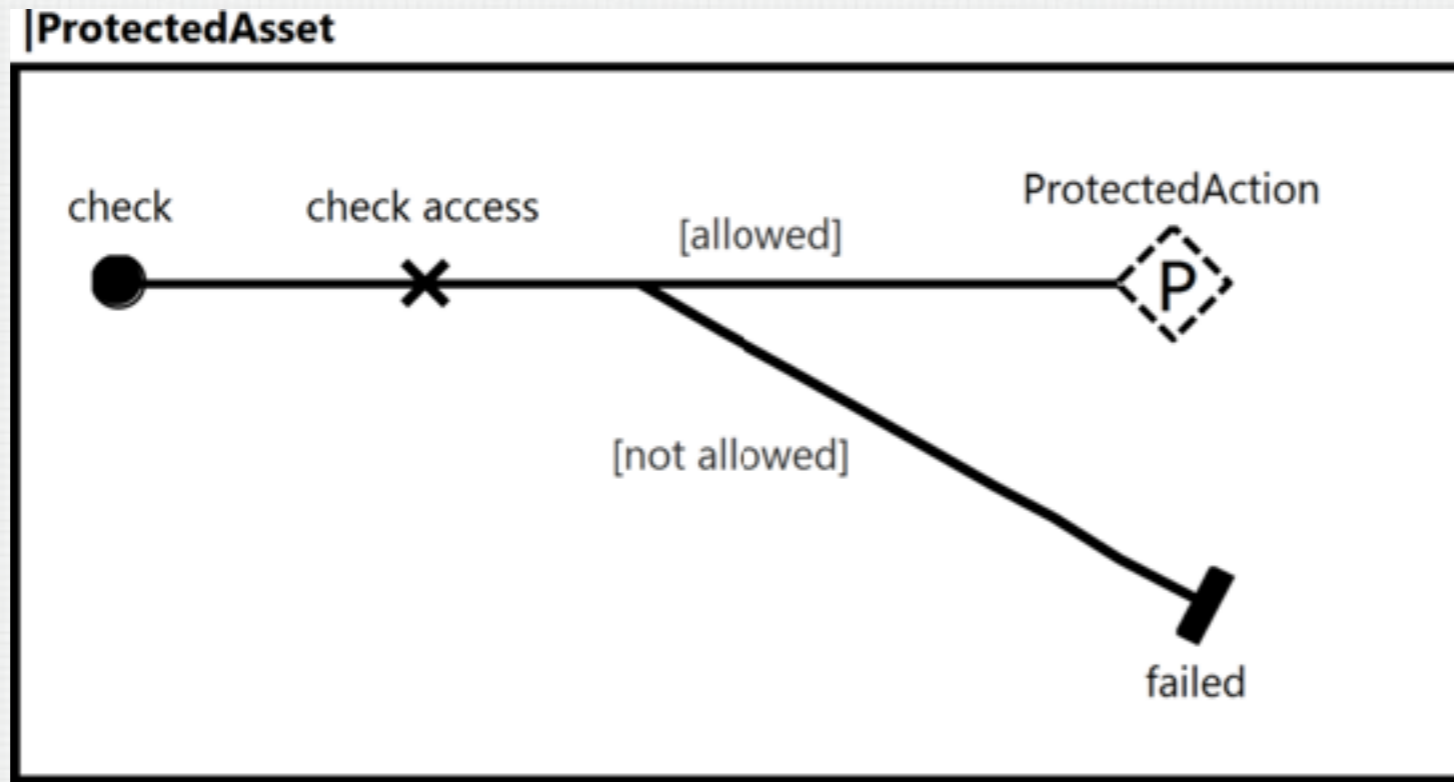
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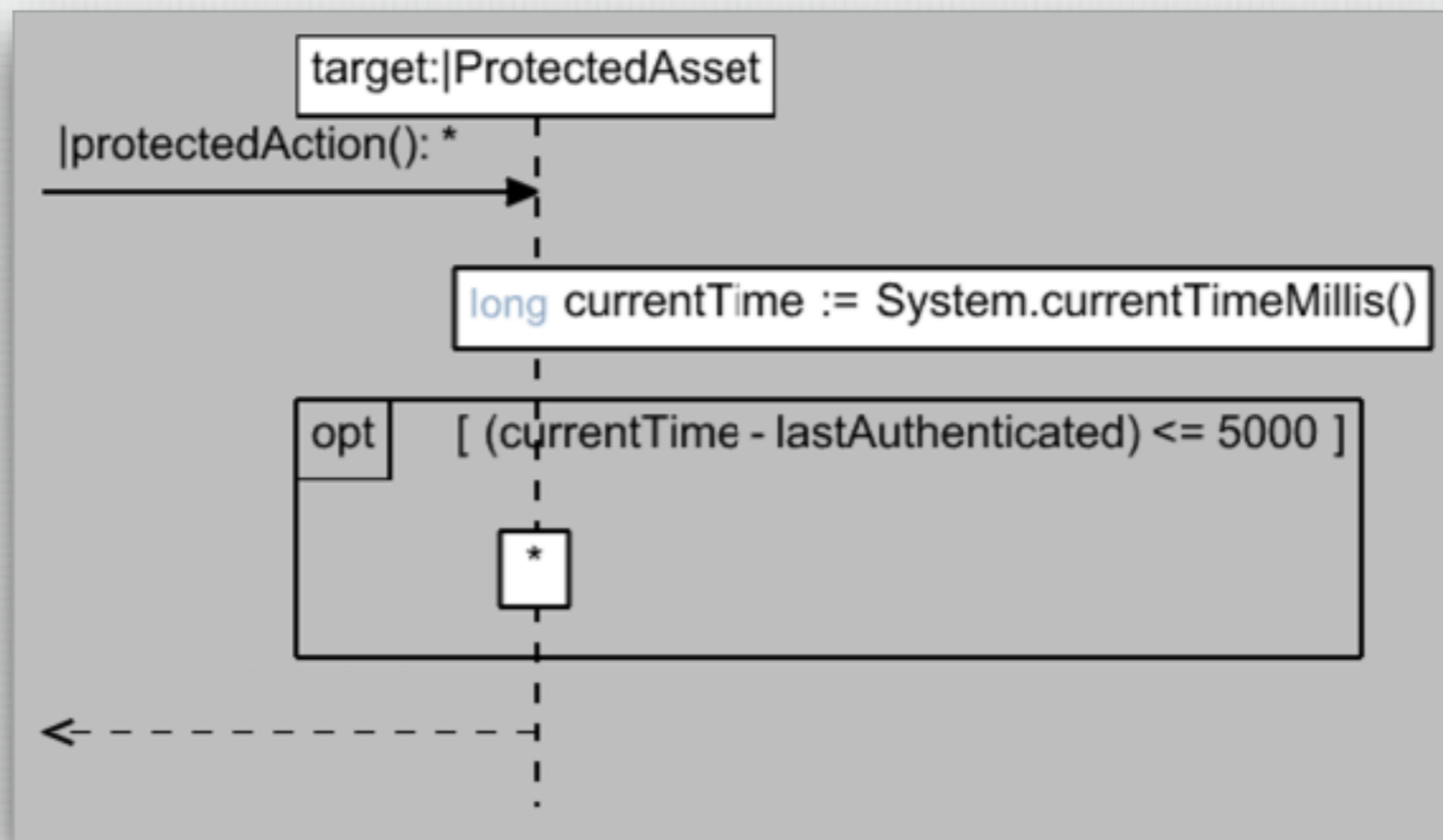
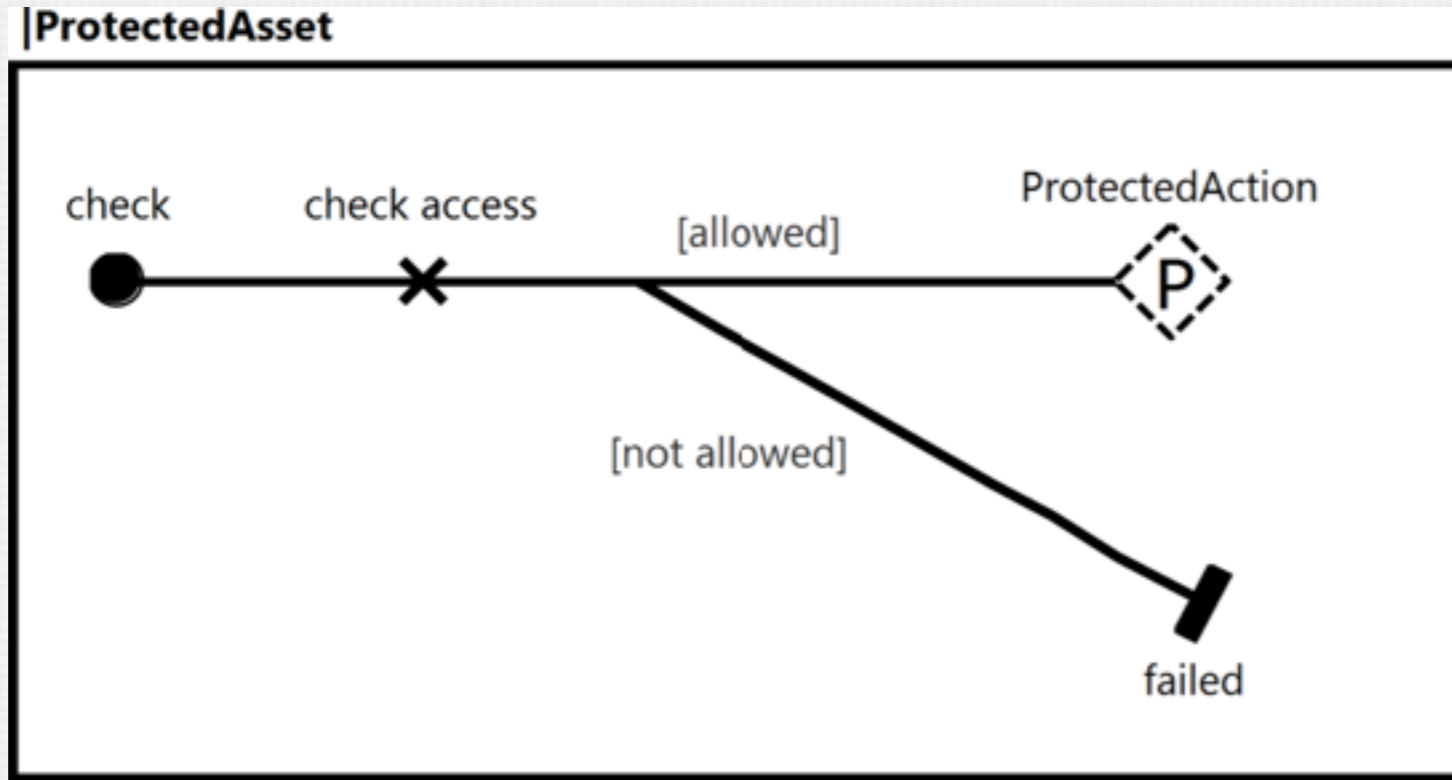
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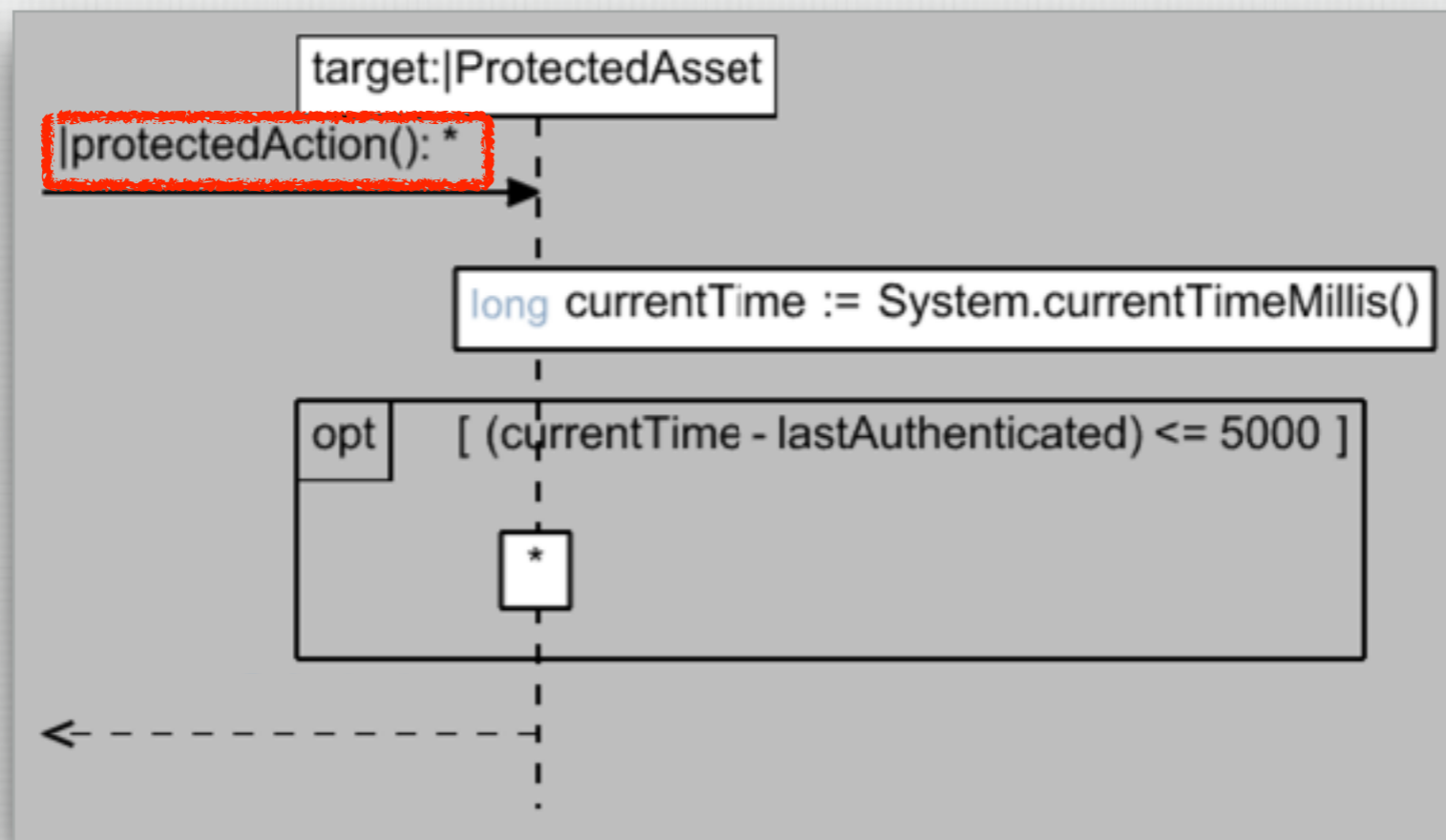
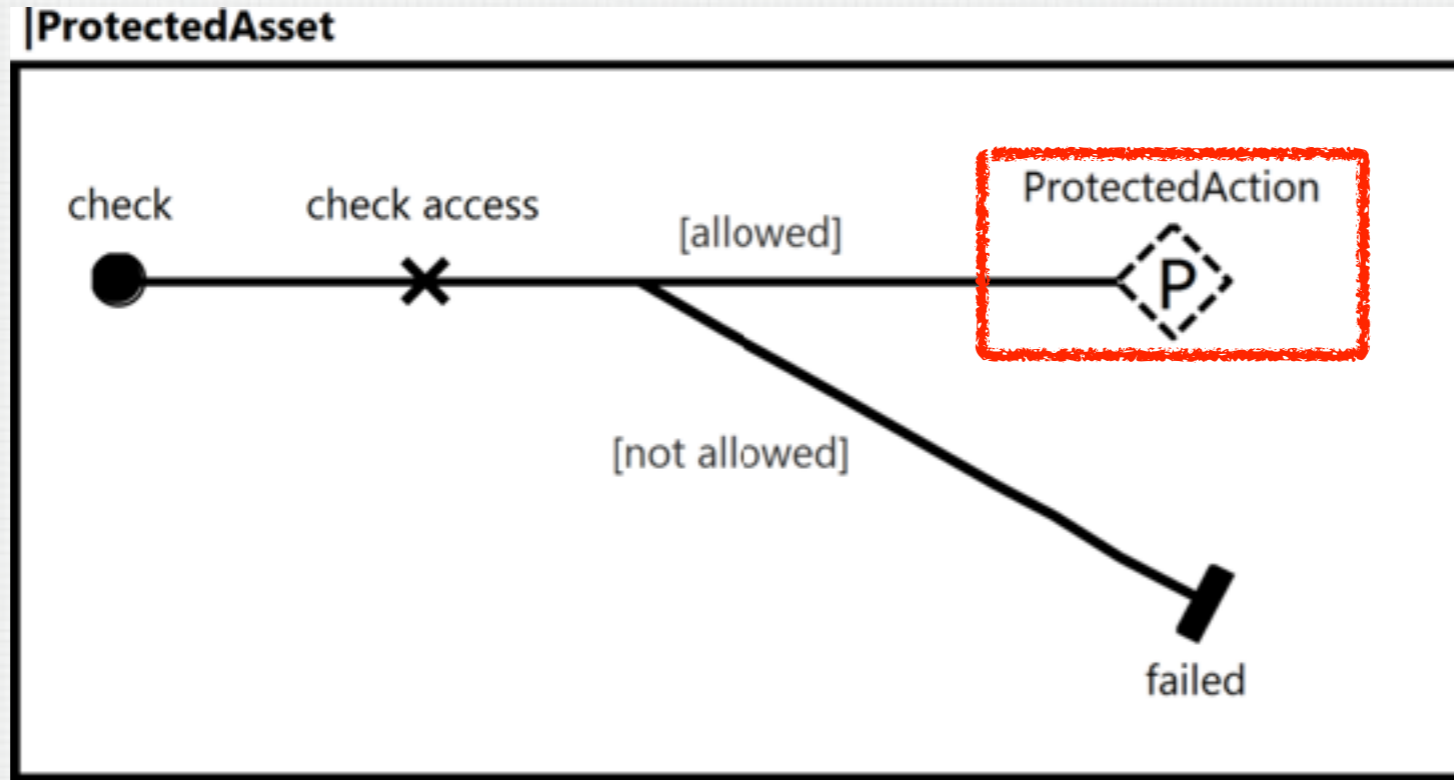
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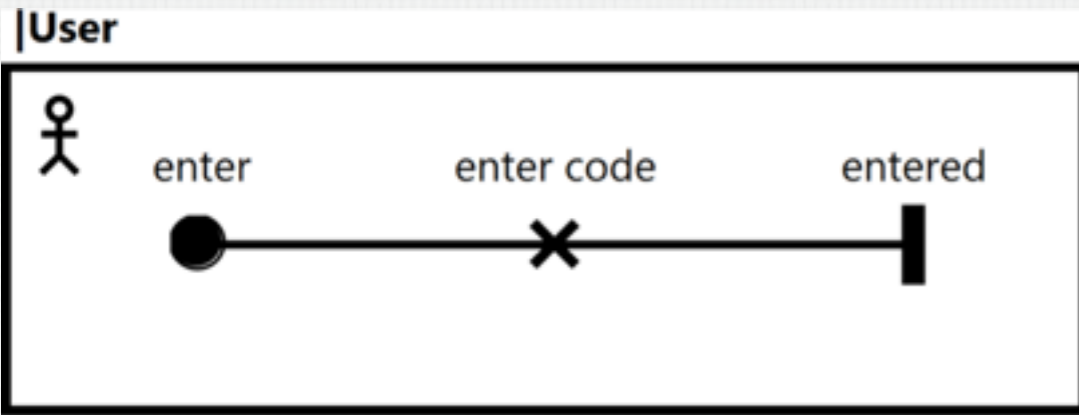
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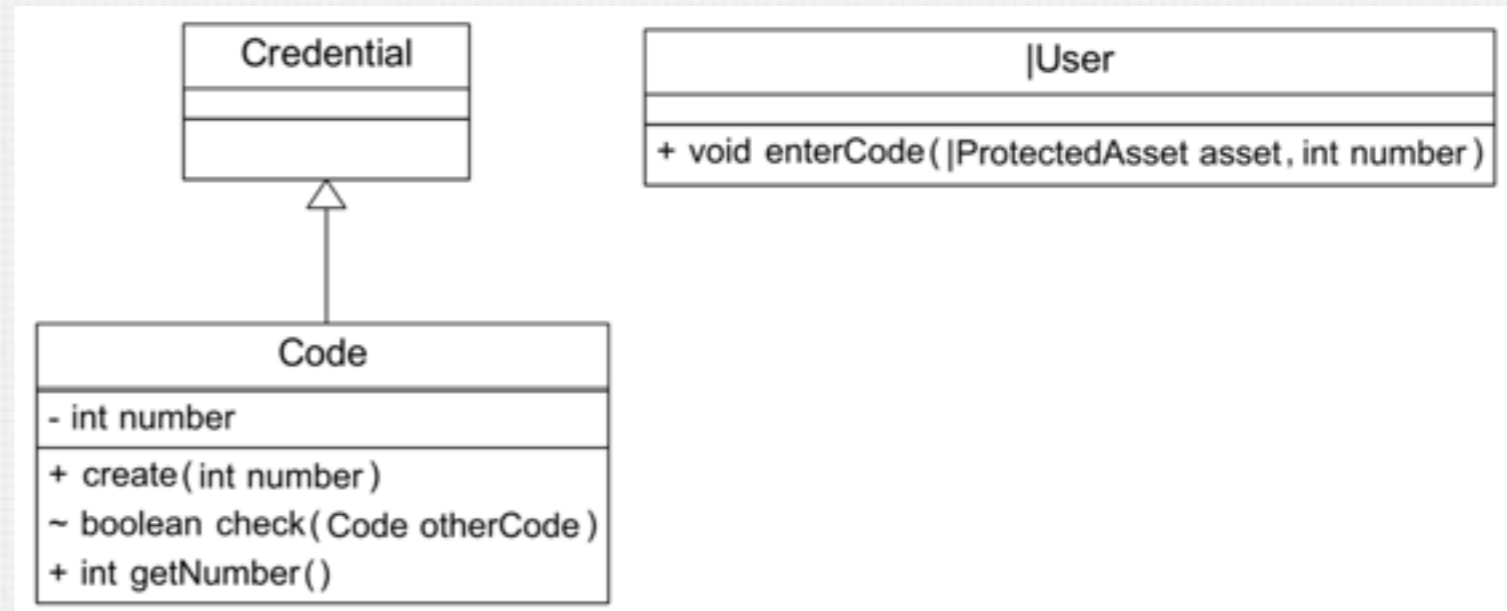
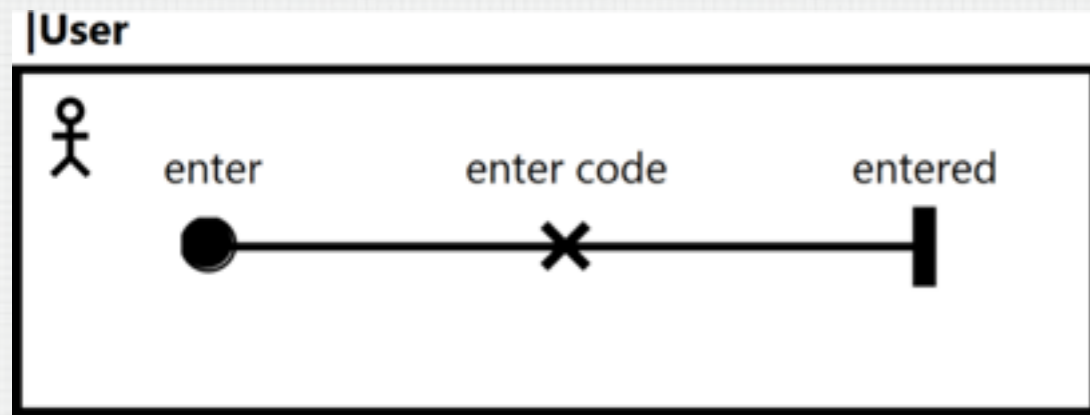
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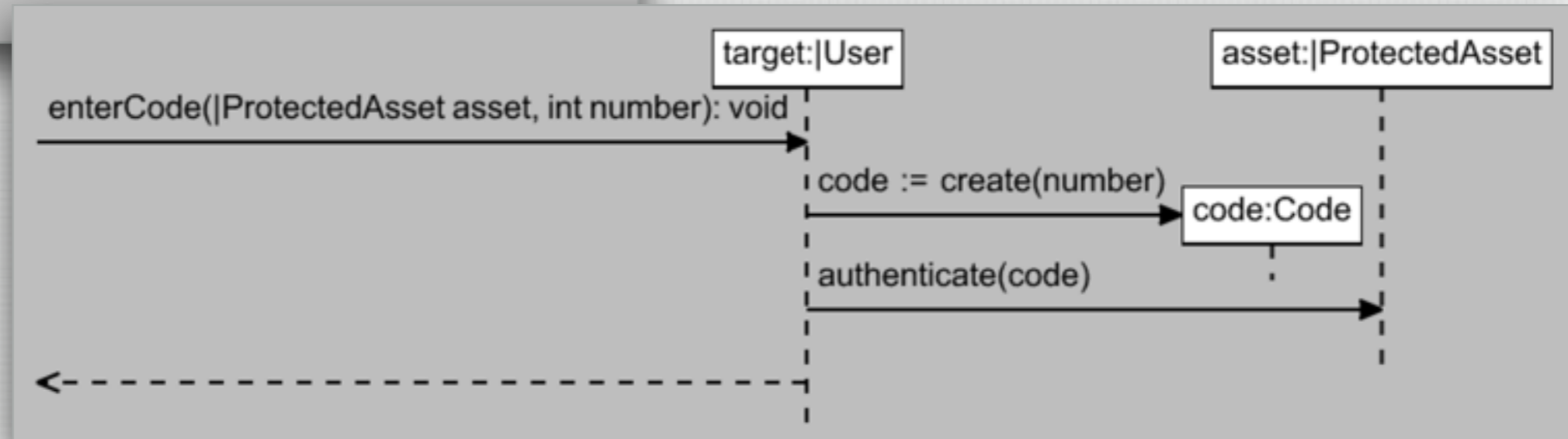
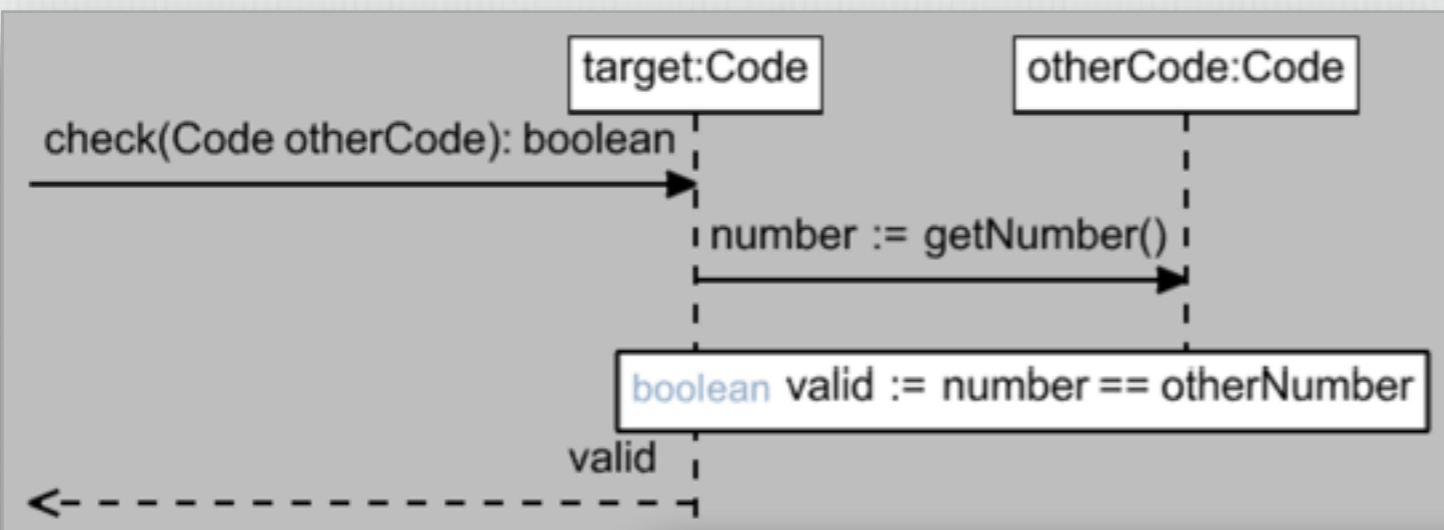
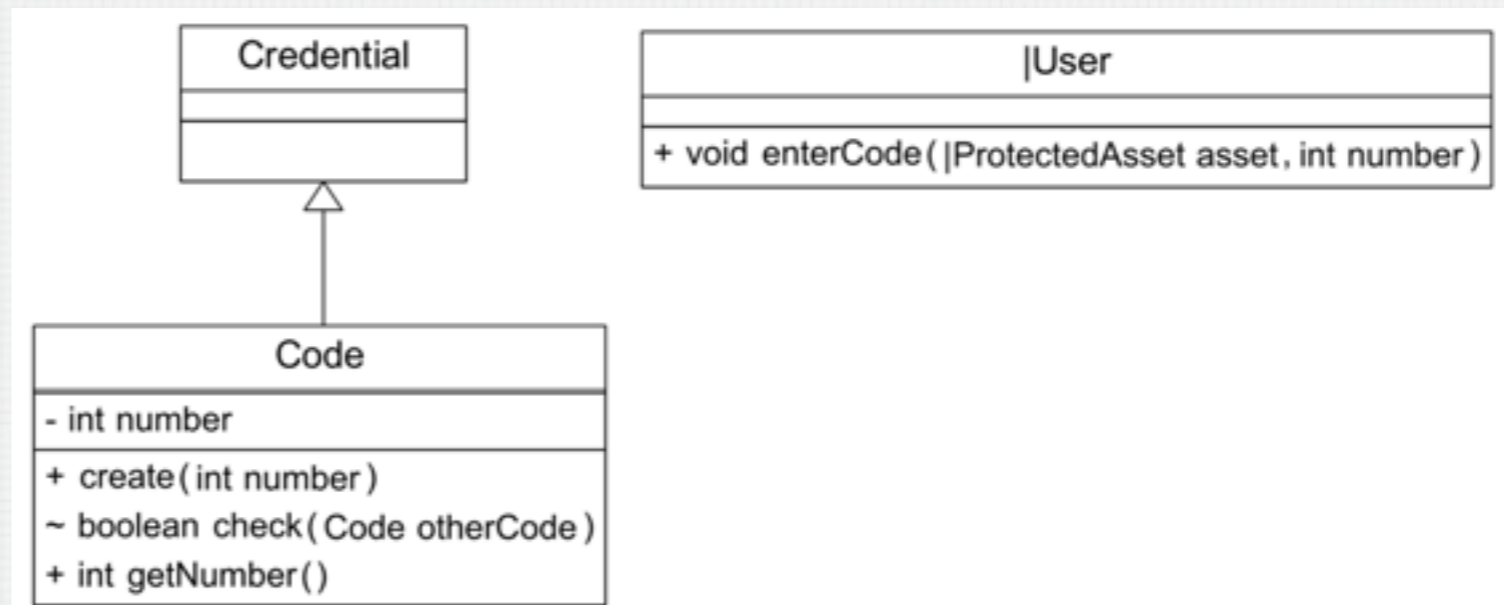
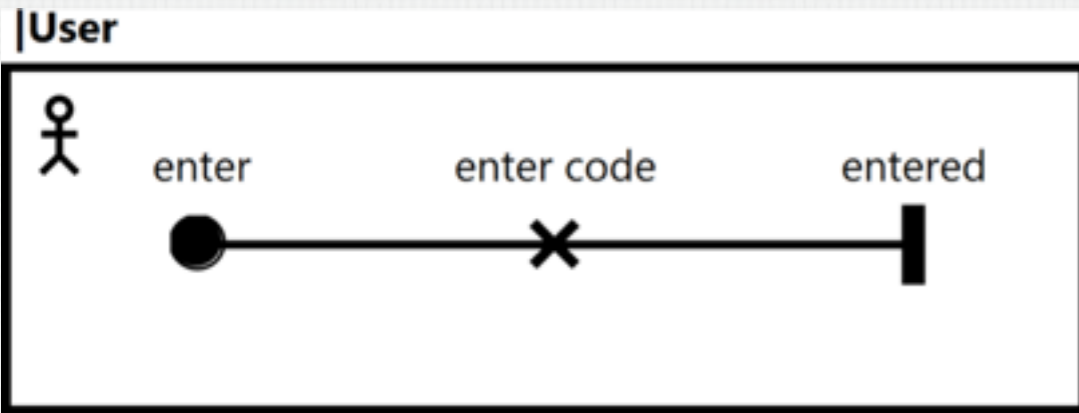
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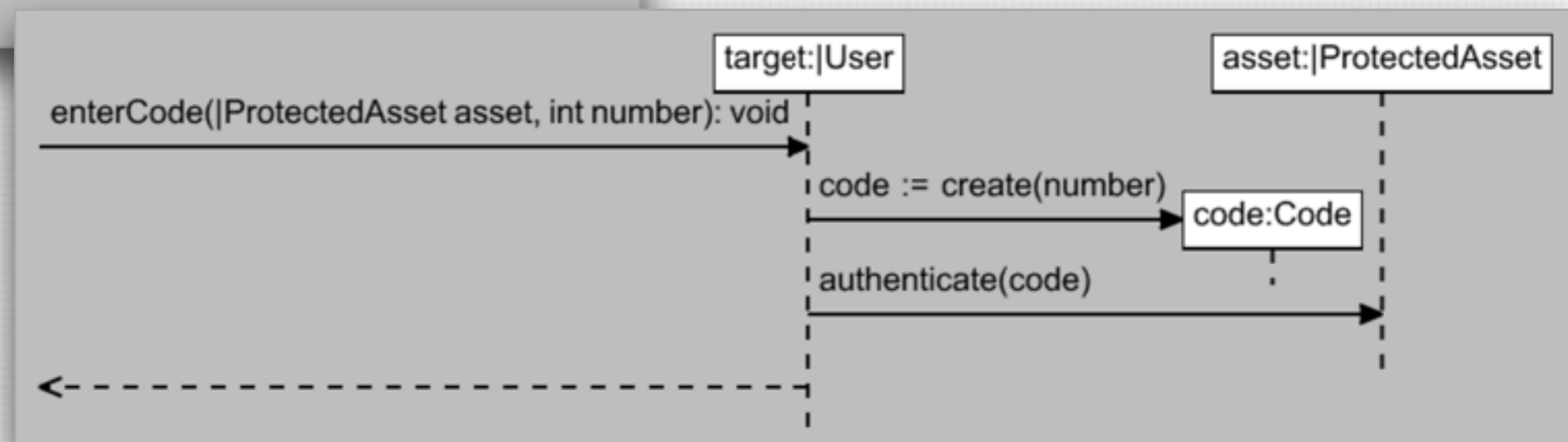
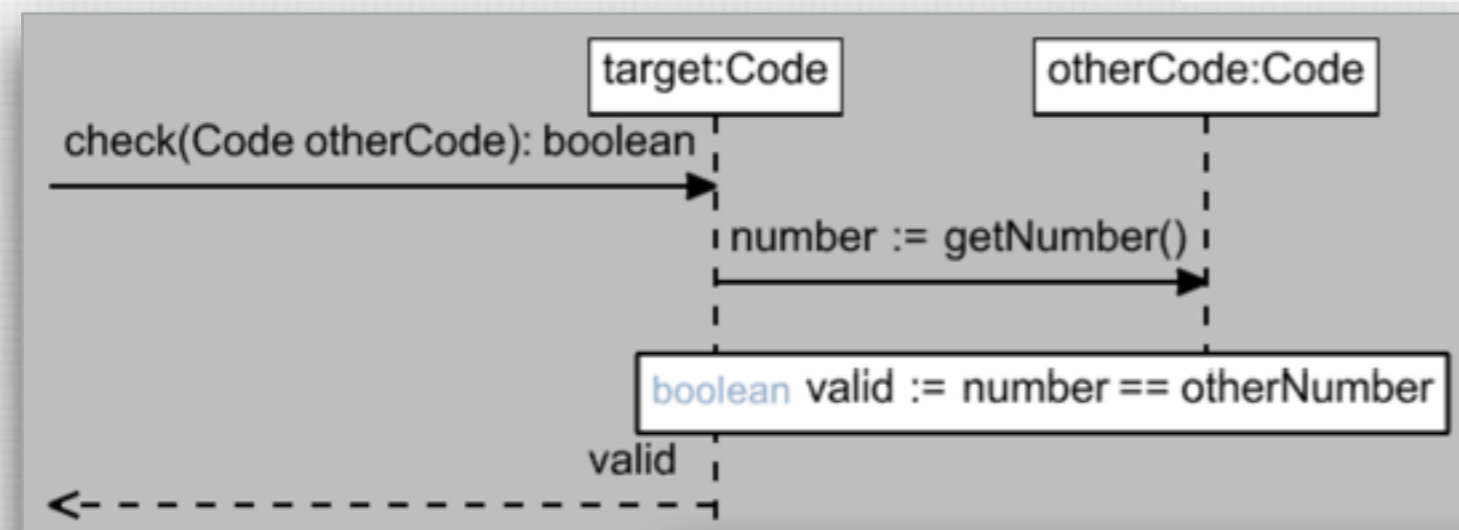
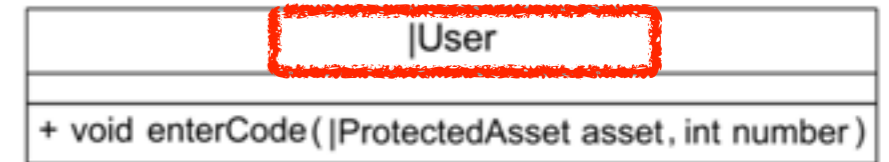
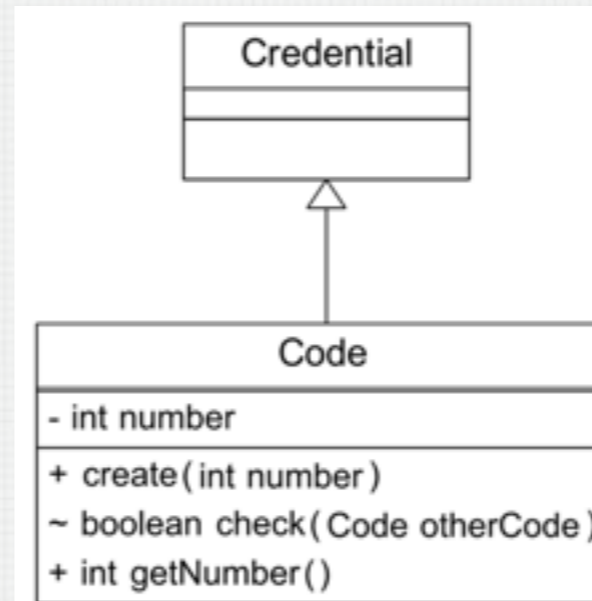
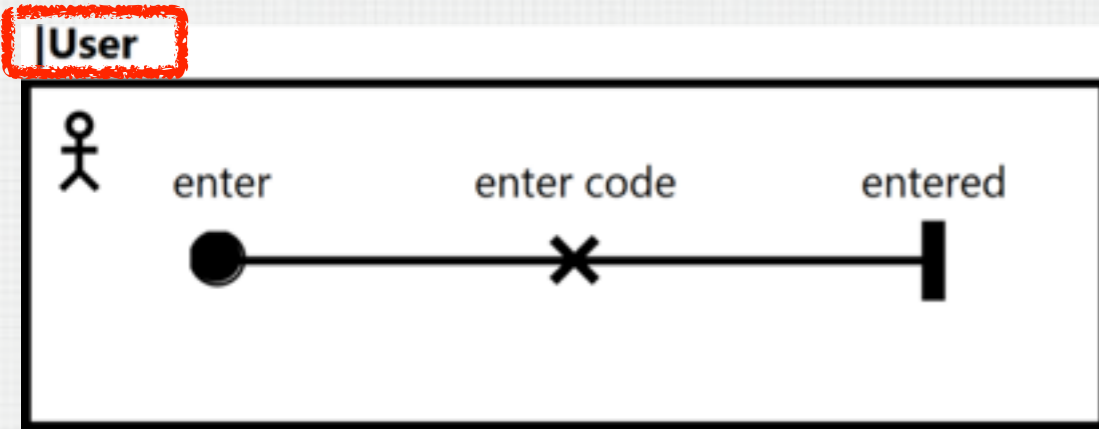
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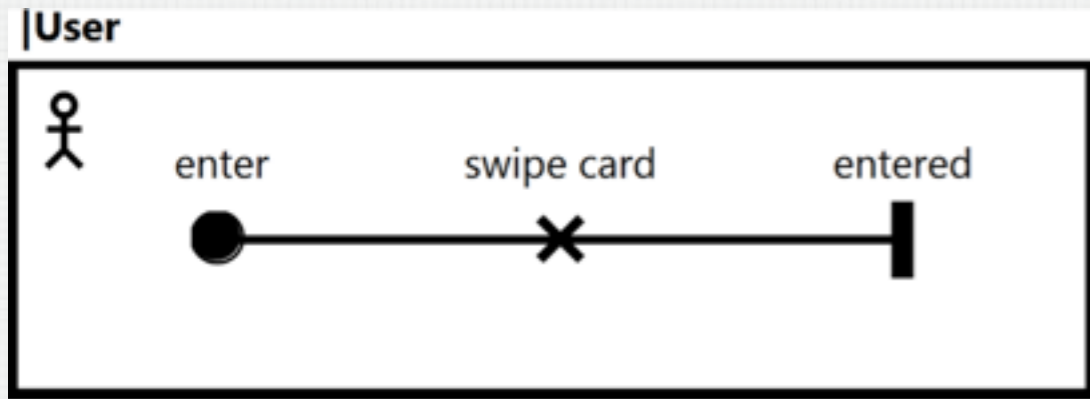
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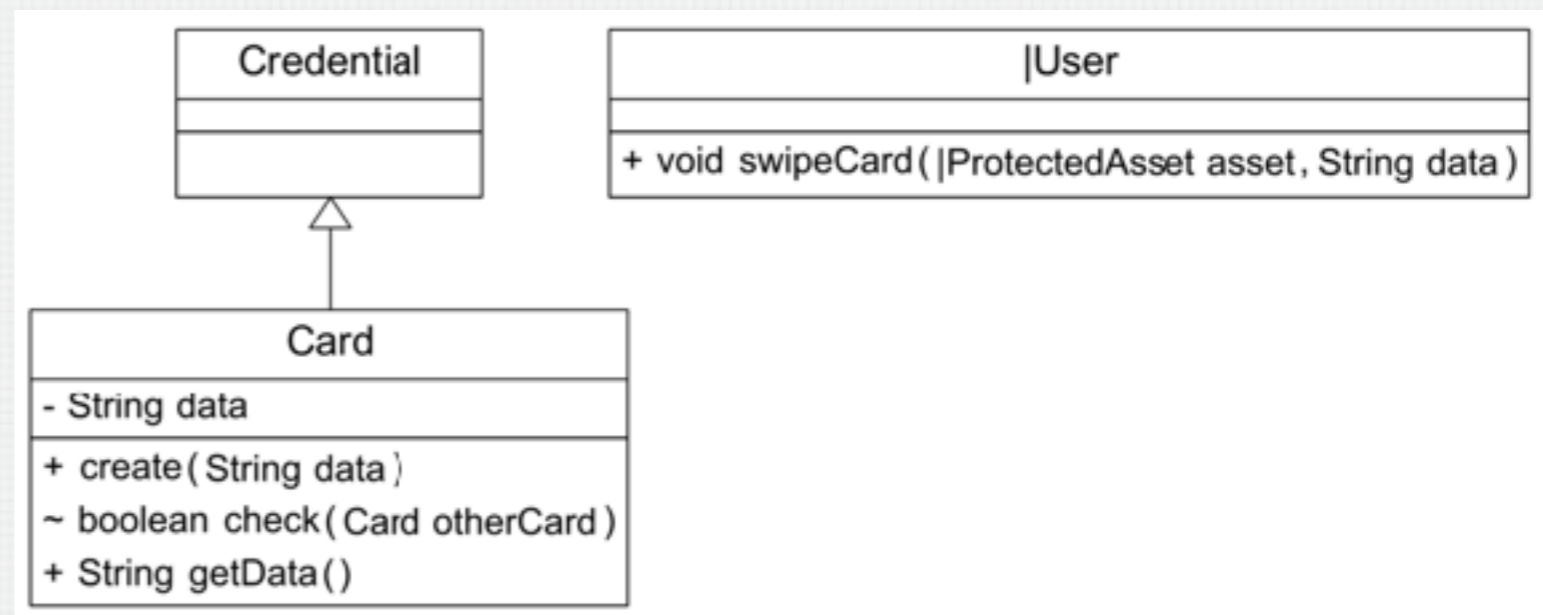
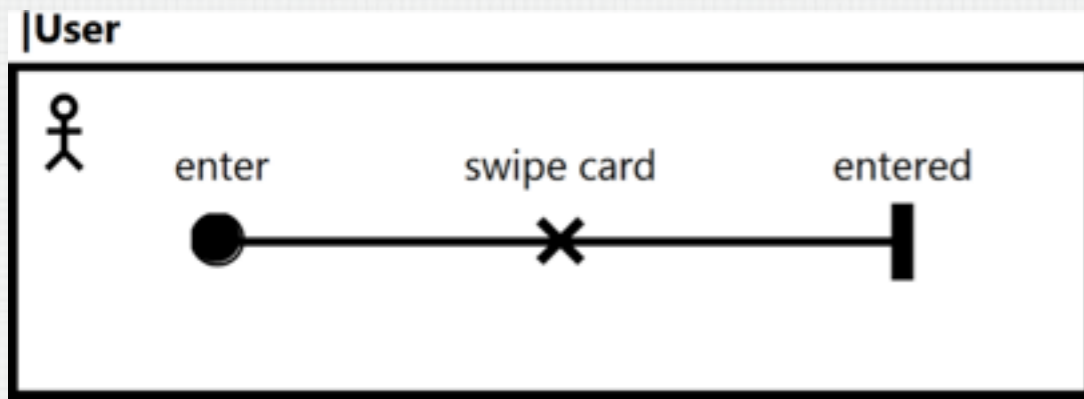
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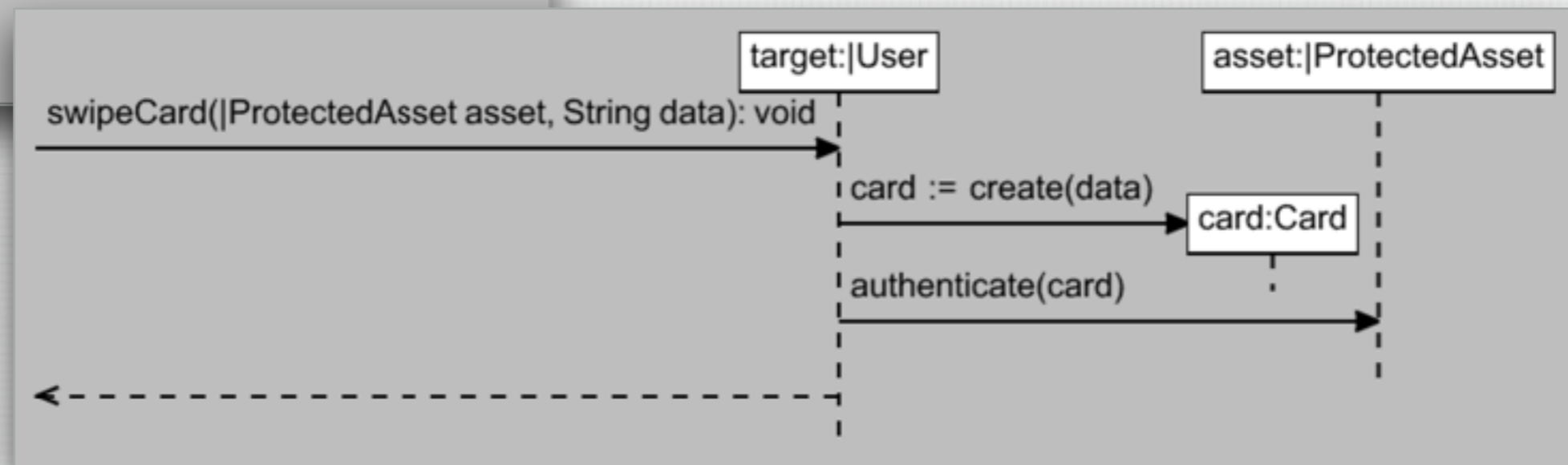
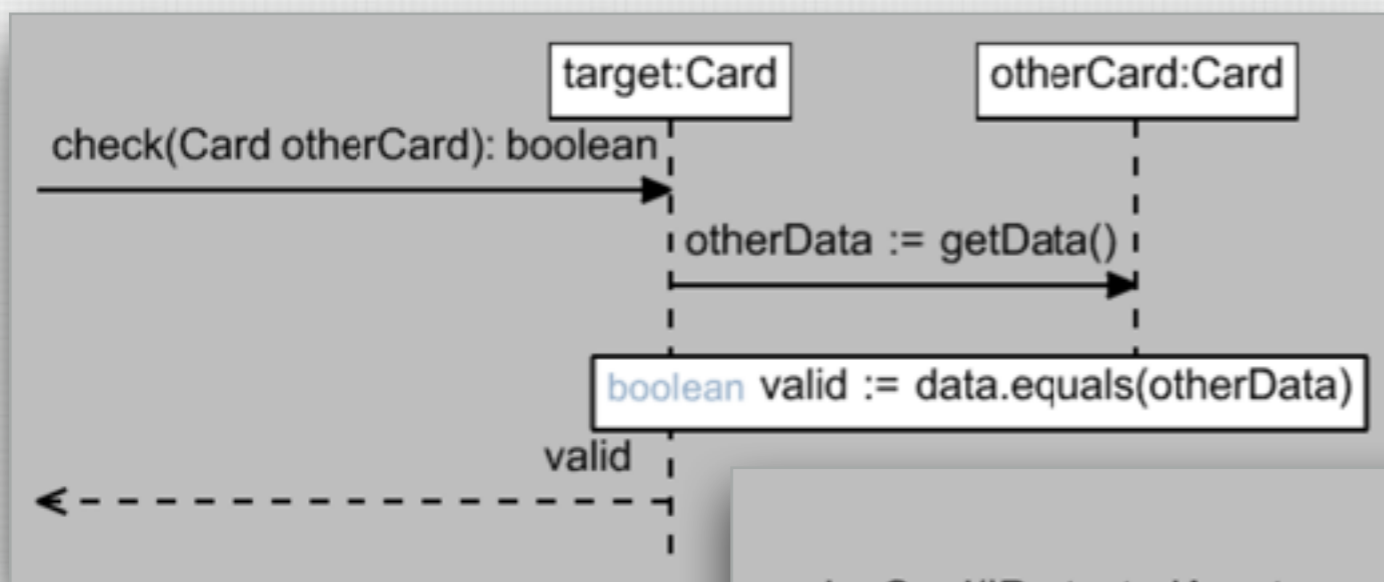
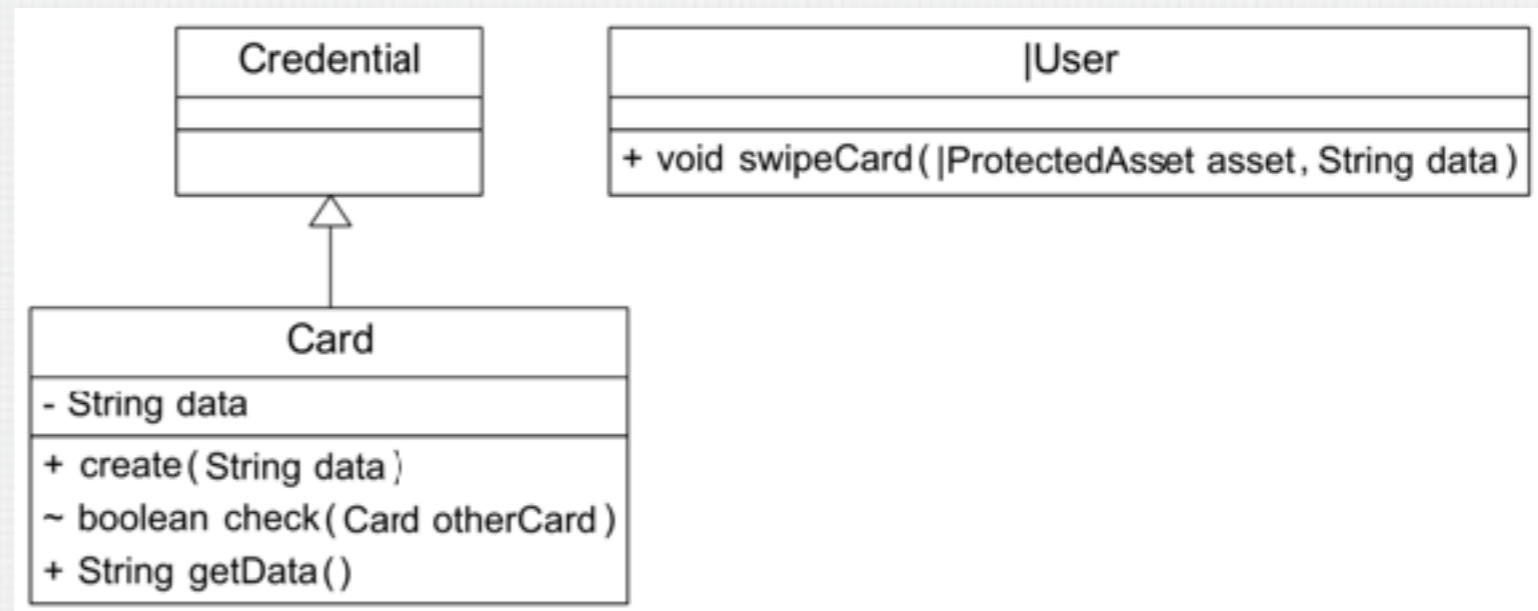
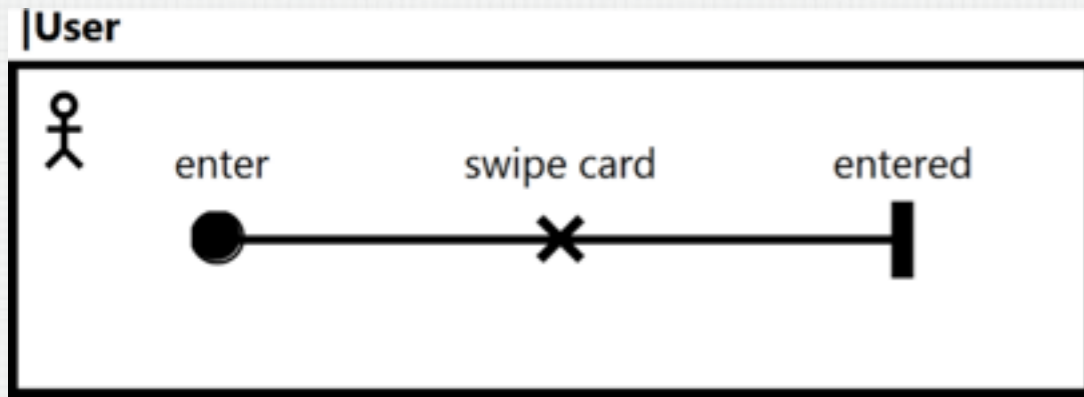
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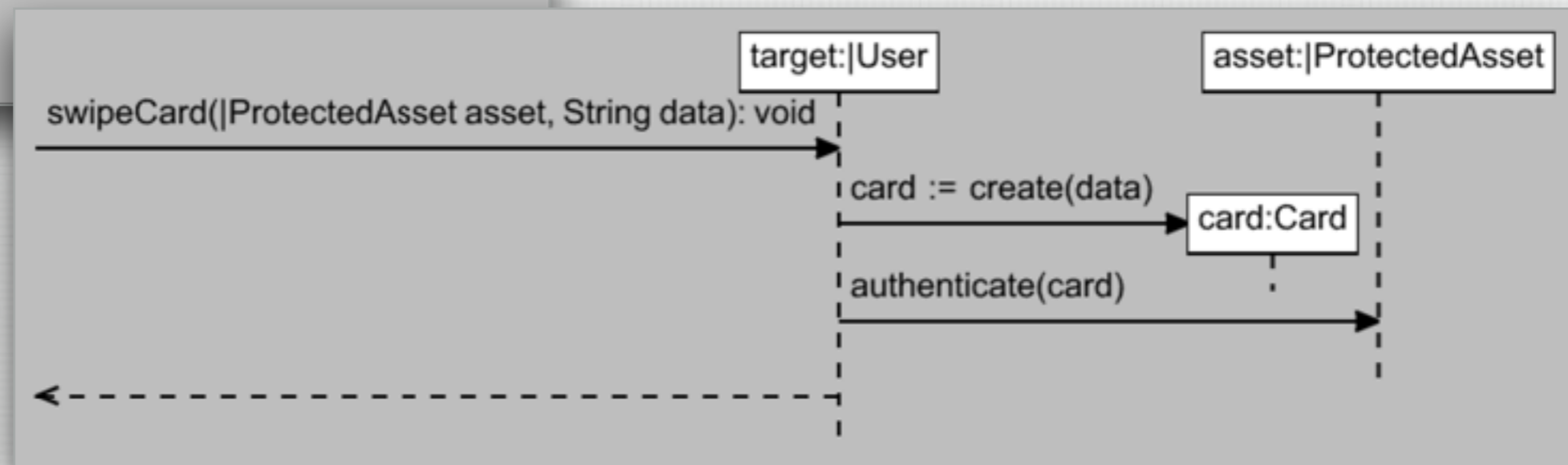
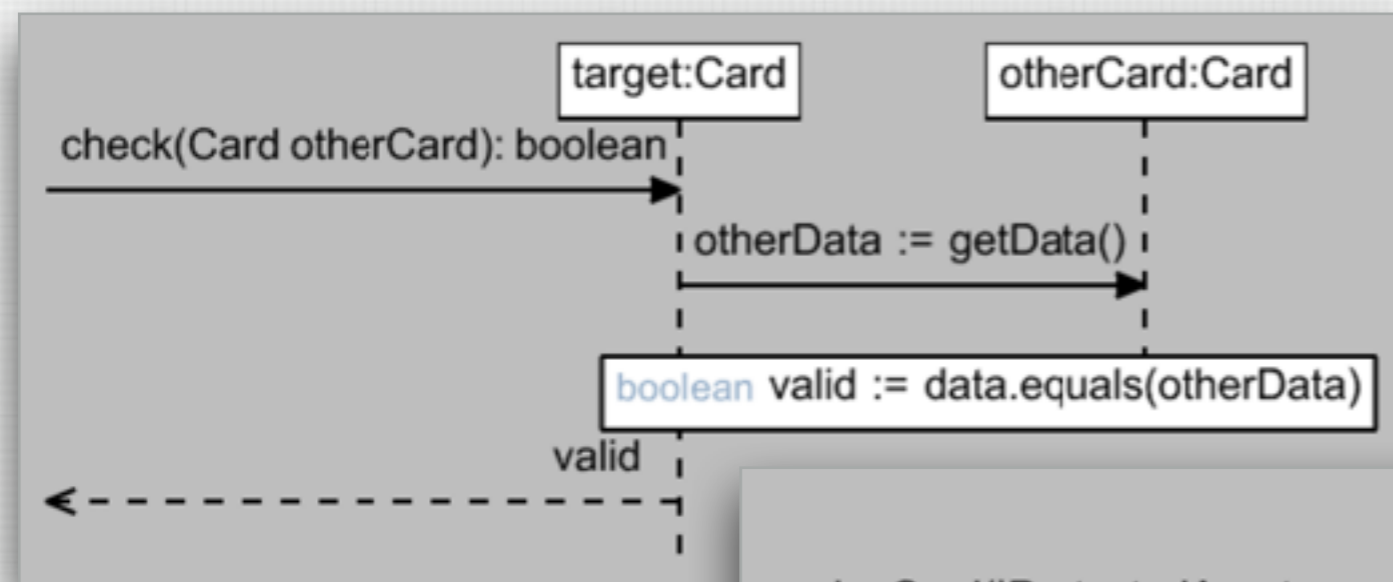
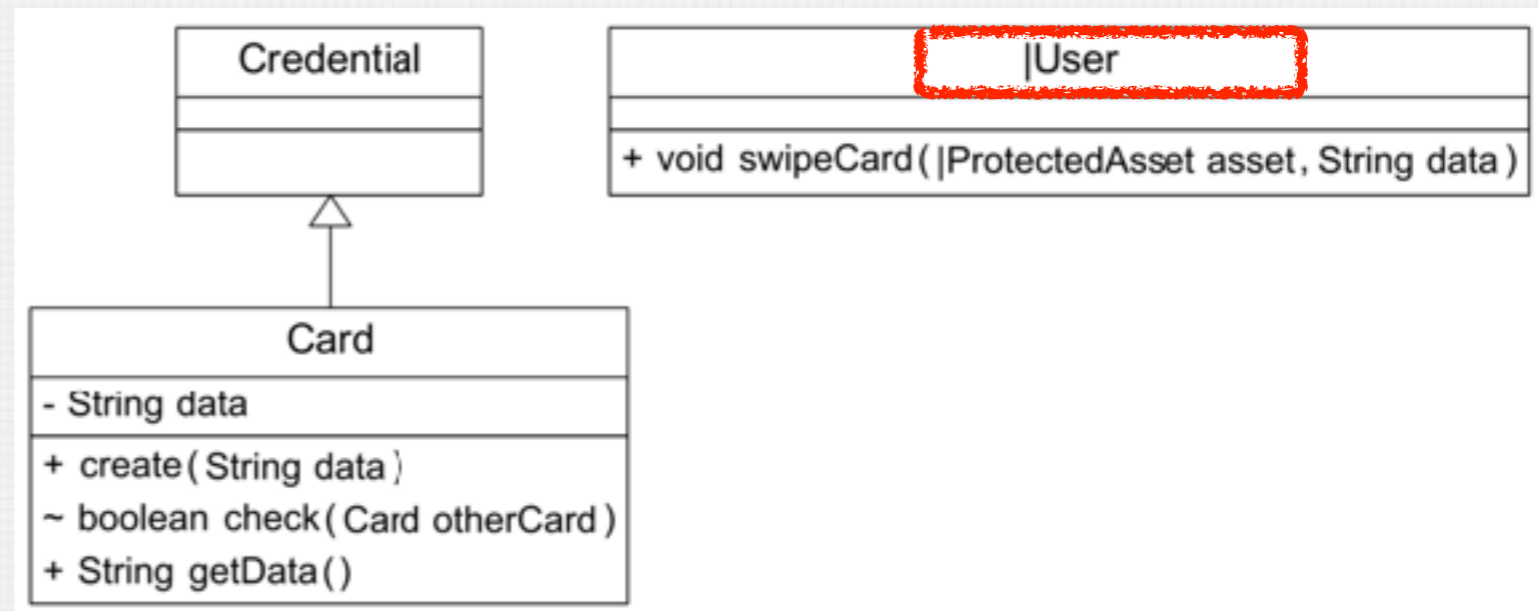
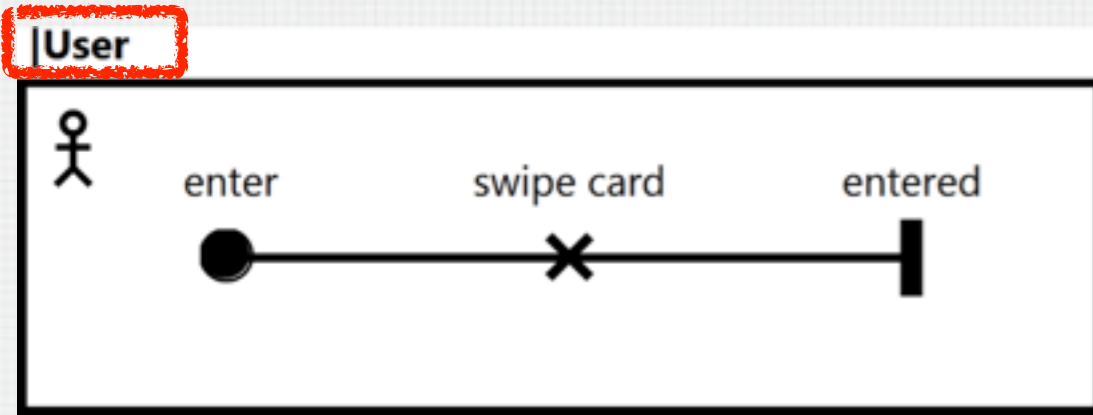
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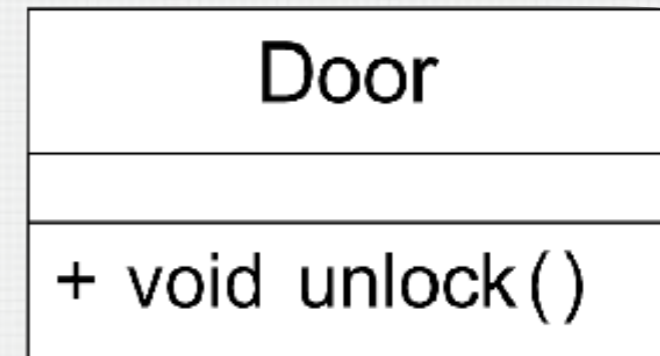
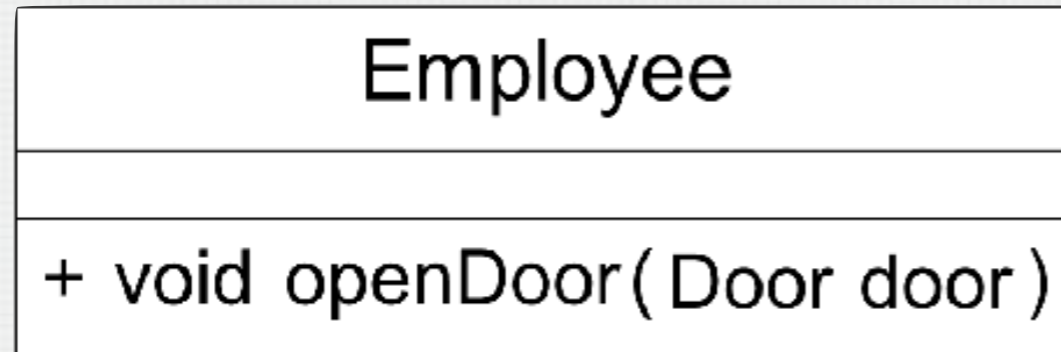
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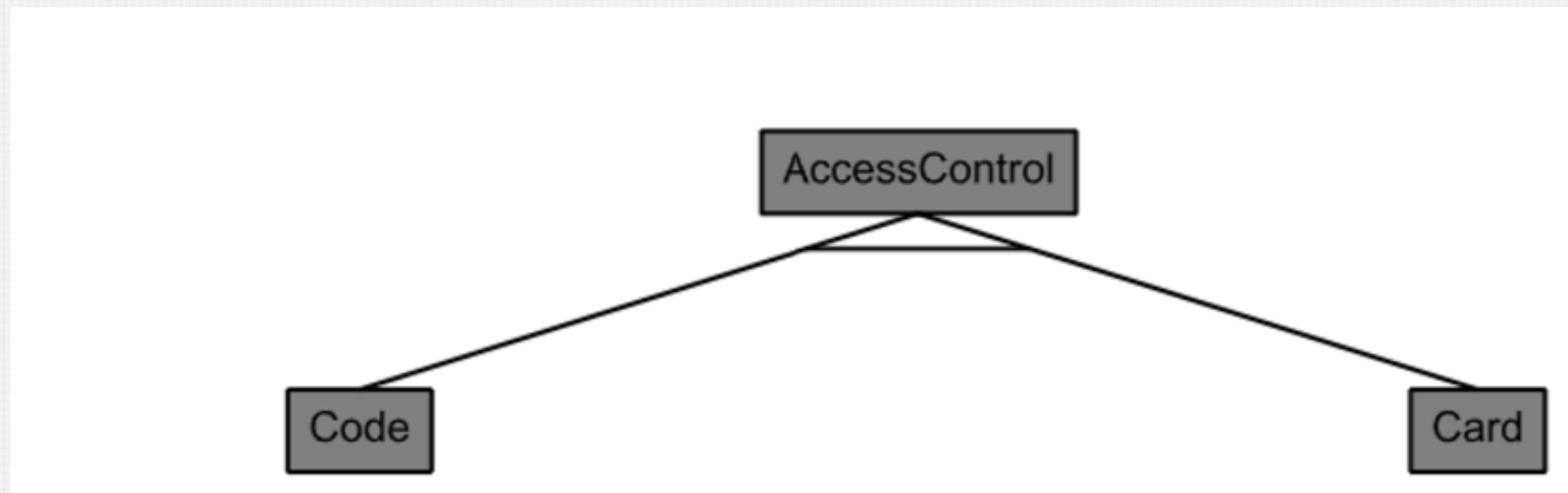
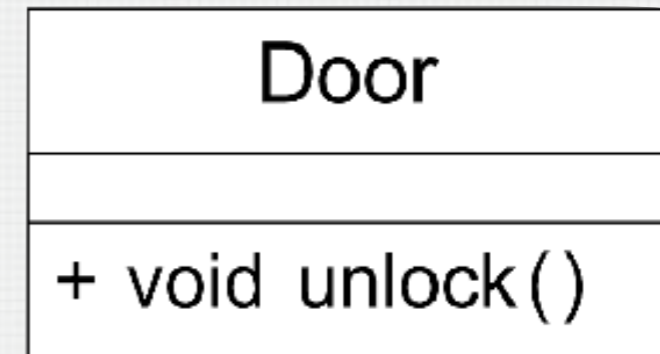
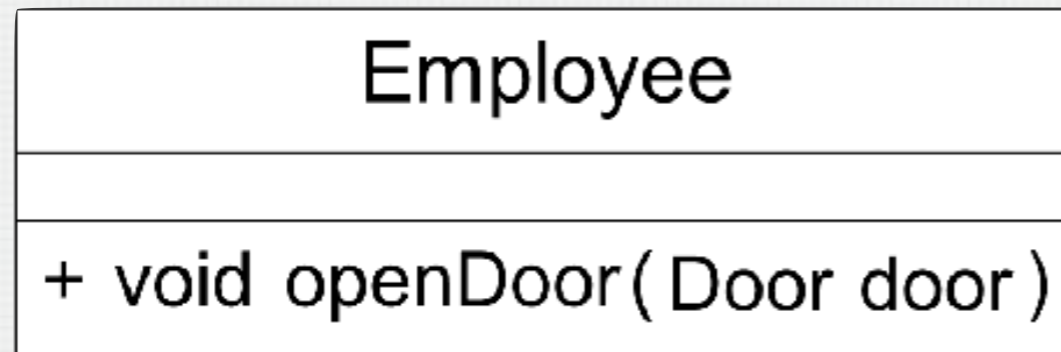
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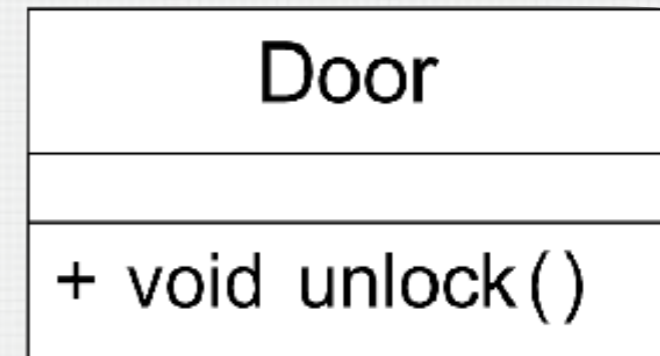
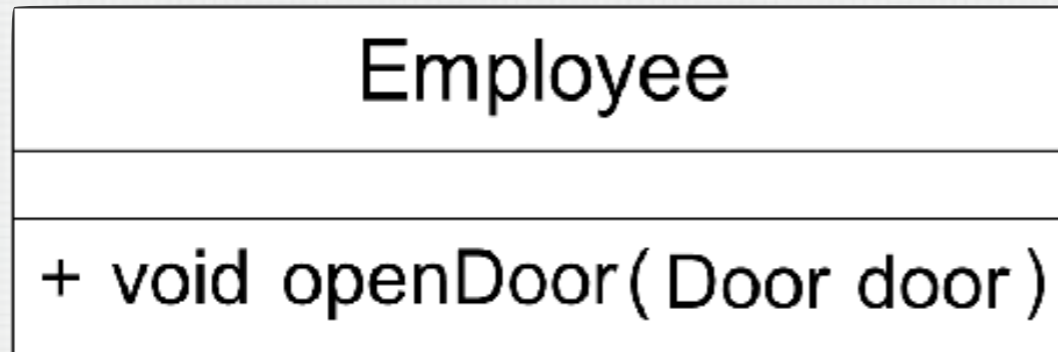
REUSE: VARIATION



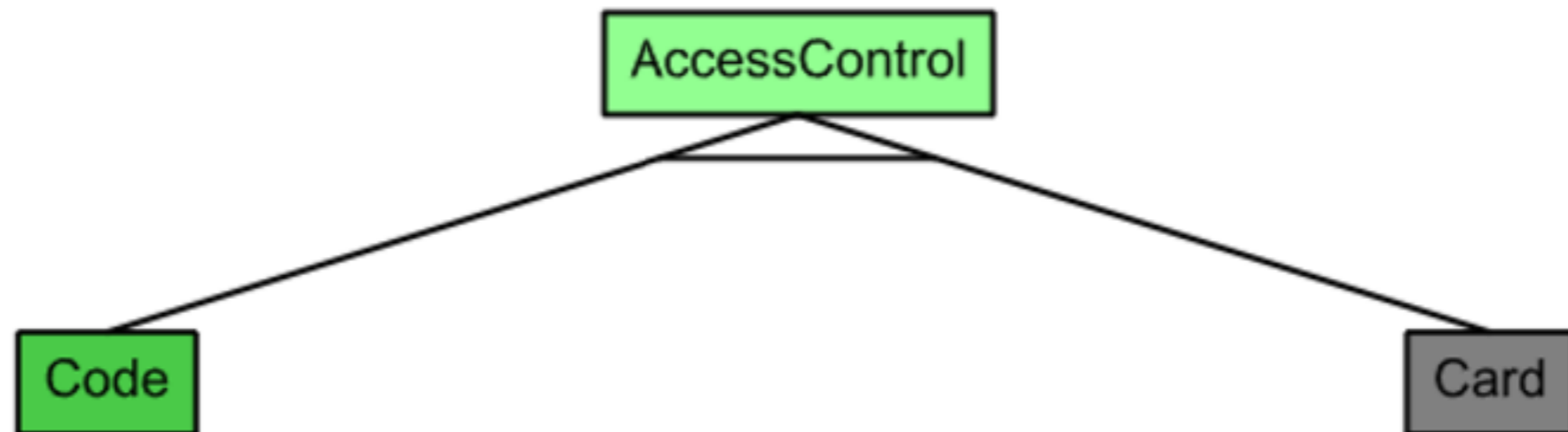
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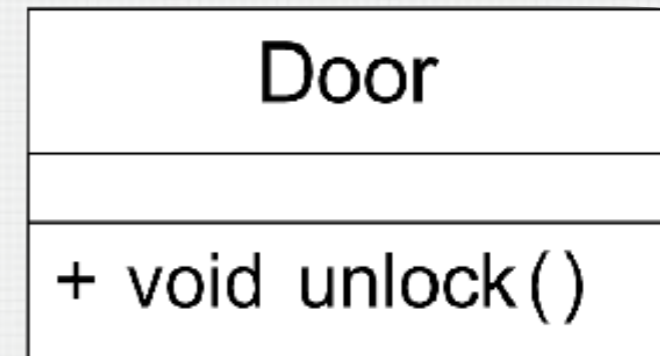
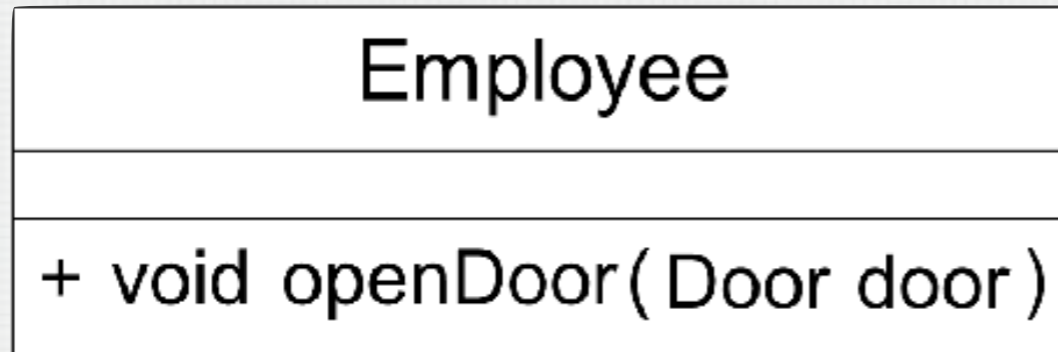
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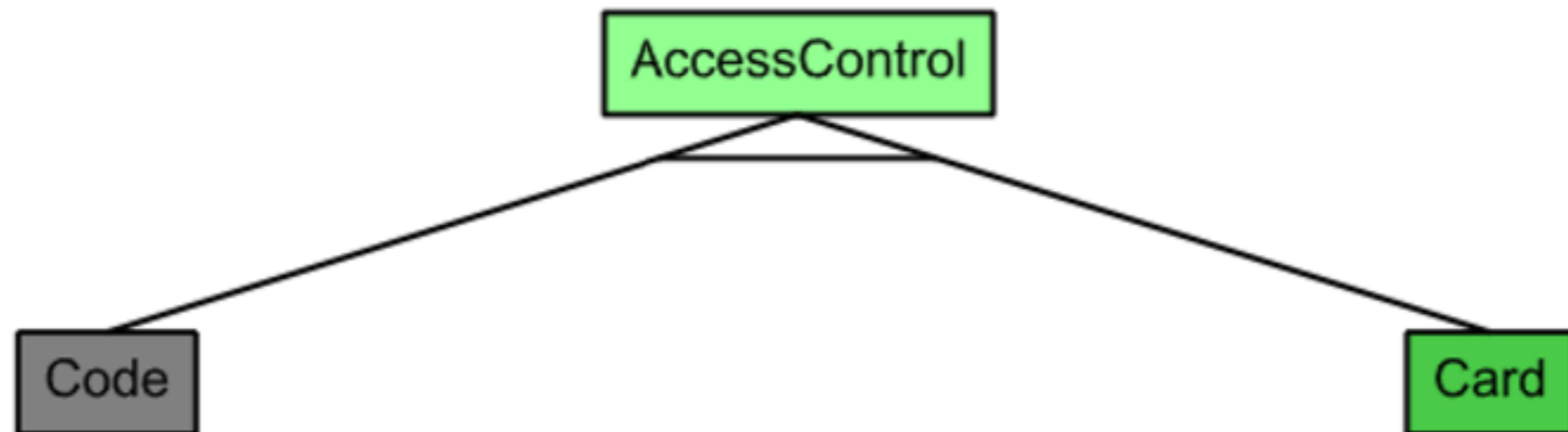
Improve Security : 1 Improve User Convenience : 1



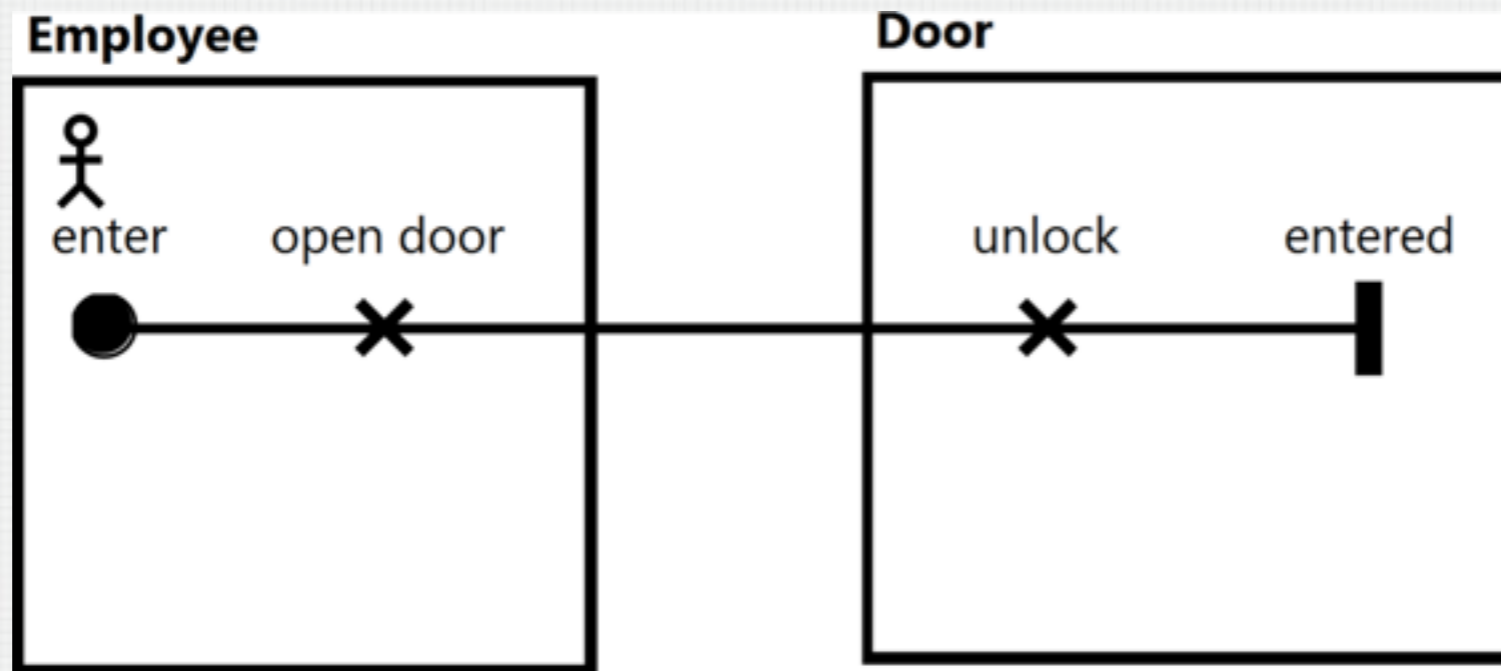
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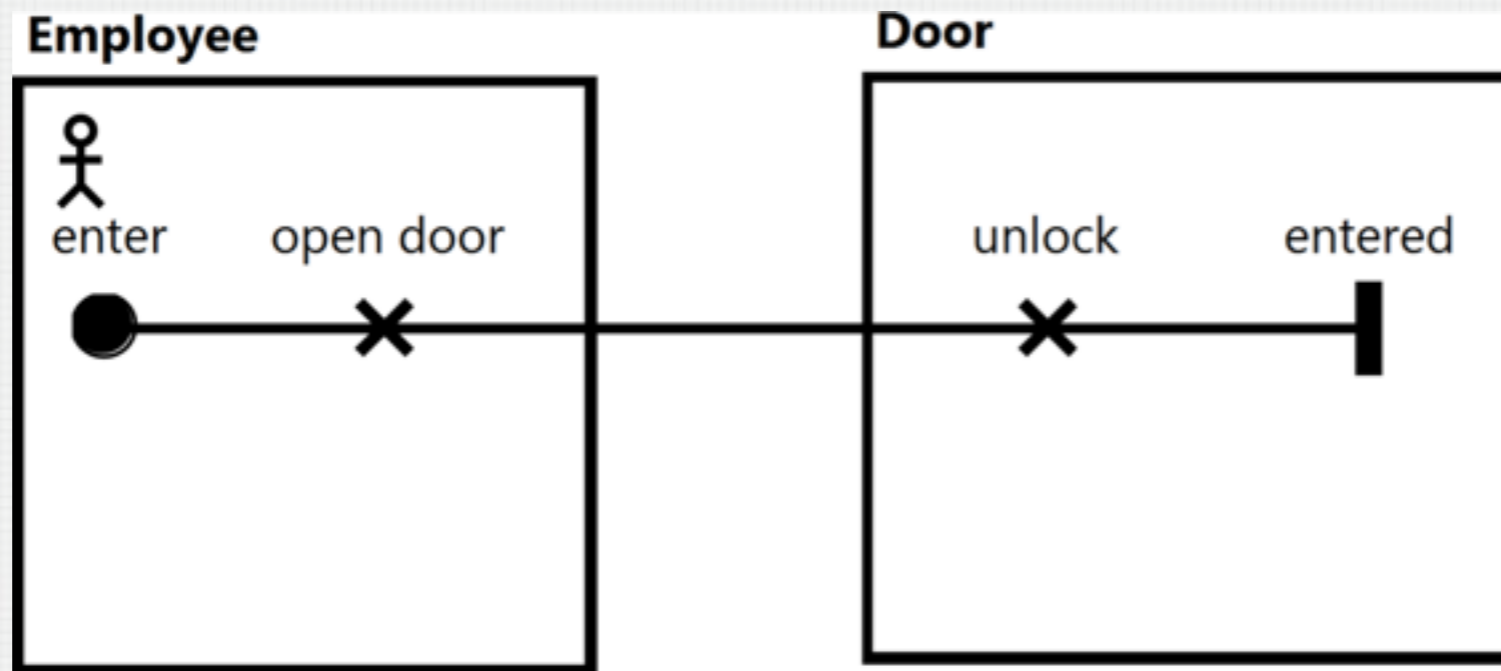
Improve Security : 2 Improve User Convenience : 8



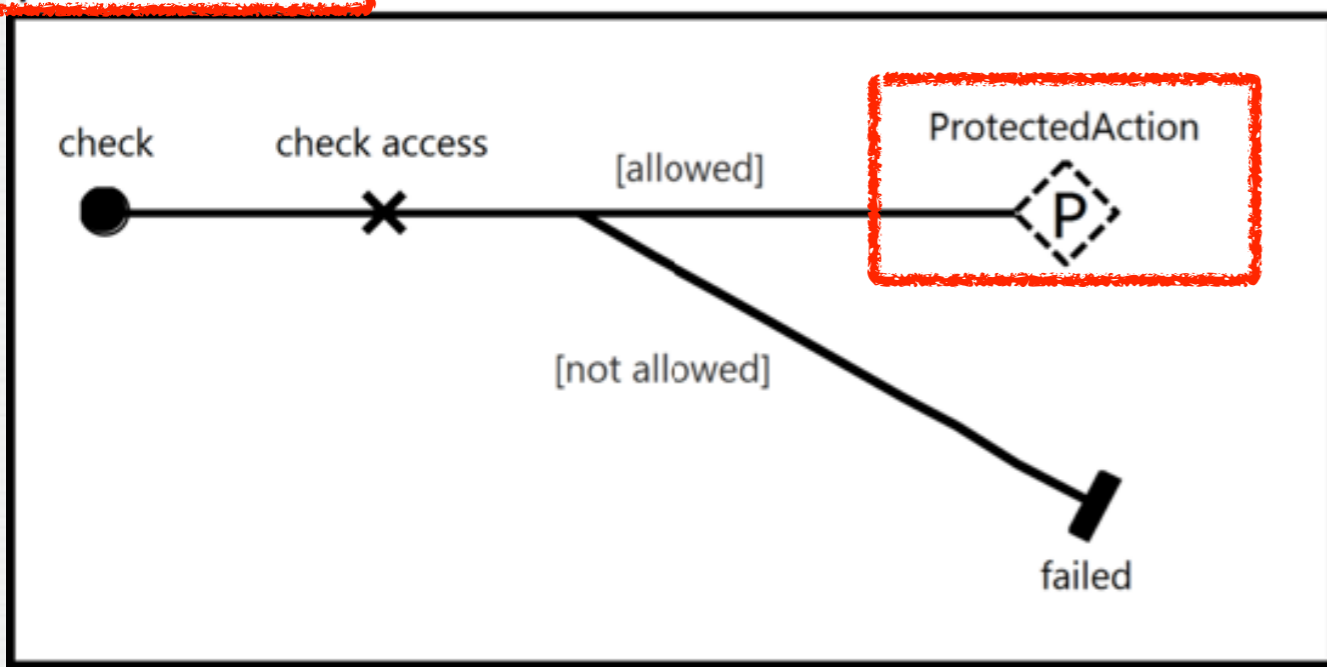
REUSE: CUSTOMIZATION



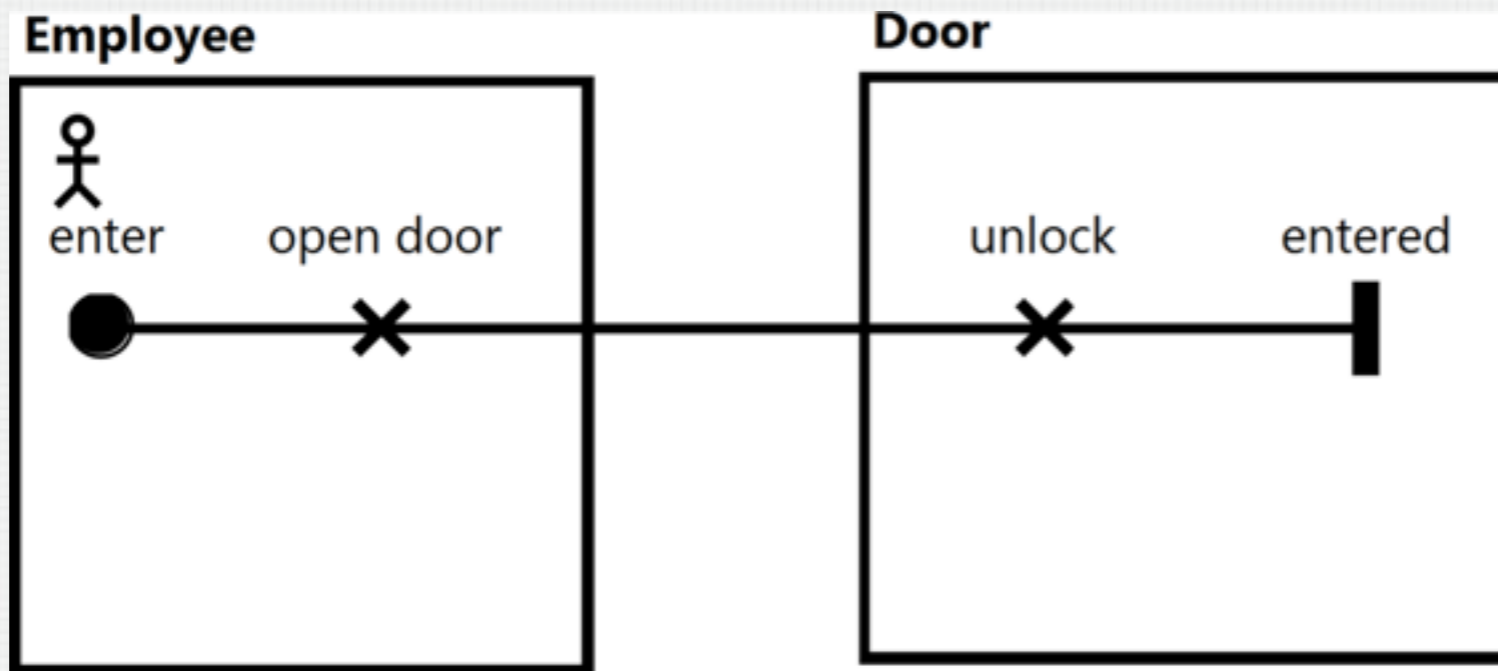
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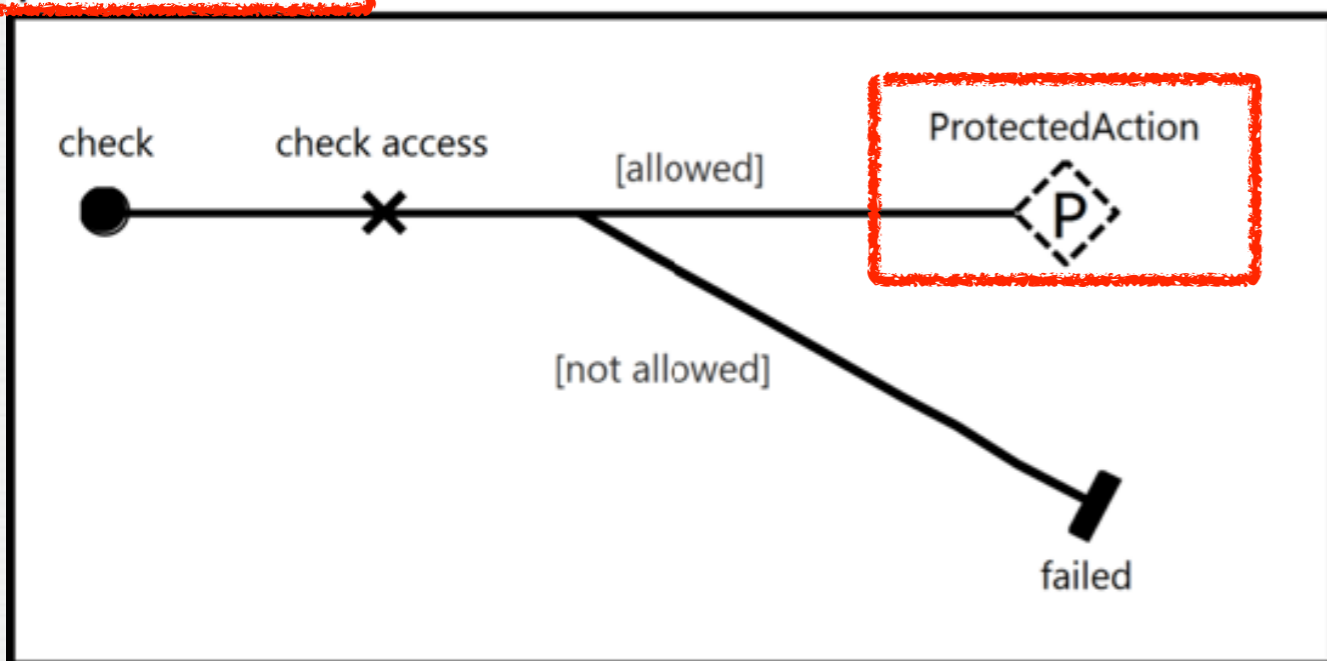
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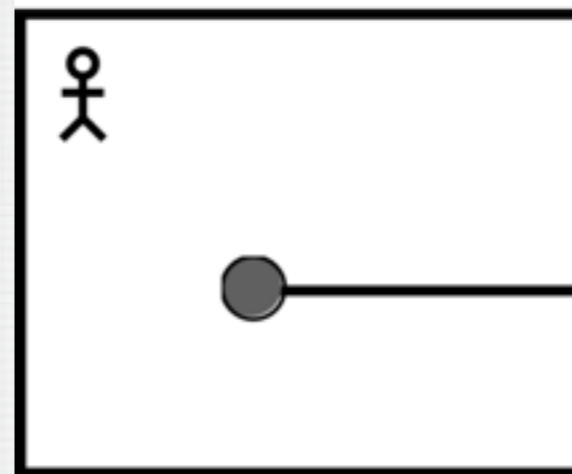
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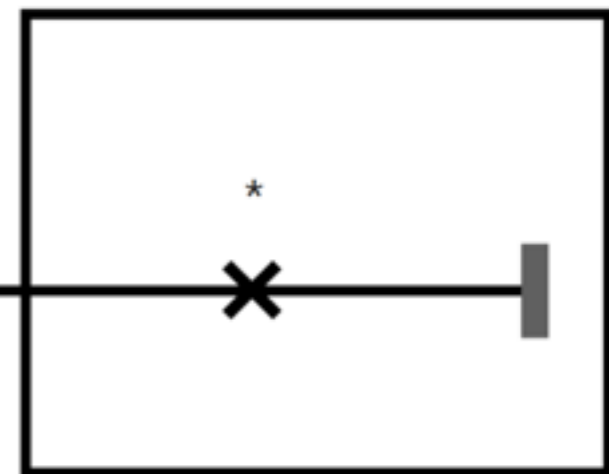
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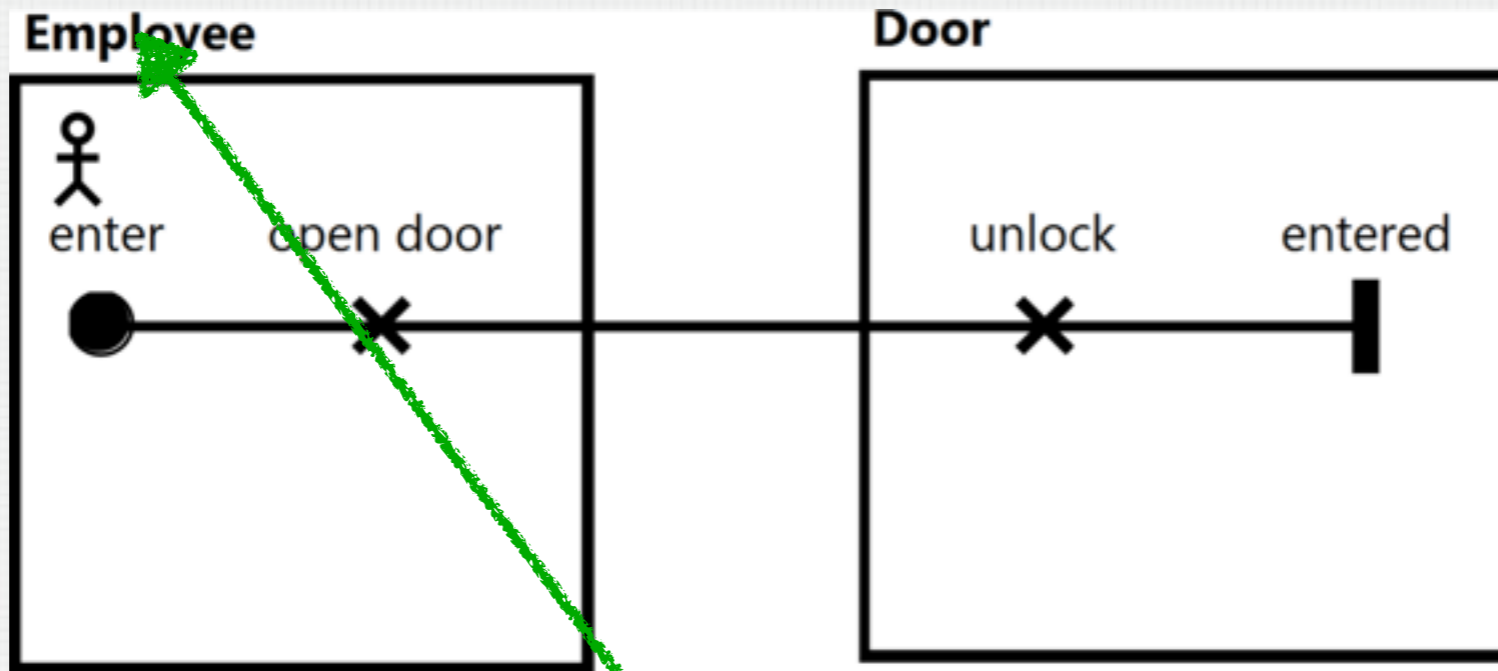
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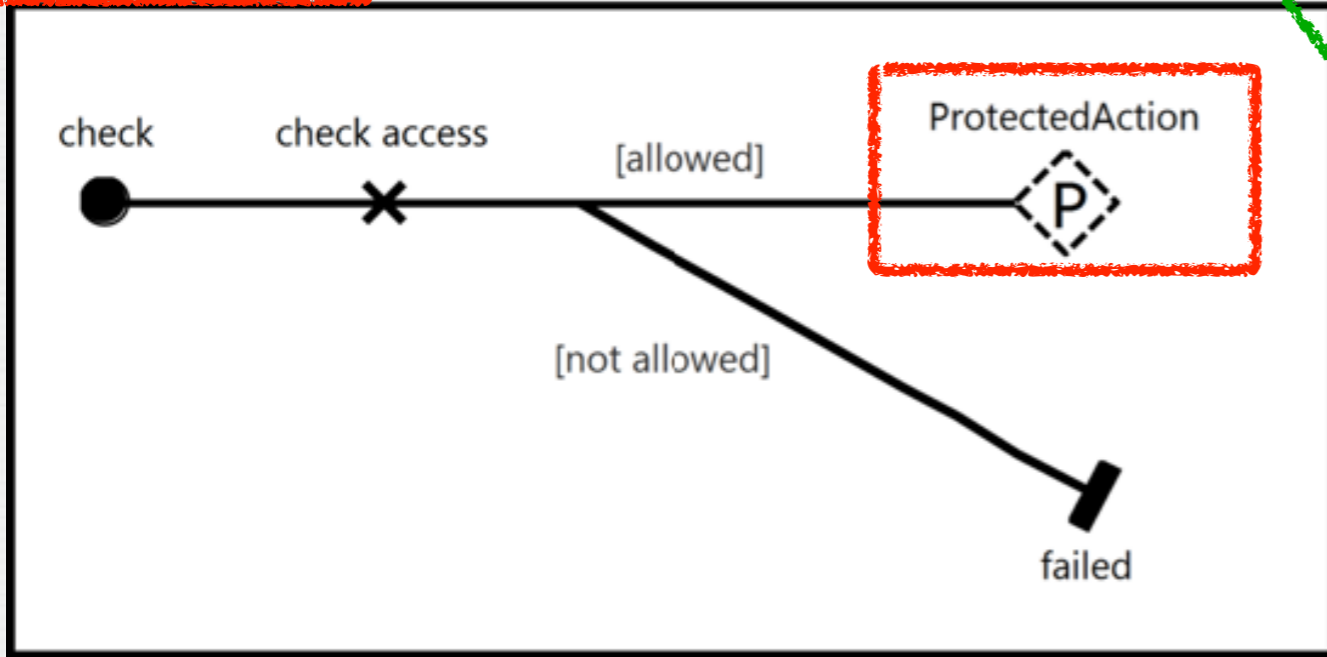
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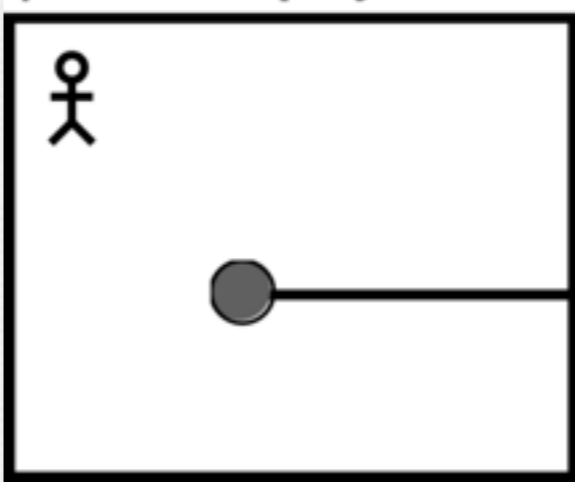
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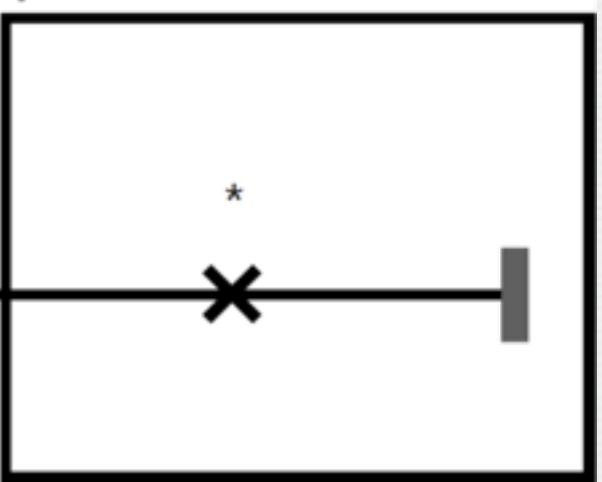
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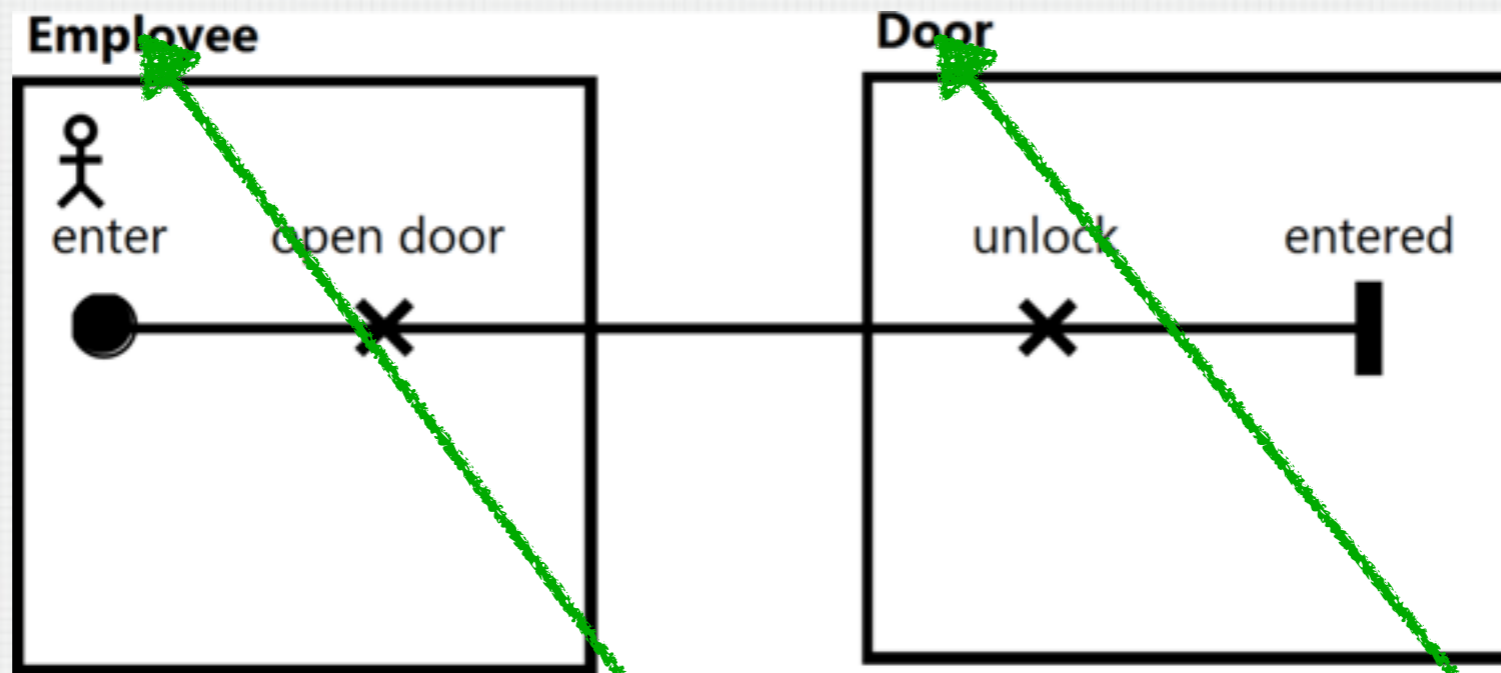
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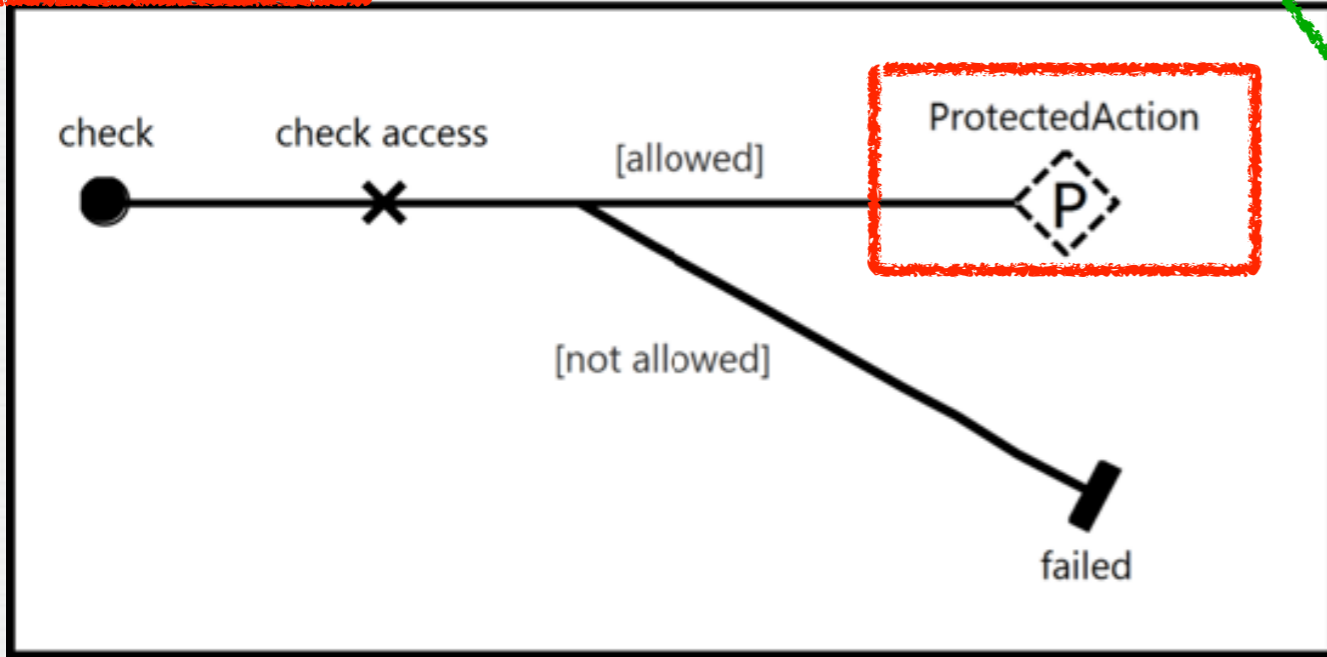
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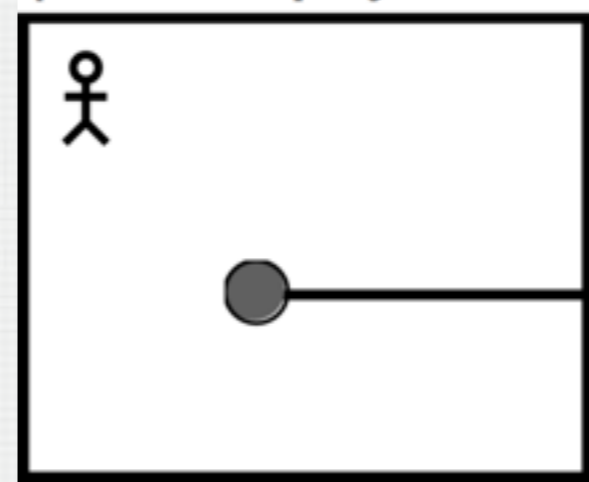
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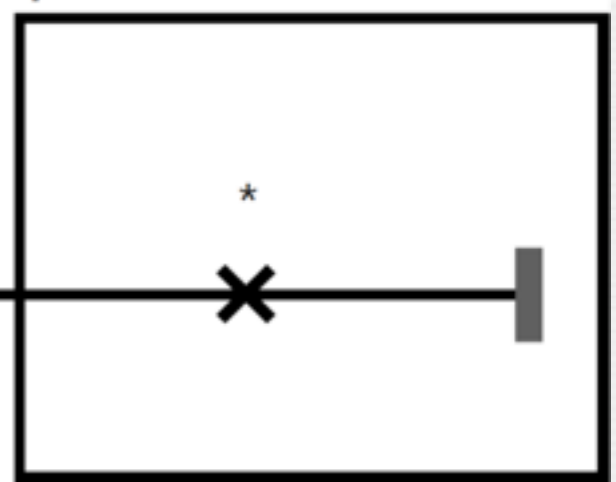
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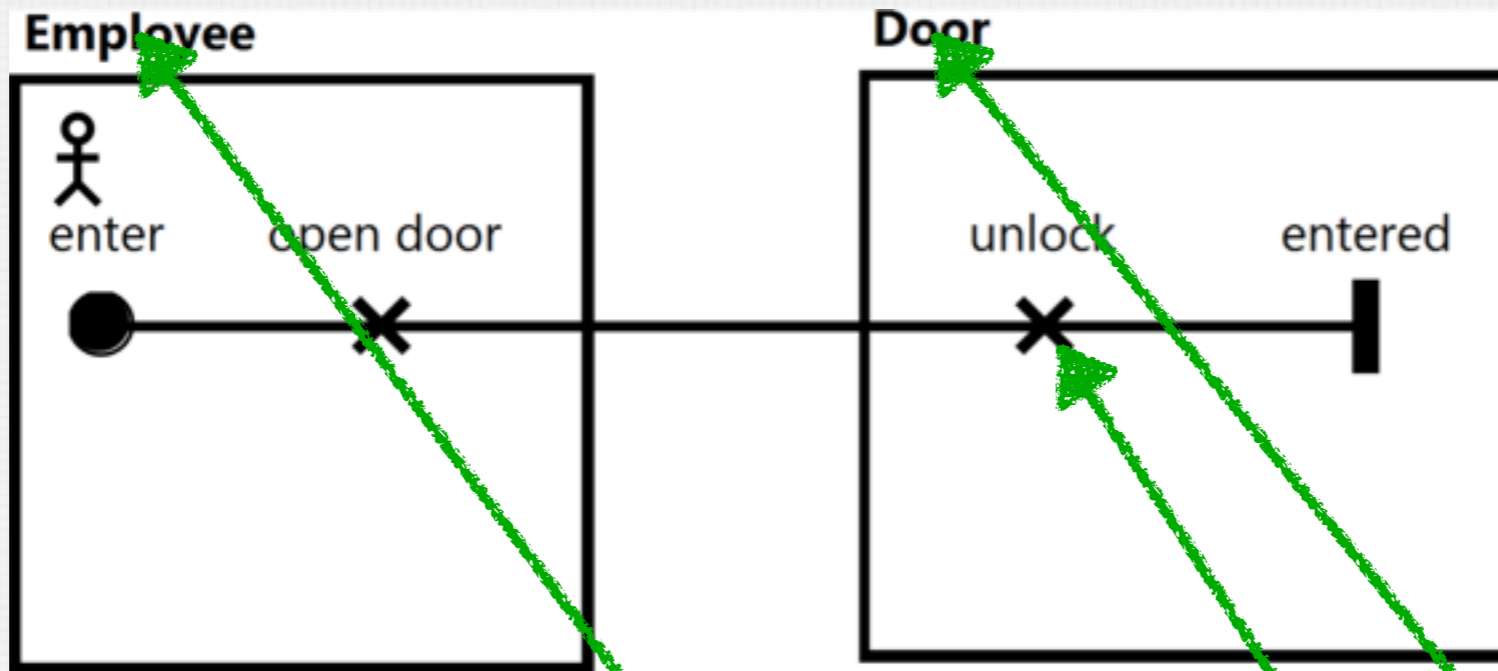
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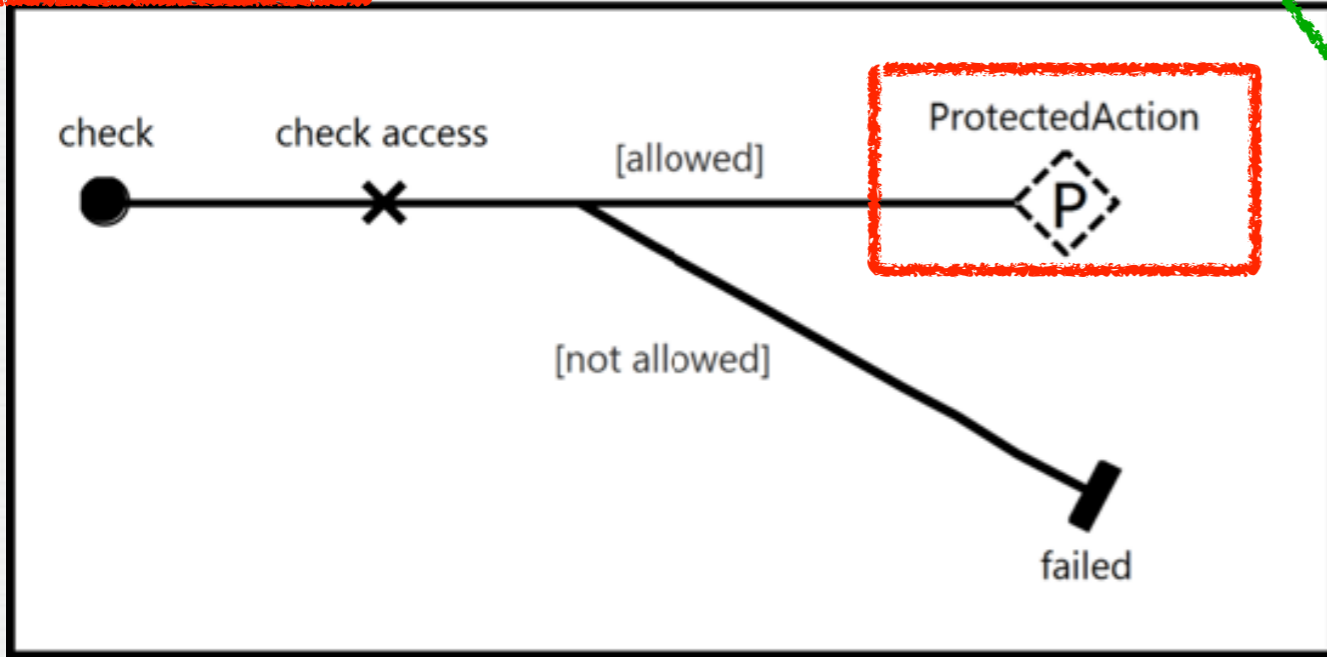
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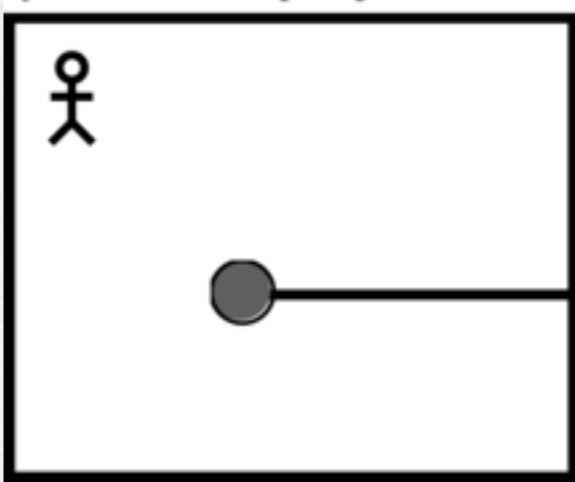
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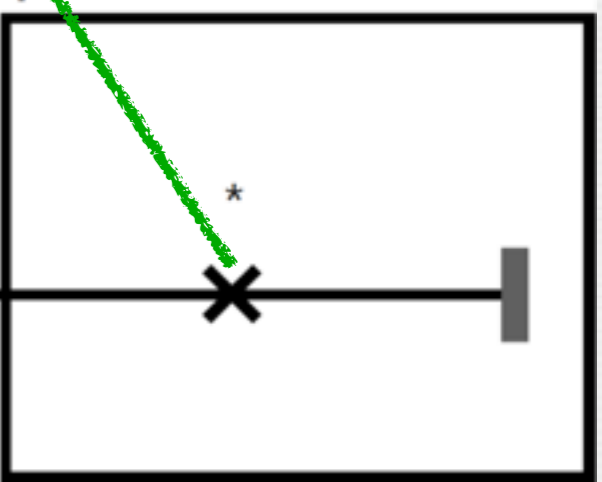
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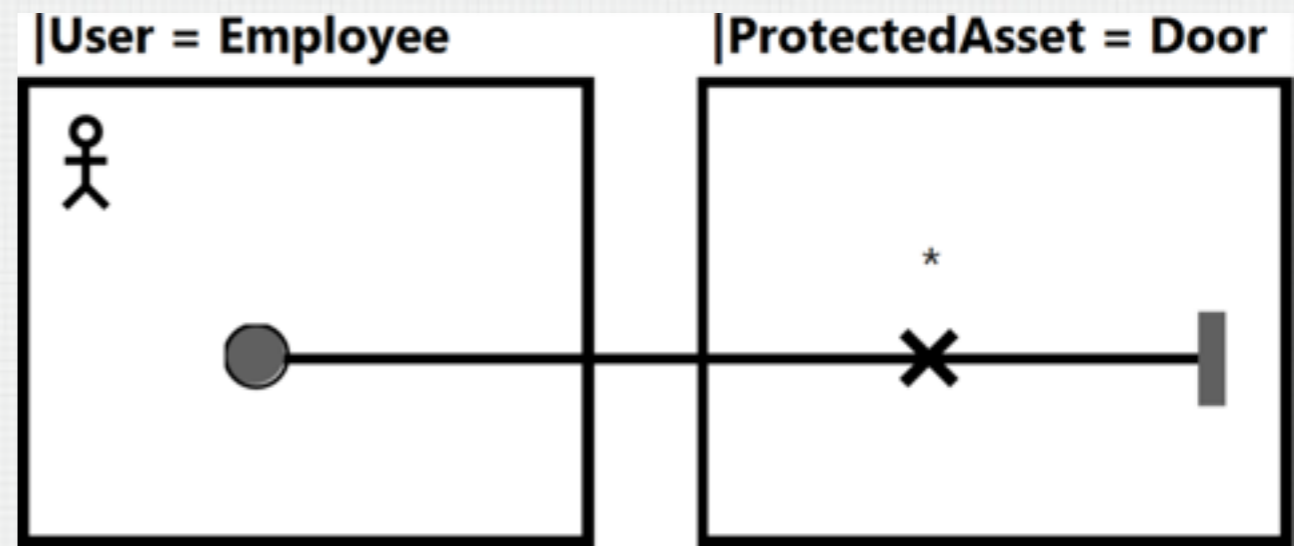
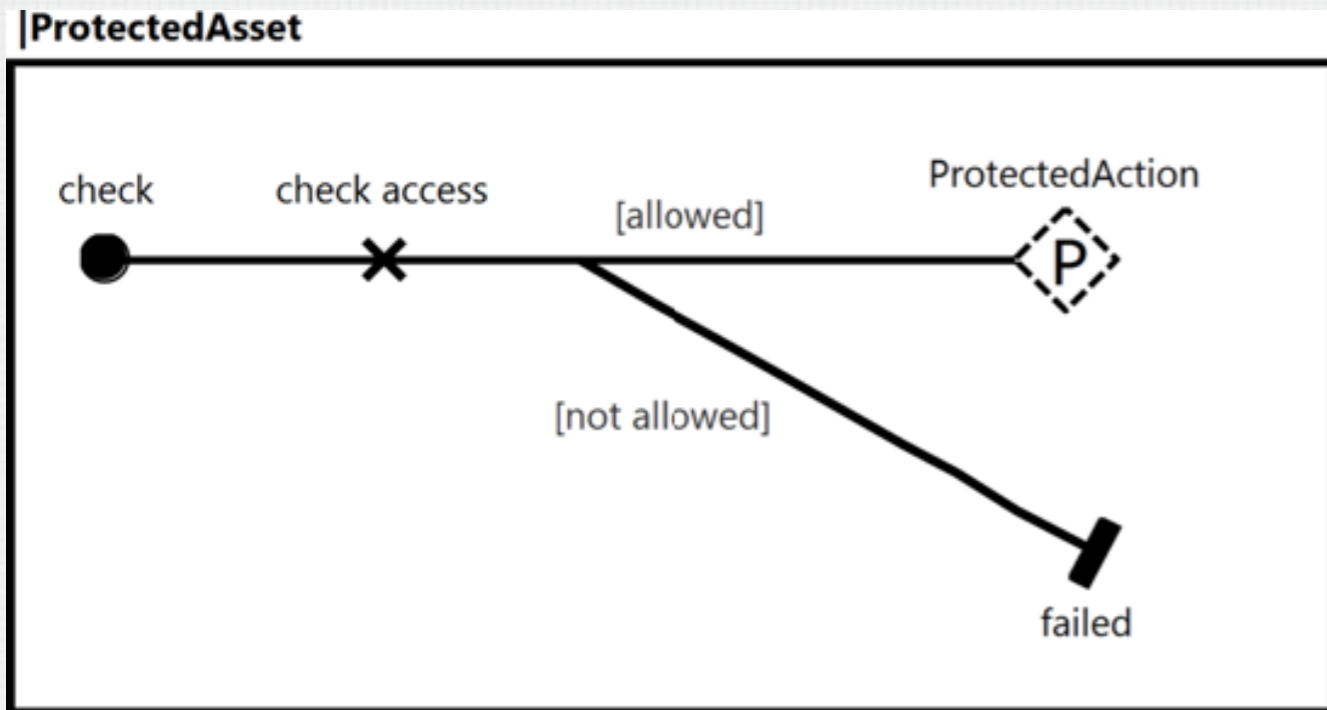
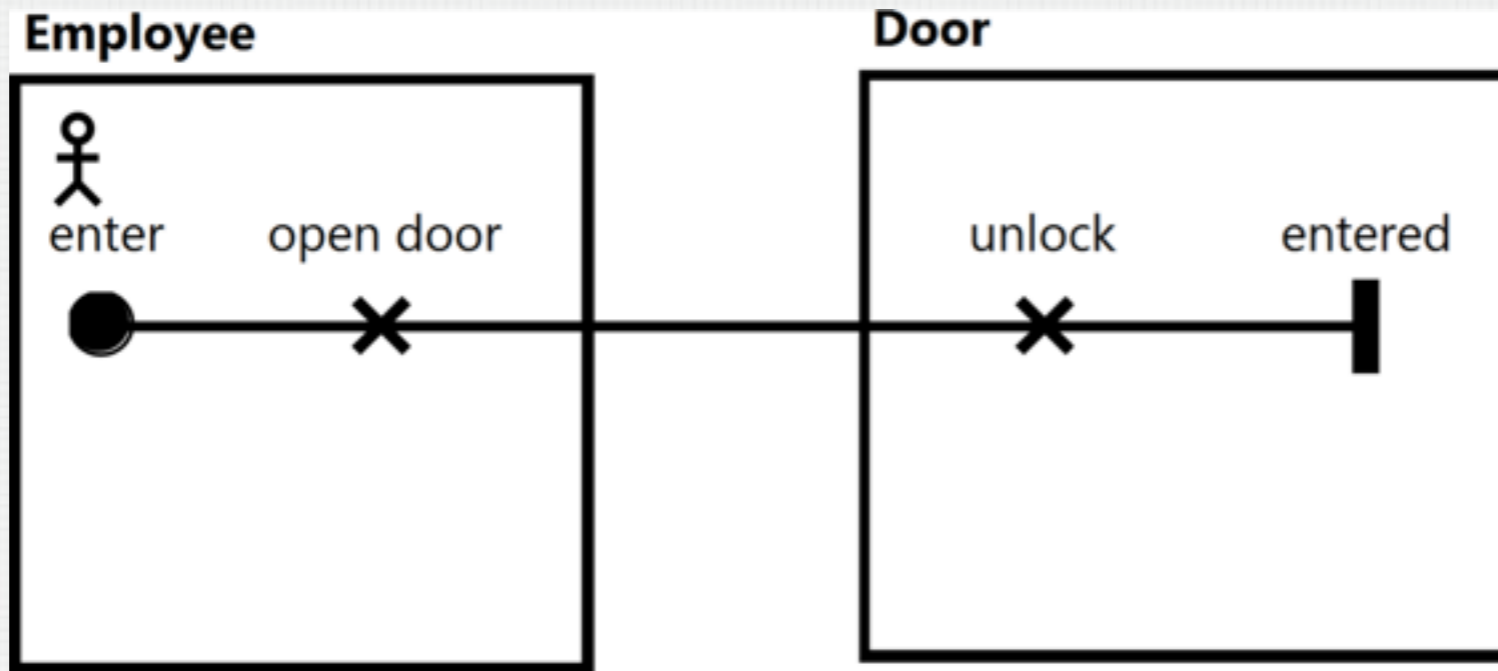
|User = Employee



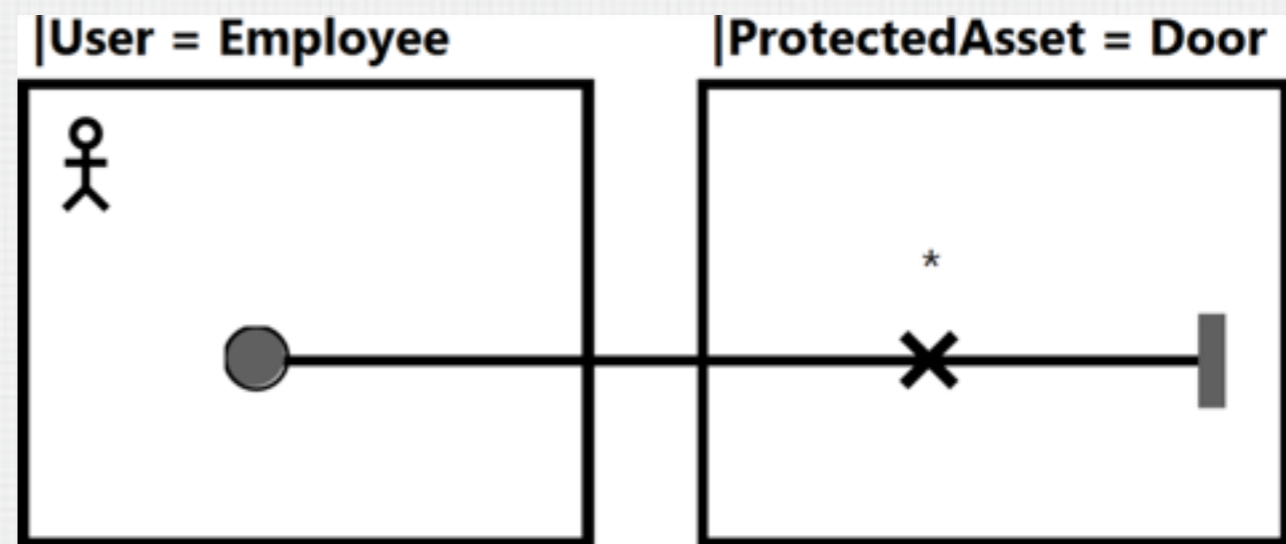
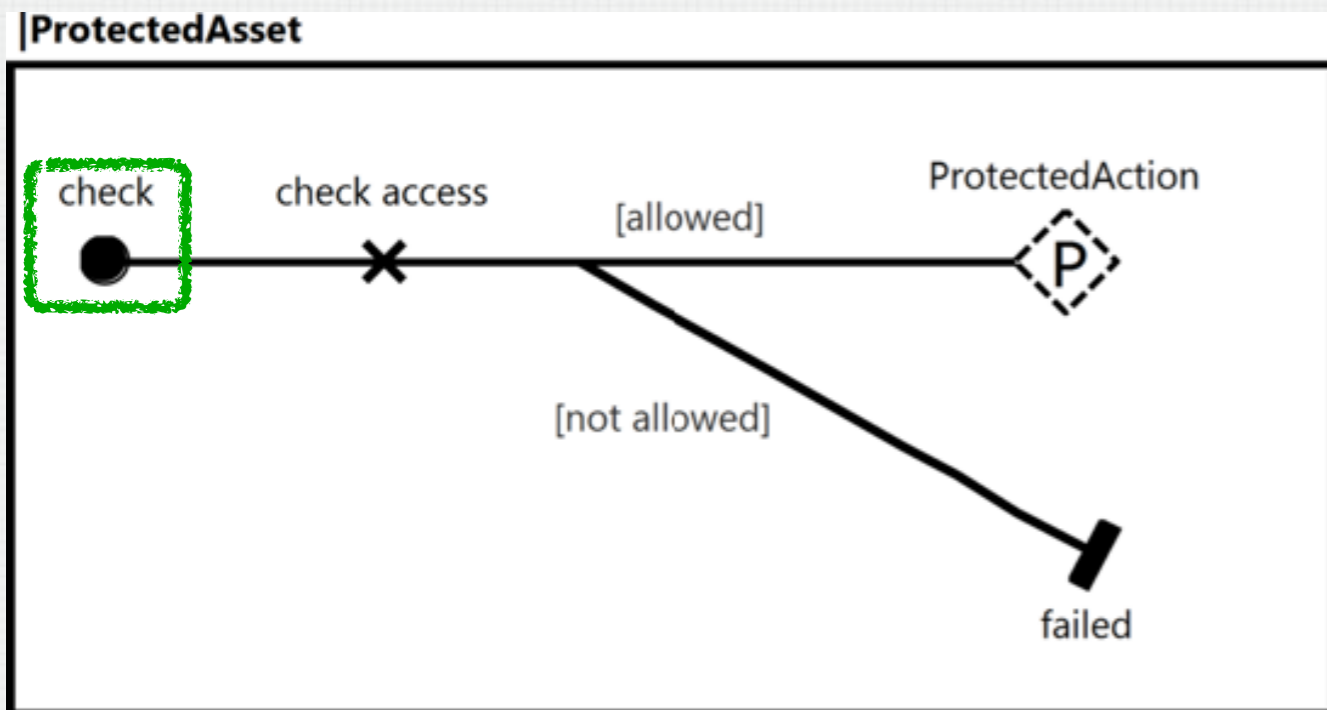
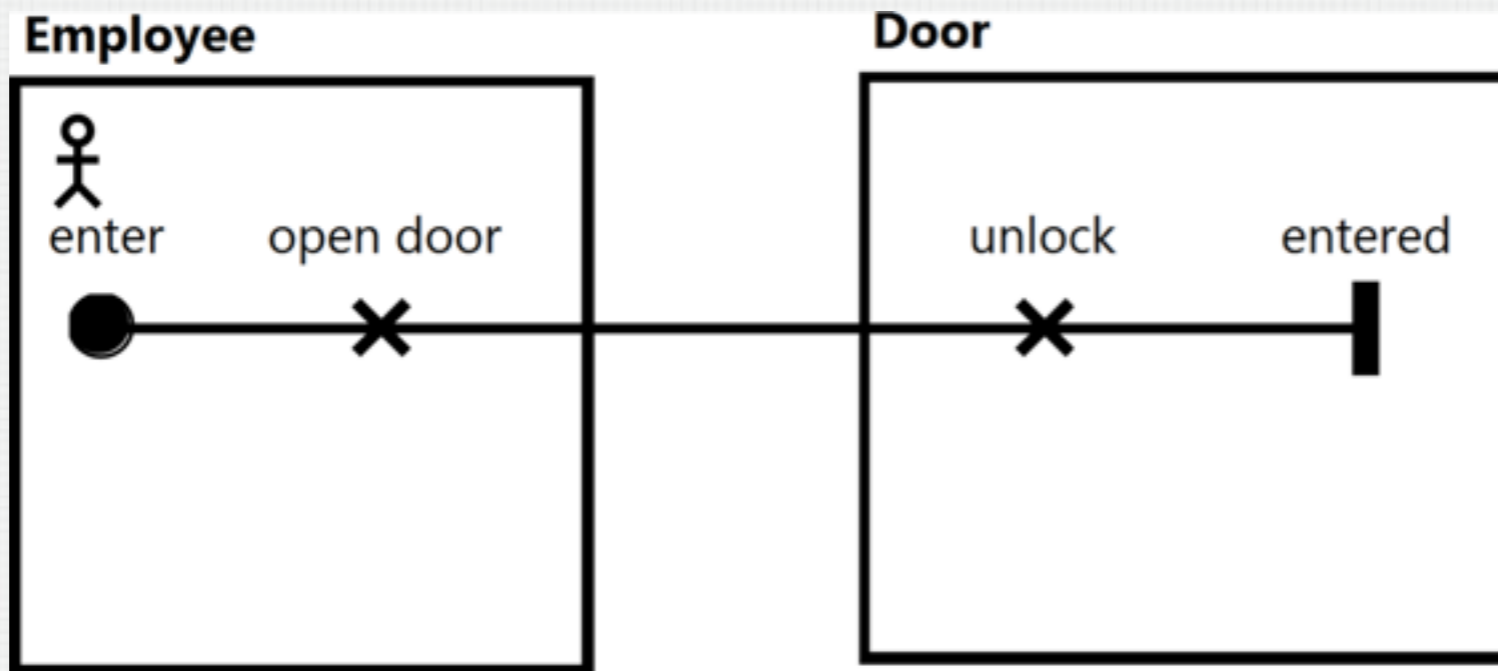
|ProtectedAsset = Door



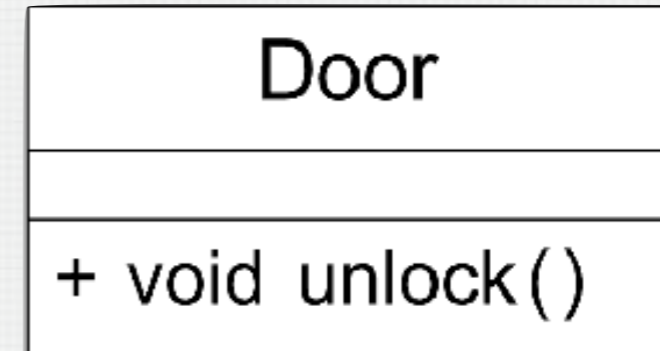
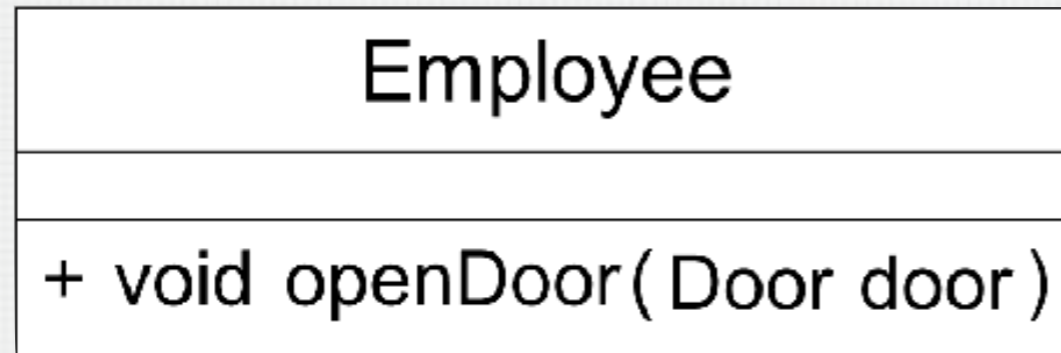
REUSE: USAGE



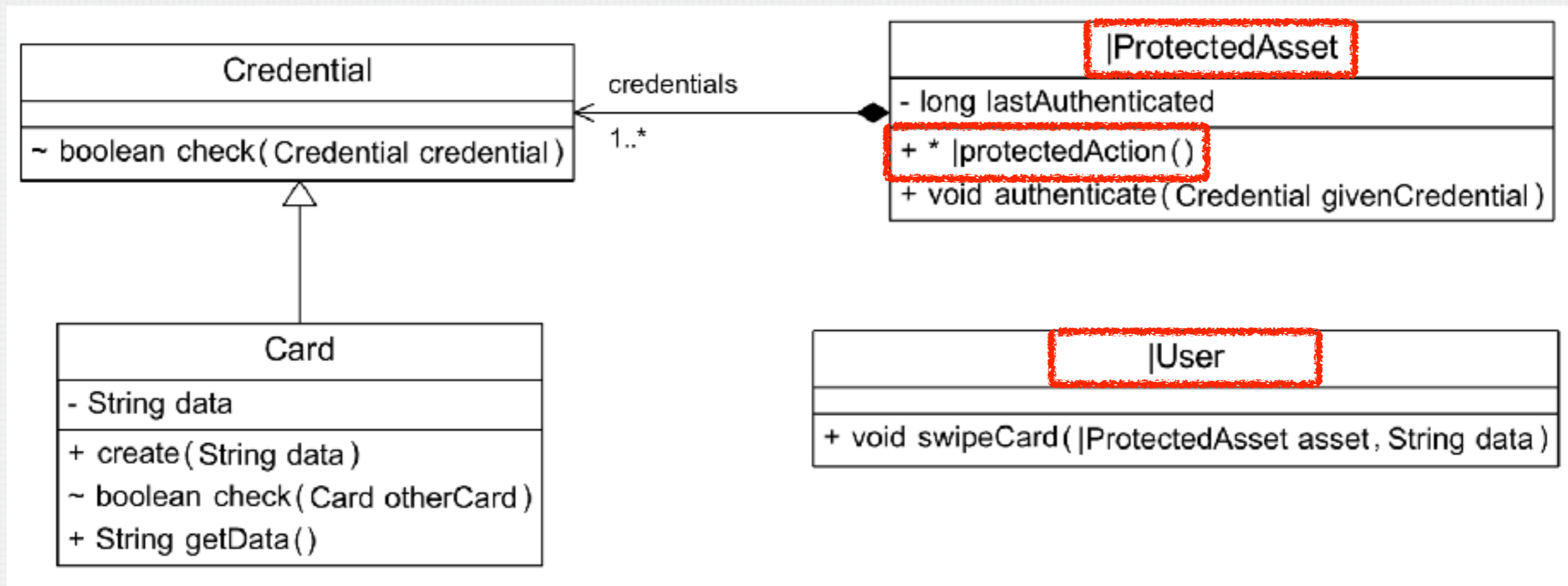
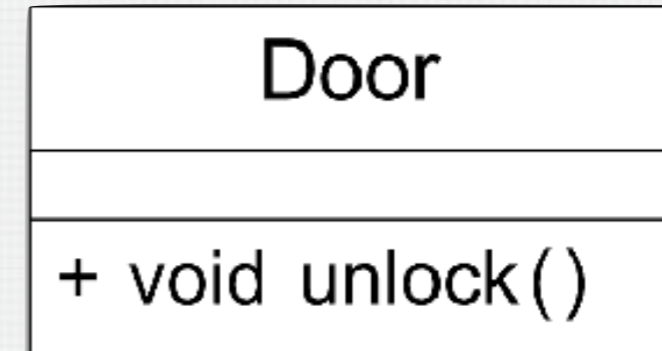
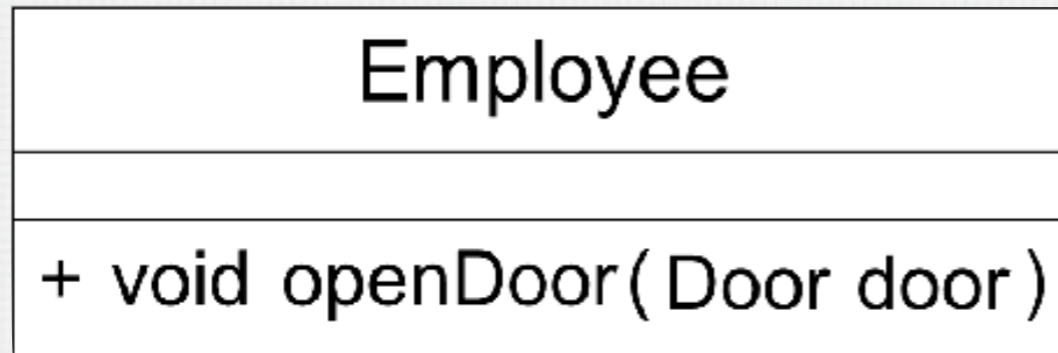
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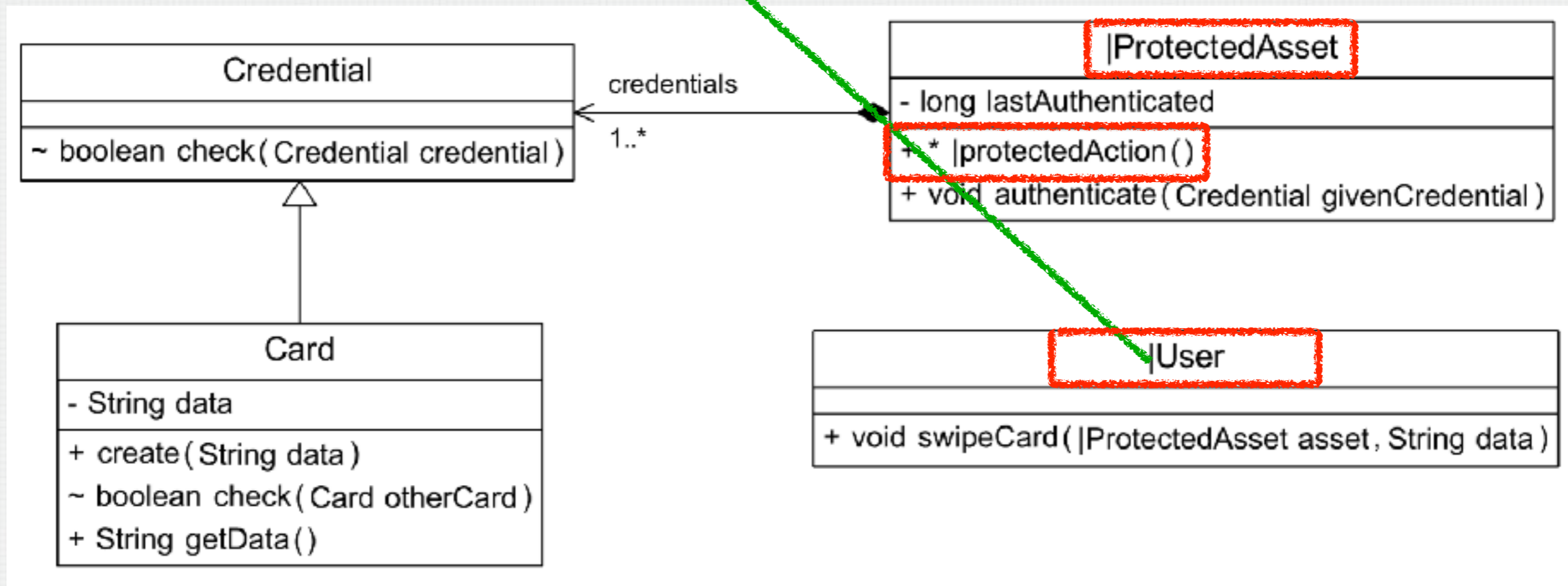
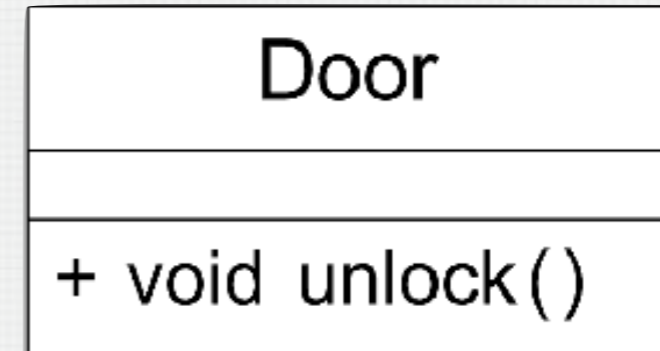
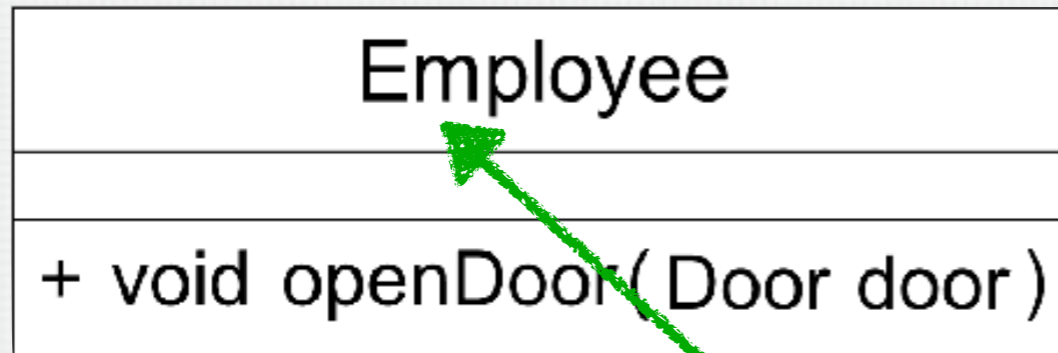
REUSE: CUSTOMIZATION



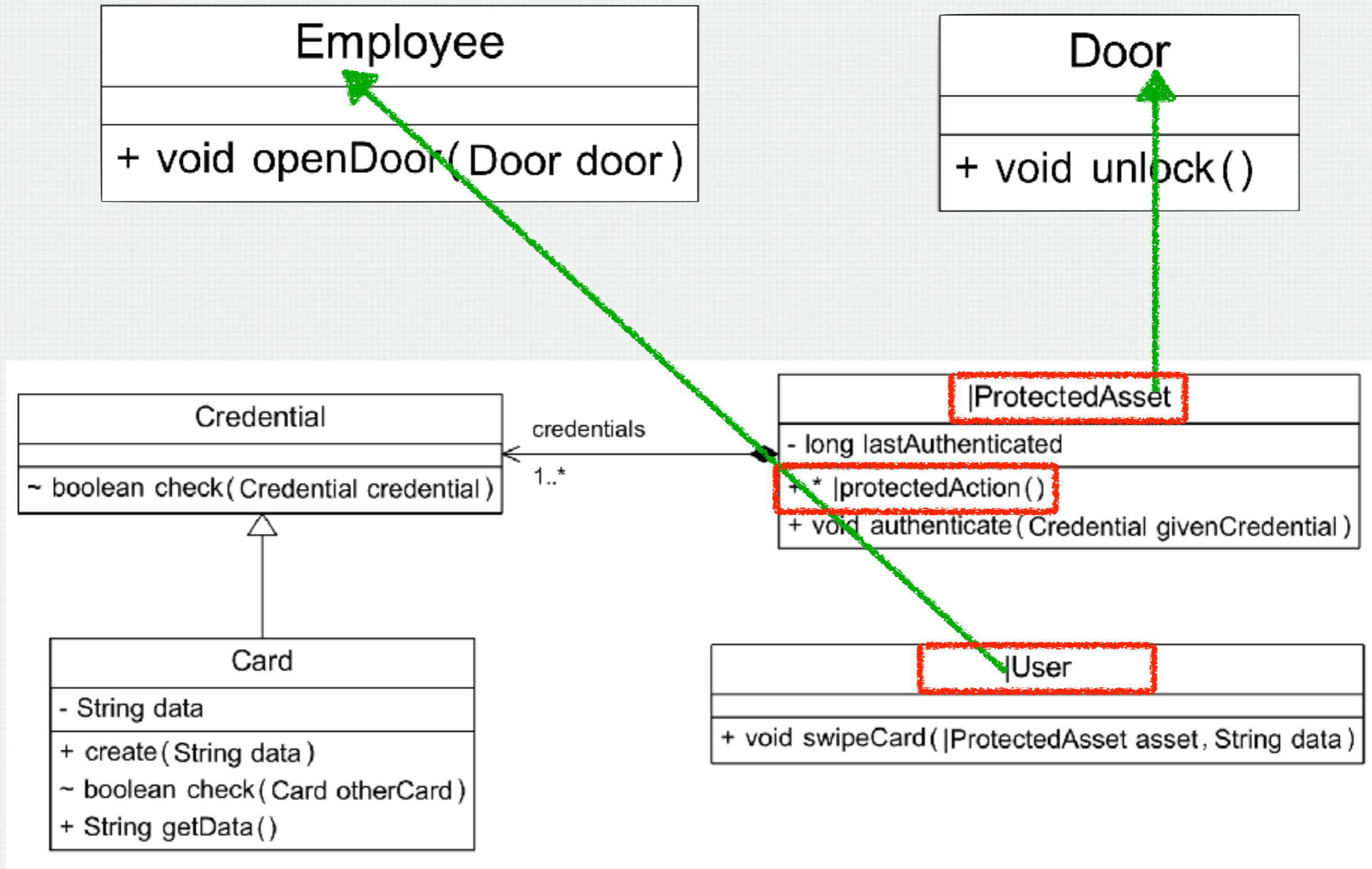
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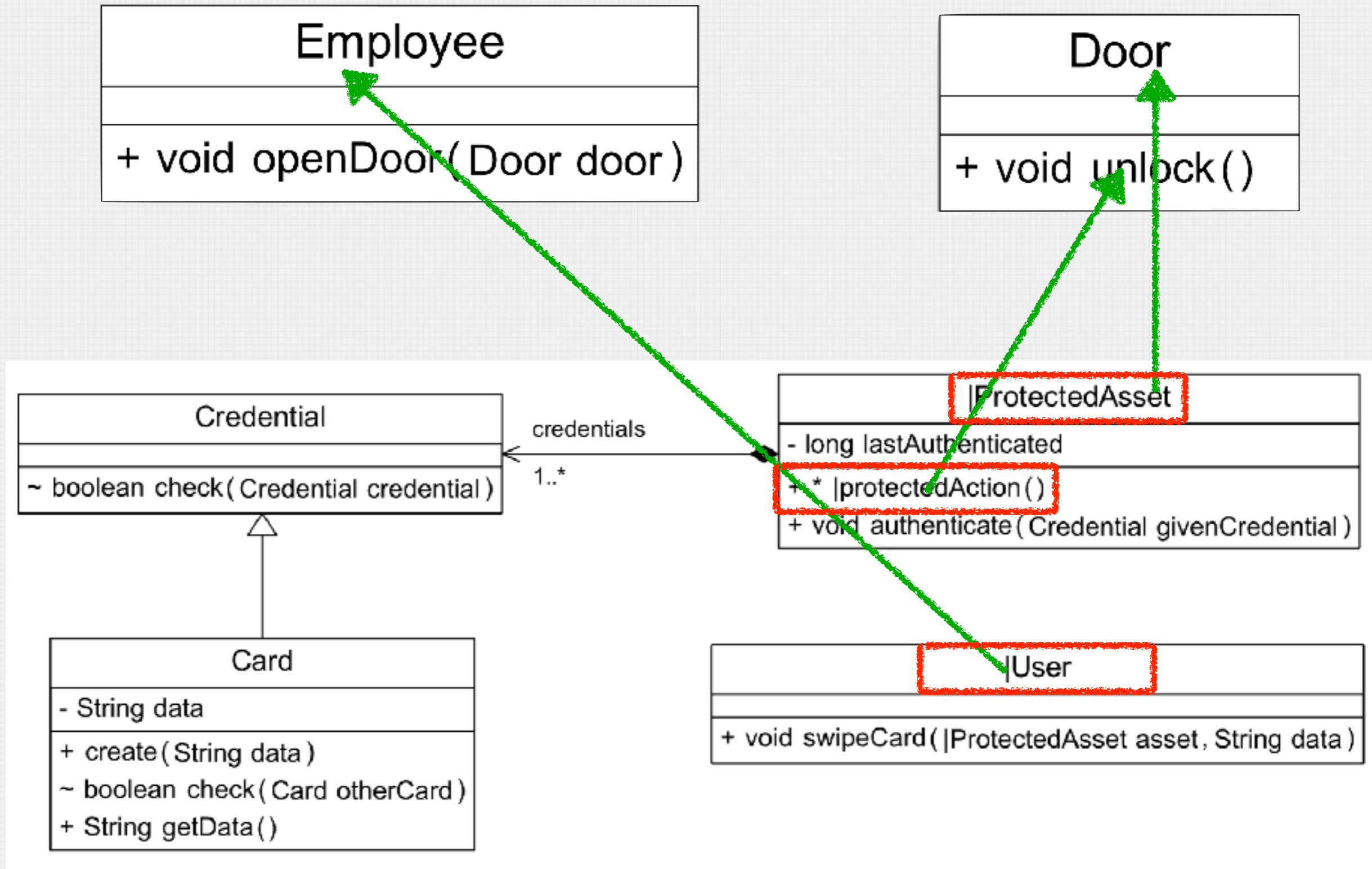
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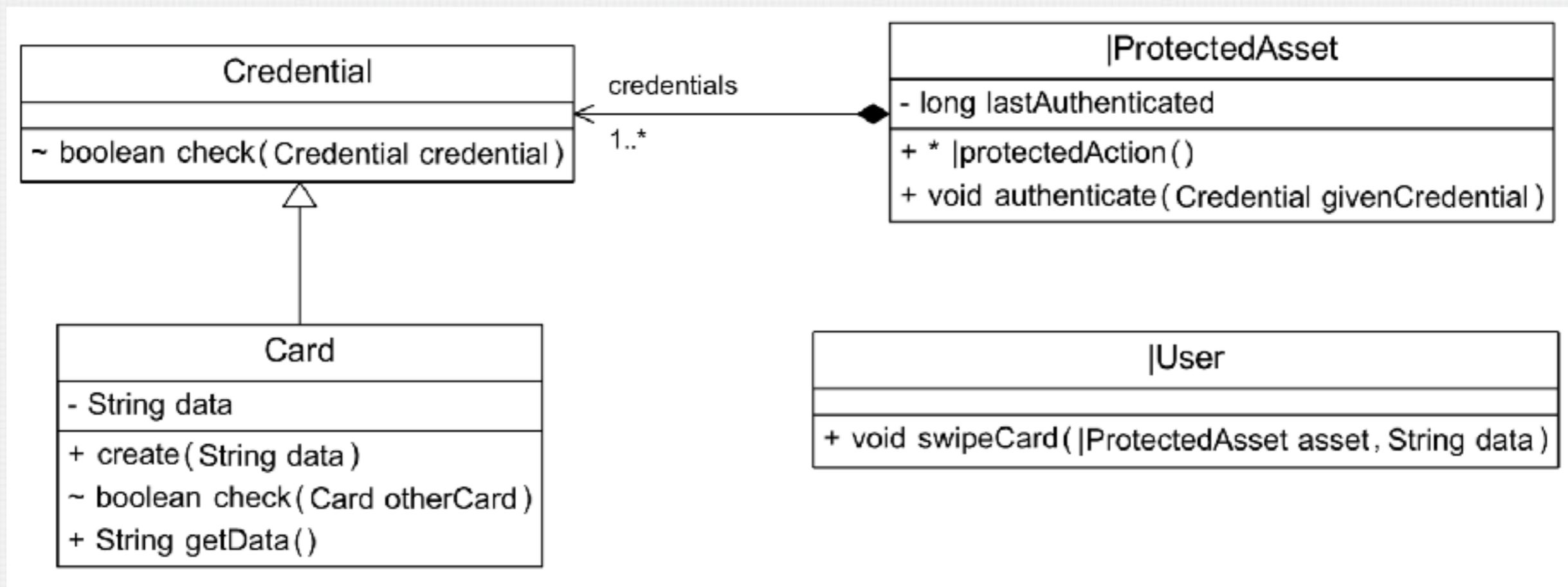
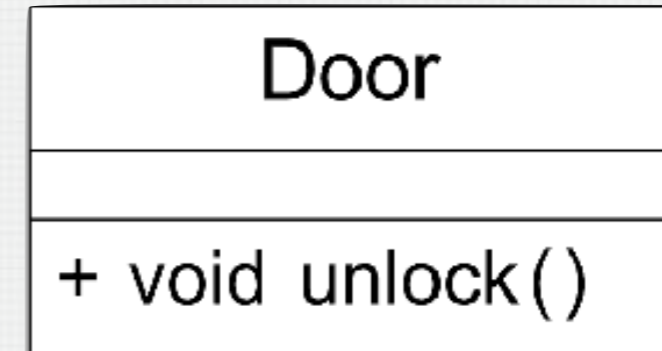
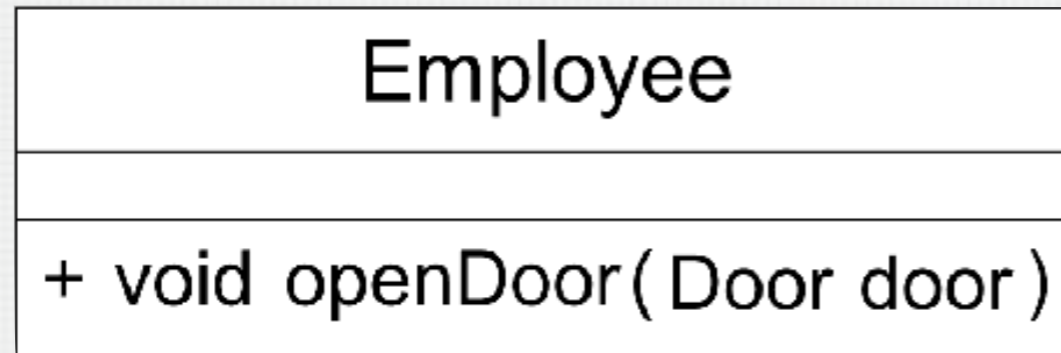
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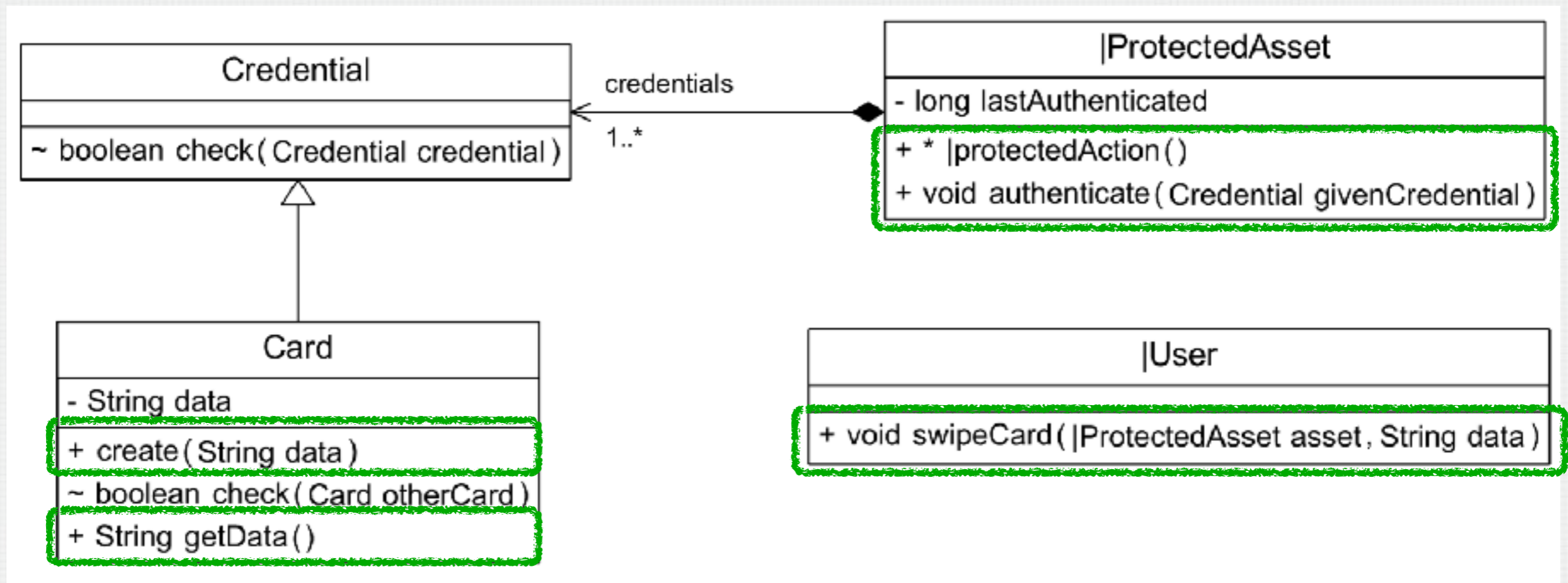
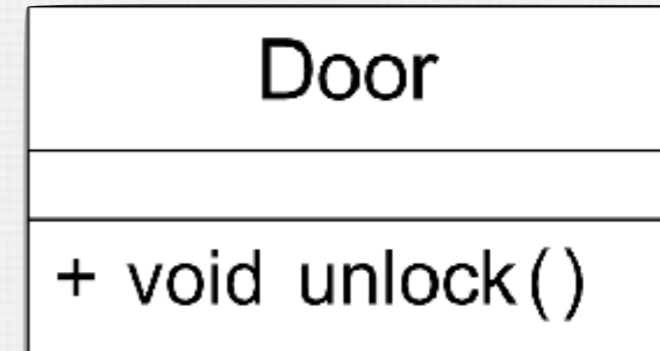
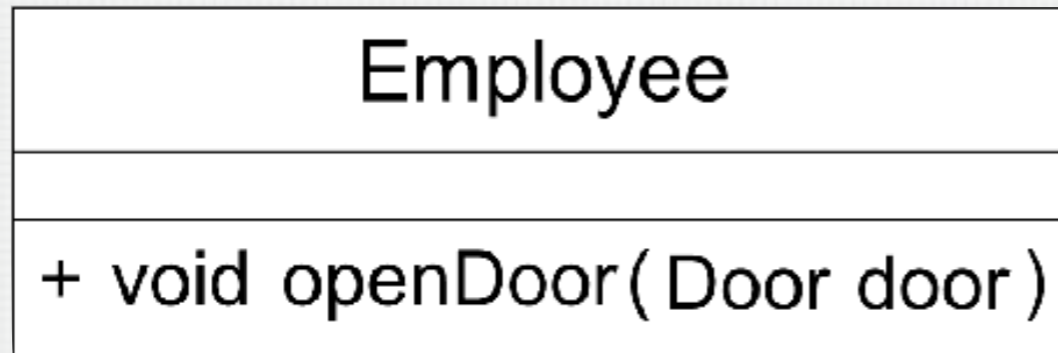
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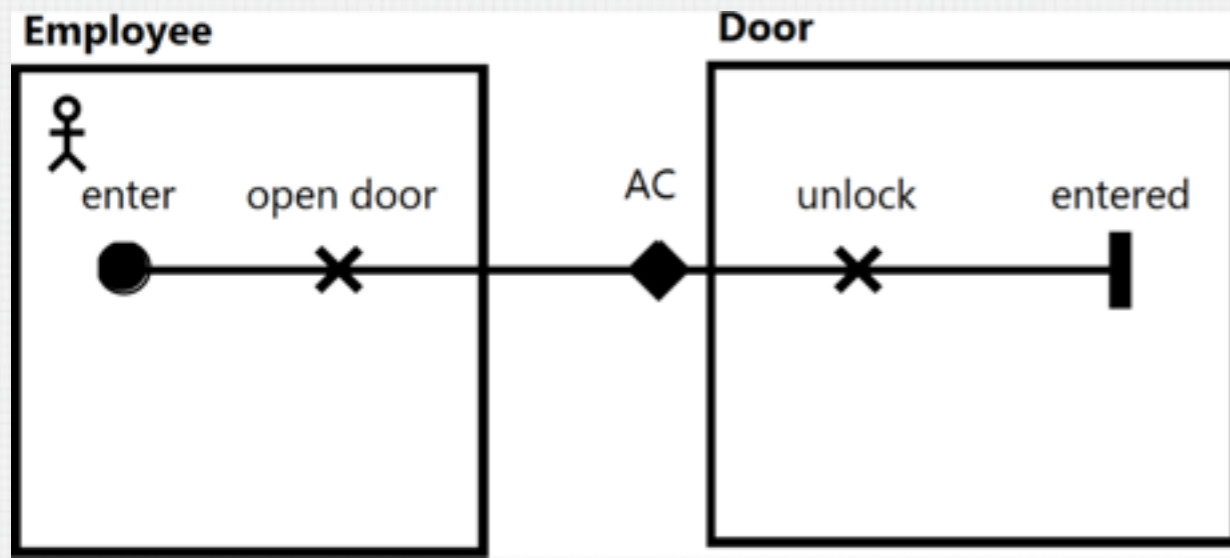
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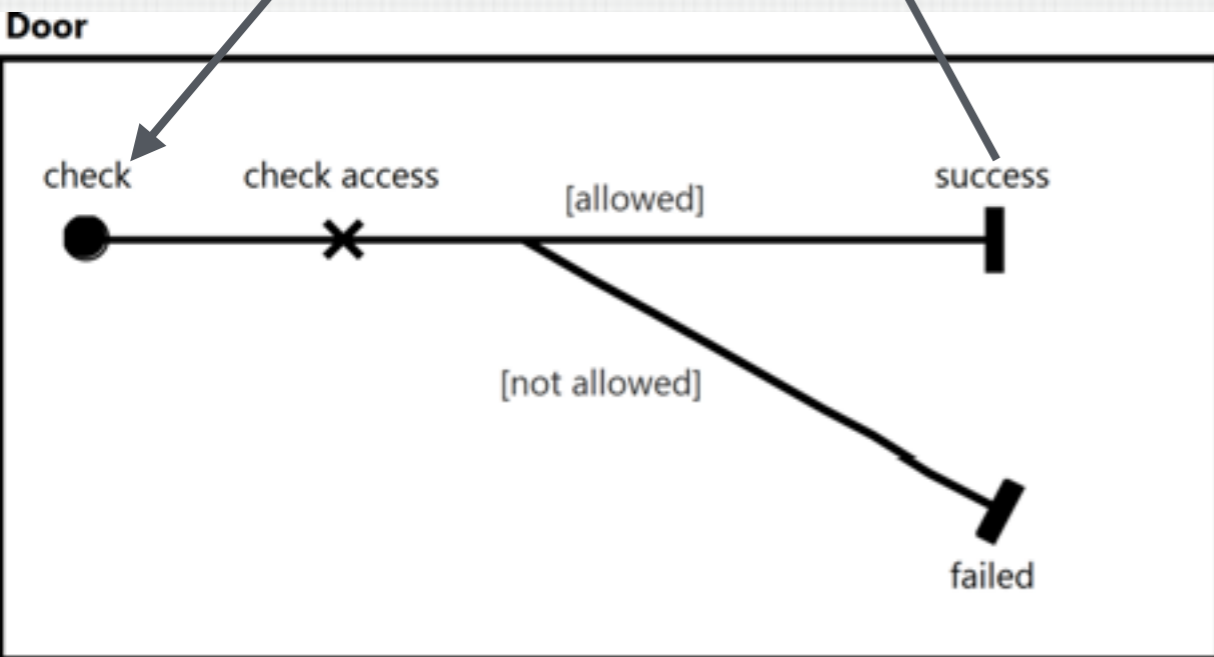
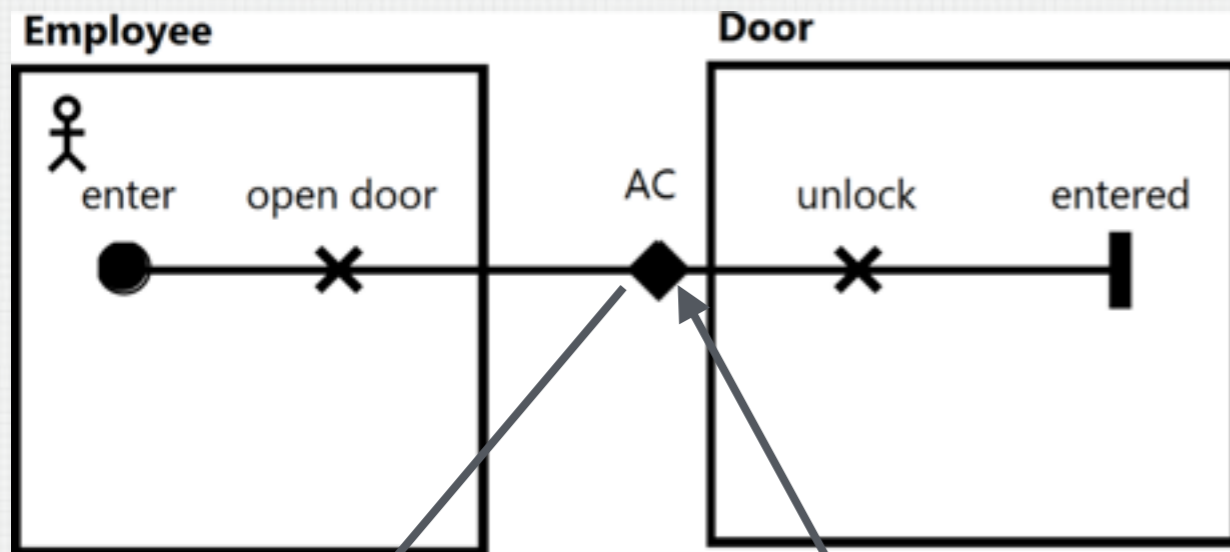
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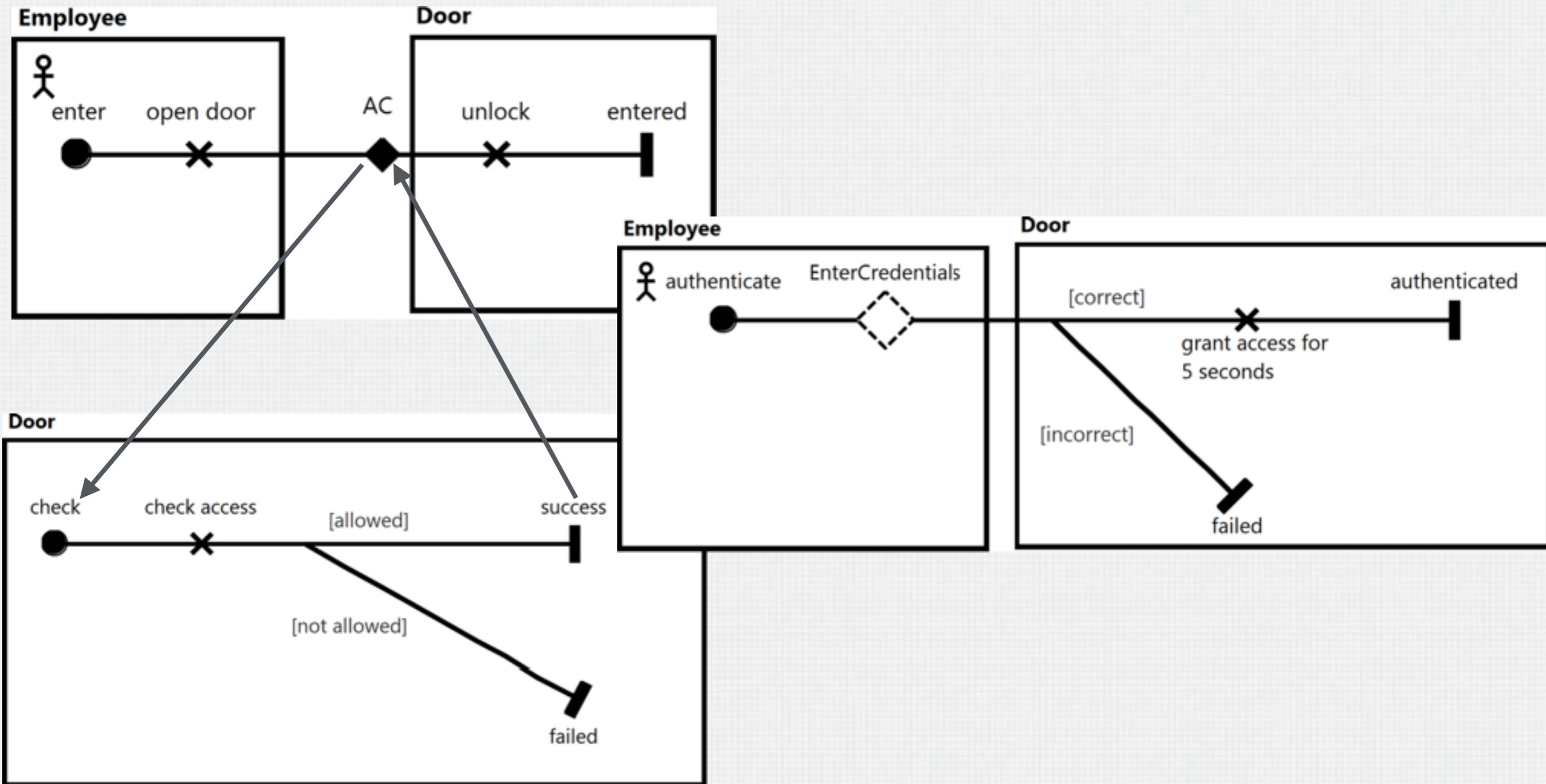
COMPOSITION: WORKFLOW



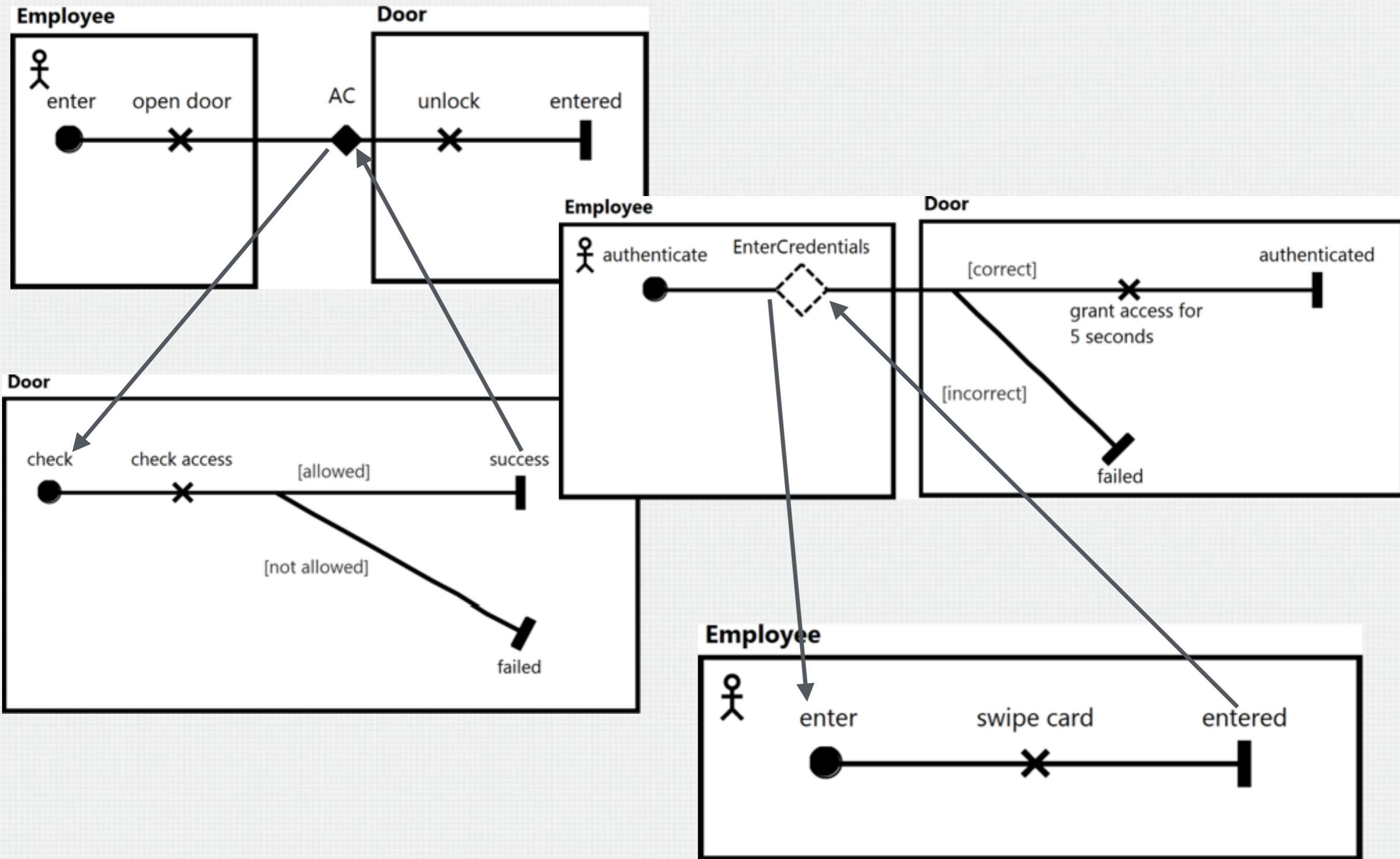
COMPOSITION: WORKFLOW



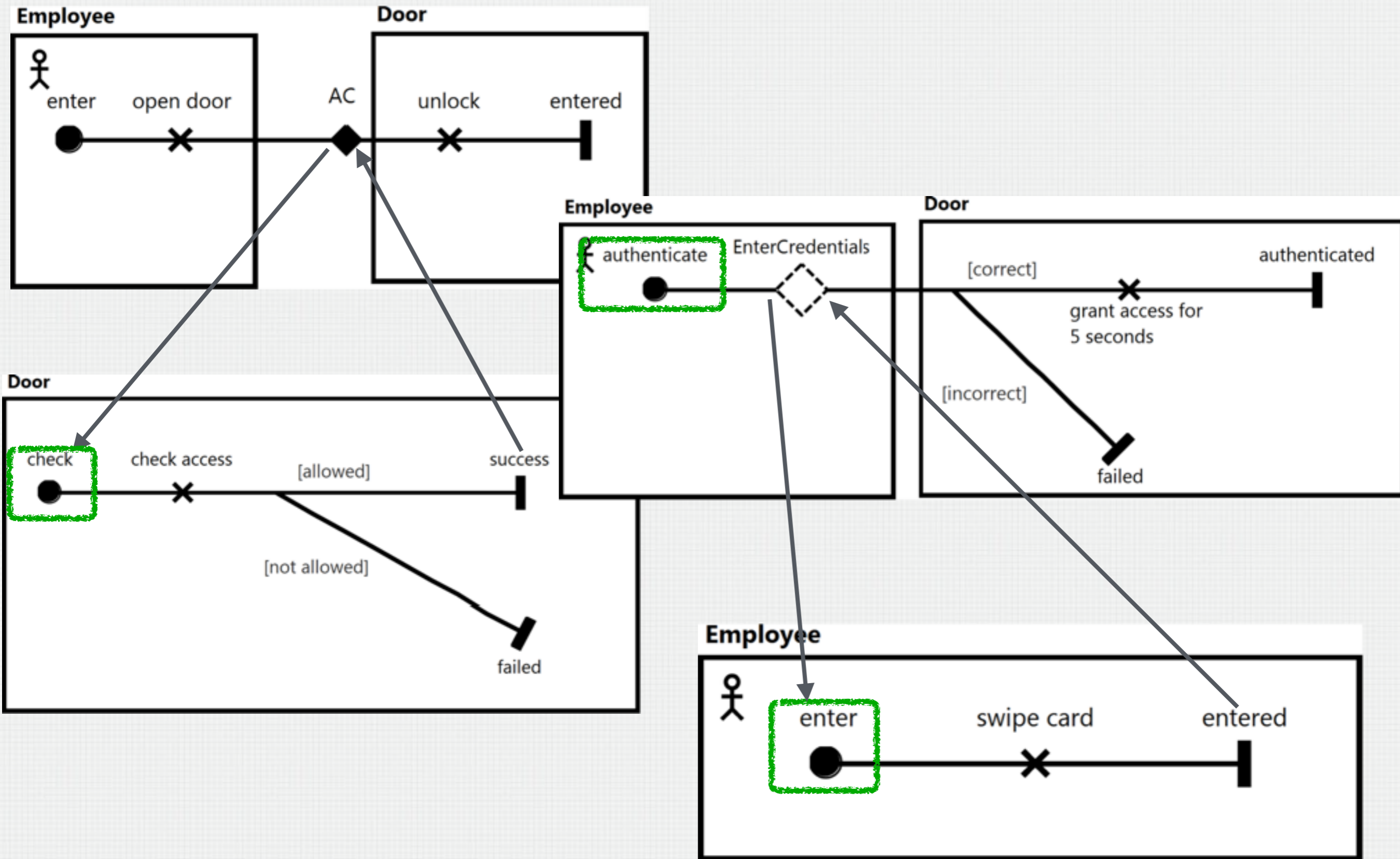
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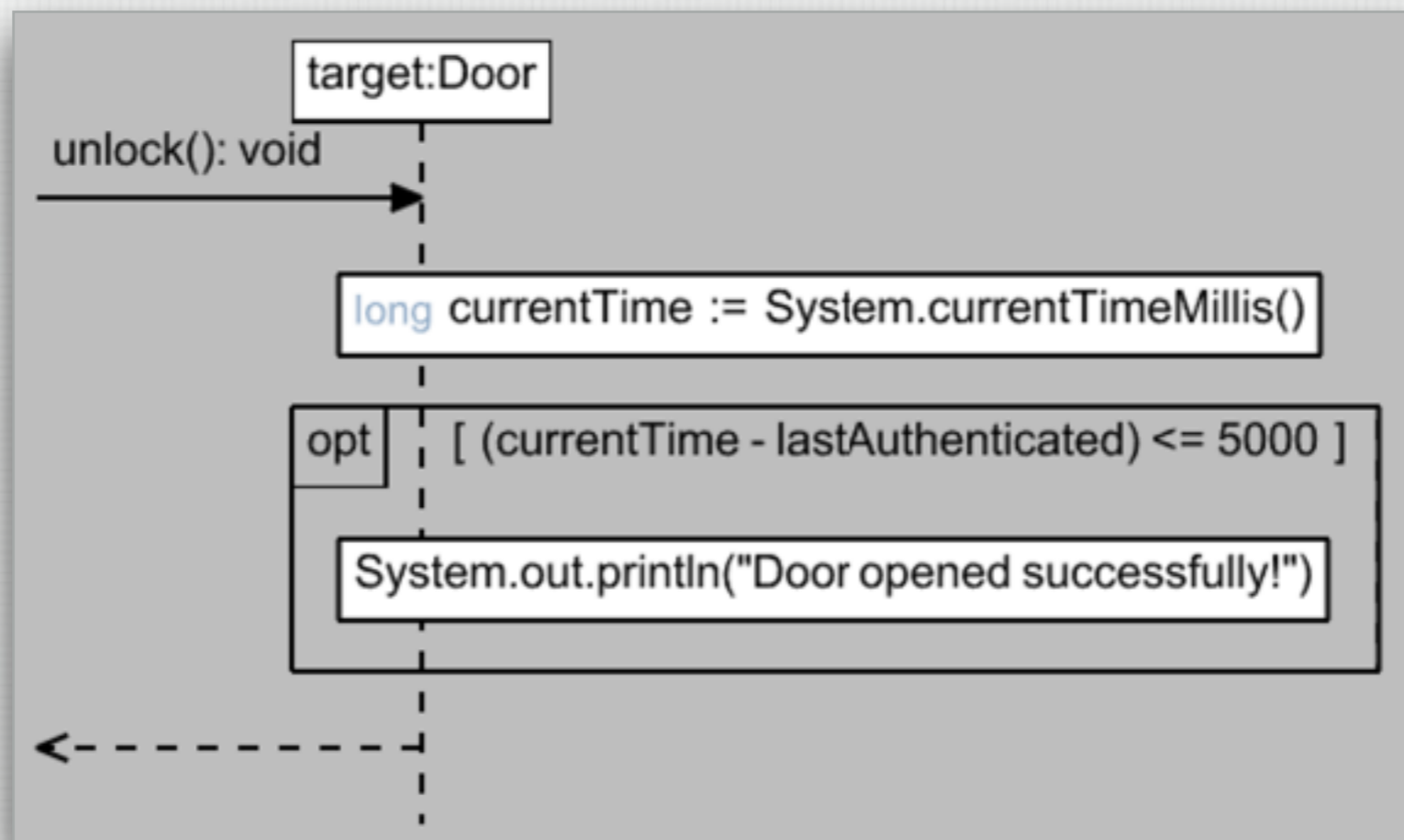
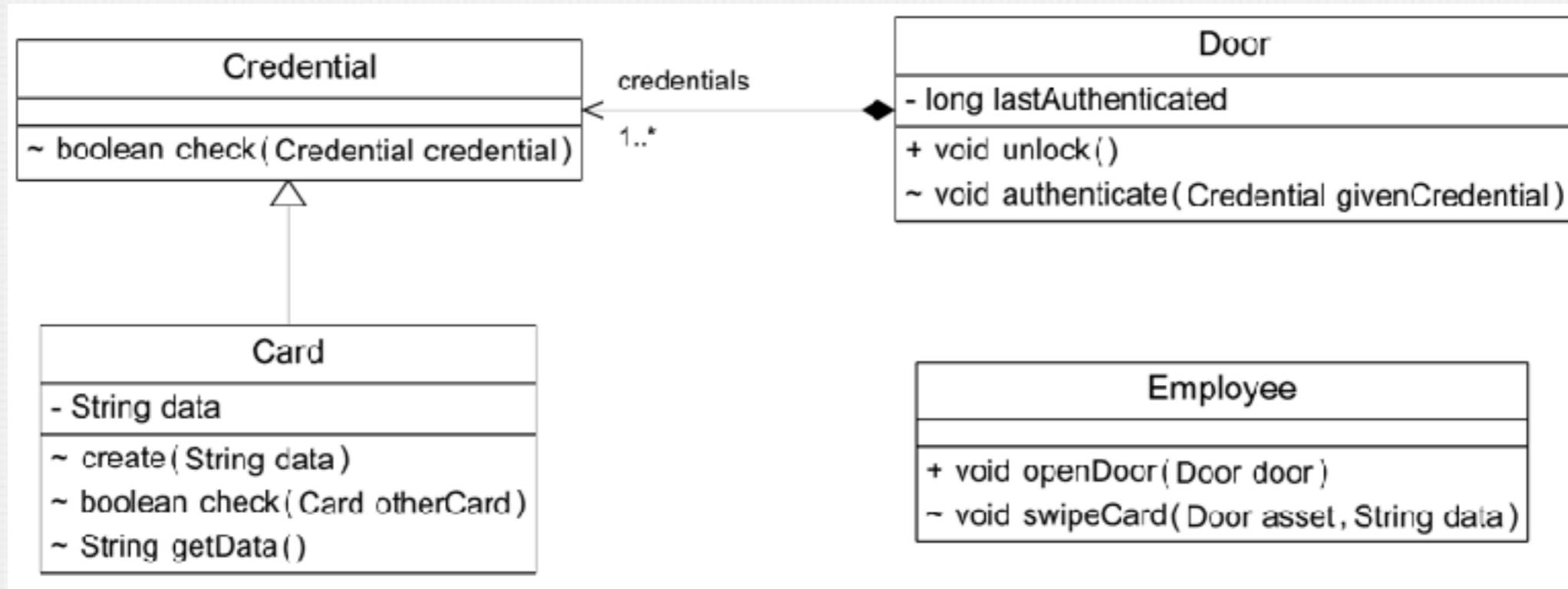
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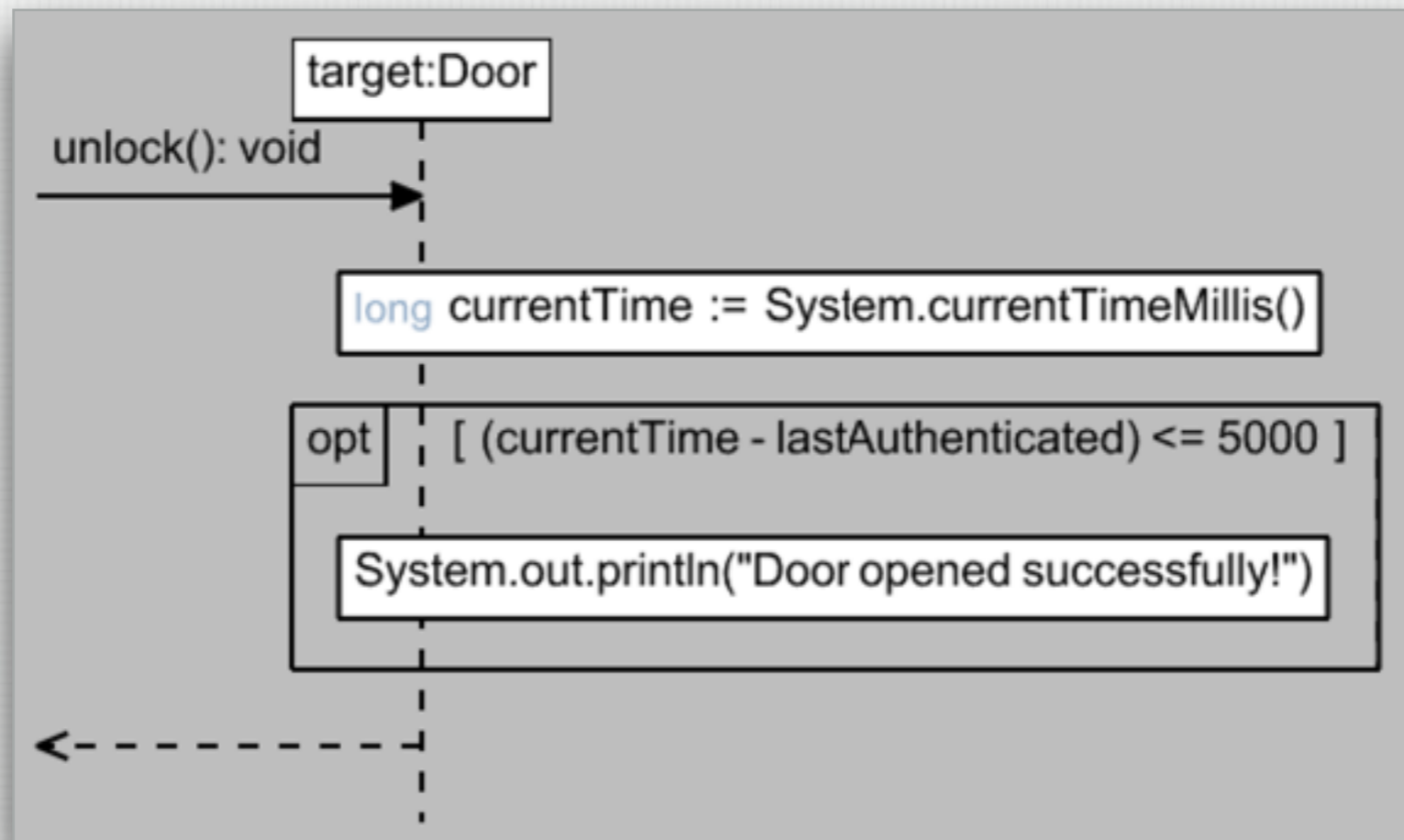
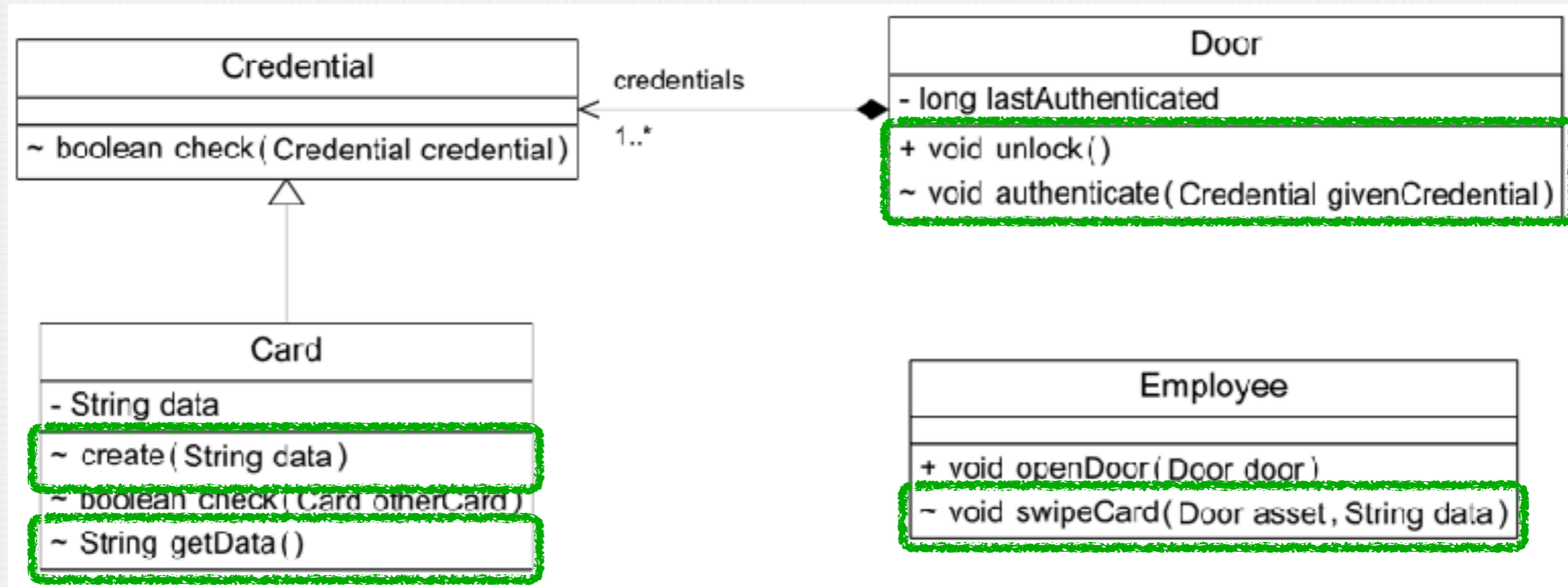
COMPOSITION: WORKFLOW



COMPOSITION: DESIGN



COMPOSITION: DESIGN



CONCERN REUSE PROCESS

1. Use the **variation interface** of the concern to select the most appropriate feature(s)

- That provides the desired functionality
 - That maximizes positive impact on relevant non-functional application properties
- ➔ This generates the generic models for the selected feature(s) of the concern

2. Use the **customization interface** of the generated models to adapt the generic model elements to the application-specific model(s)

- ➔ This generates the application-specific models for the selected feature(s) of the concern

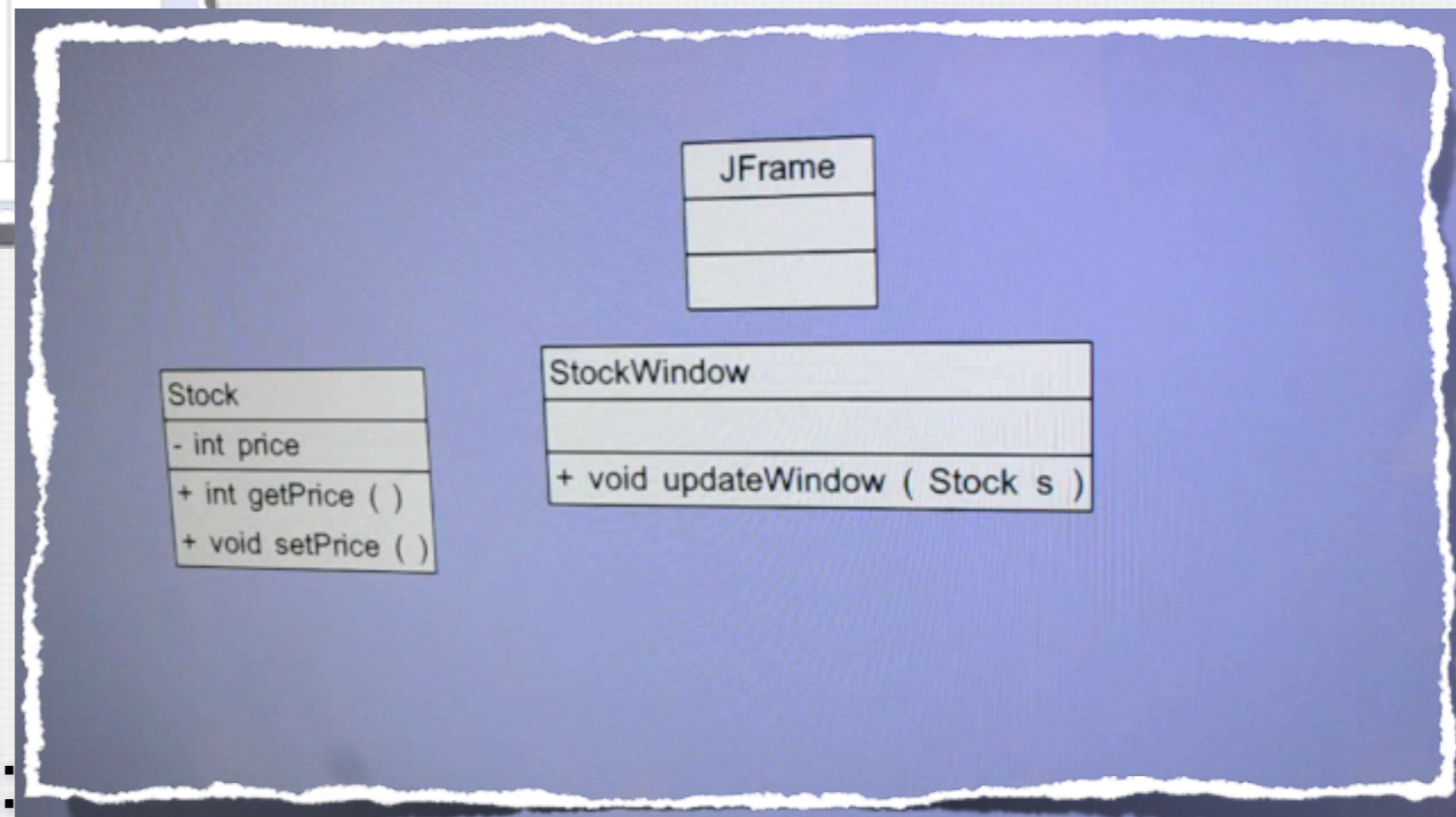
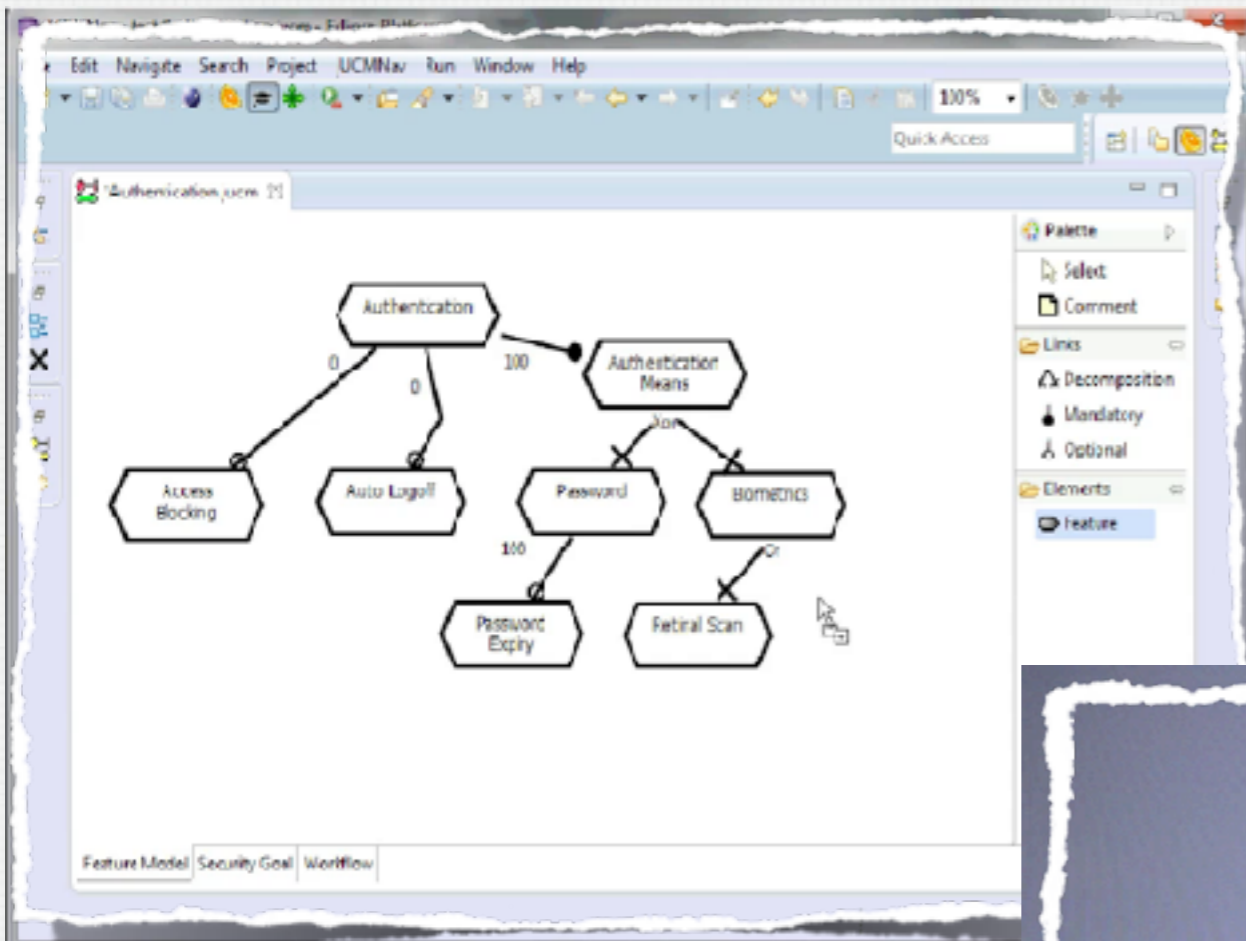
3. Use the selected concern features within the application model(s) according to the **usage interface**



QUESTIONS?

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Download TouchCORE:

<http://www.cs.mcgill.ca/~joerg/SEL/TouchCORE.html>