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# 软件工程

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# Unified Process

- **Unified Process ---- a good OO paradigm**
- **Analysis workflow ---- to understand requirements deeper, to make it easier to design and implement the target system**
- **Unified process covers 3 kinds of classes:**
  - ▶ **Entity class**
  - ▶ **Boundary class**
  - ▶ **Control class**



## 5.3 Class Diagram

# Class Modeling

## ■ What is a class diagram?

- **A class diagram shows the existence of entity classes and their relationships in a software system.**
- **Class diagrams show the static structure of the model, in particular, the things that exist such as classes, their internal structure (attributes), and their relationships to other classes.**
- **It is the static view of a system, primarily supports the functional requirements of a system.**

# Two Approaches to Class Modeling

- **Noun extraction**

- **Always works**

- **CRC, Class-Responsibility-Collaboration**

- **Need to have domain expertise**

- **For testing class diagram**

# Noun Extraction

## ■ Step 1. Concise Problem Definition

### ➤ Define product briefly and concisely

*Buttons in elevators and on the floors control movement of  **$n$**  elevators in a building with  **$m$**  floors. Buttons illuminate when pressed to request the elevator to stop at a specific floor; illumination is canceled when the request has been satisfied. When an elevator has no requests, it remains at its current floor with its doors closed.*

# Noun Extraction

## ■ Step 2. Identify nouns

*button, elevator, floor, movement, building,  
illumination, door*

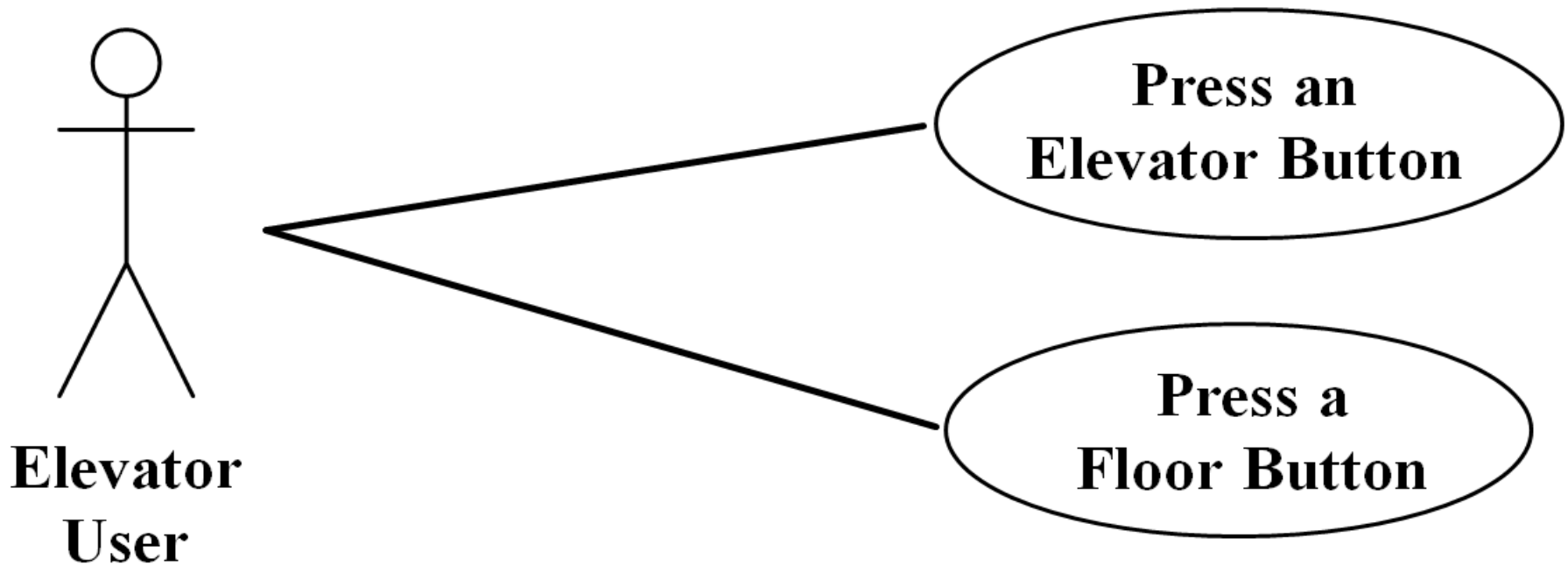


# Noun Extraction

- *movement, illumination* are abstract nouns  
— exclude (may become attributes)
- *floor, building, door* are outside problem boundary. — exclude
- Candidate classes: *Elevator* and *Button*



# Noun Extraction

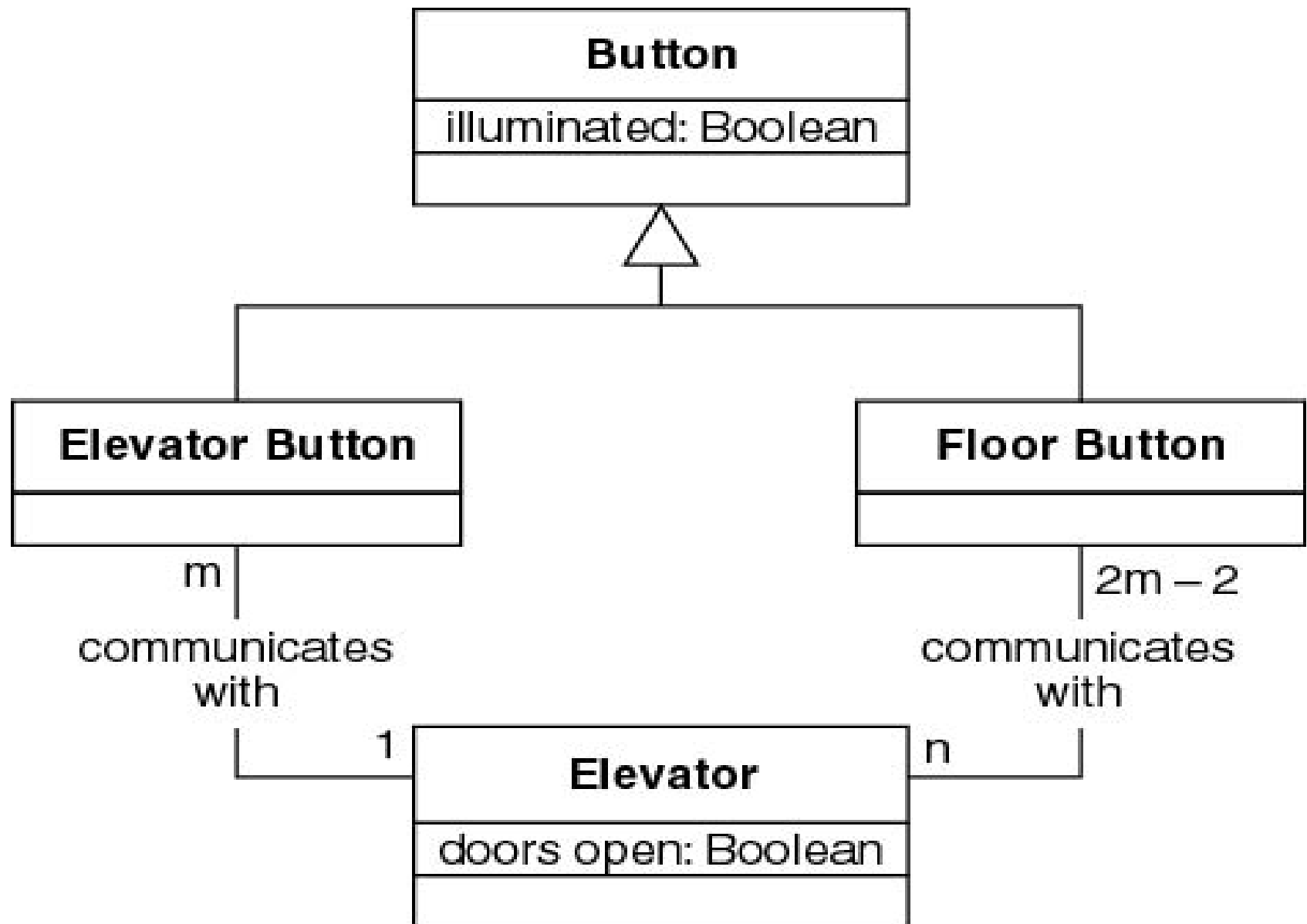


- Identify classes from use case diagram:

*ElevatorButton* and *FloorButton*

- *Elevator*, *Button*, *ElevatorButton* and *FloorButton*

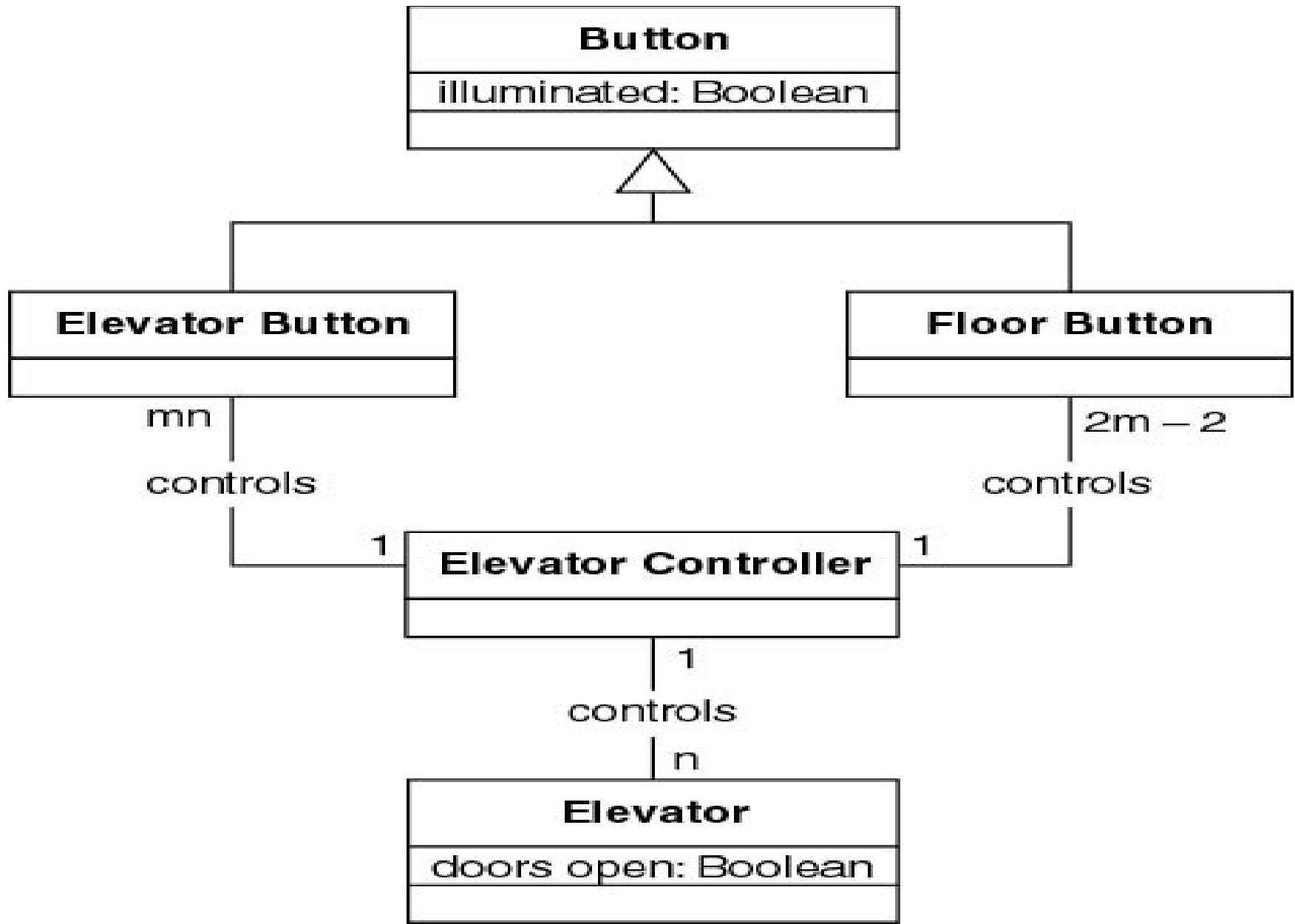
# First Iteration of Class Diagram



# Second Iteration of Class Diagram

- Buttons do not communicate directly with elevators
- We need an additional class: *ElevatorController*

# Second Iteration of Class Diagram



# Case 2. Online Shop





# WebOrder: On-Line Instrument Shopping!

Username: ehn

[Login](#)

Password: \*\*\*\*\*

[Logout](#)

## Products

Guitar  
Saxophone

## Current Product



Saxophone

\$199

Brass wind instrument

Units:

1

[Add To Basket](#)

## Shopping Basket

1 Saxophone(s)  
2 Guitar(s)

[Empty Basket](#)[Remove Item](#)

Shipping Preference:

☒ Air☐ Ground

Cost of Items

\$797

Shipping Weight

14 lbs

Shipping Cost

\$10

Total Cost of Your Order

\$807

[Submit Order](#)[Order History](#)

# Case 2. Online Shop

