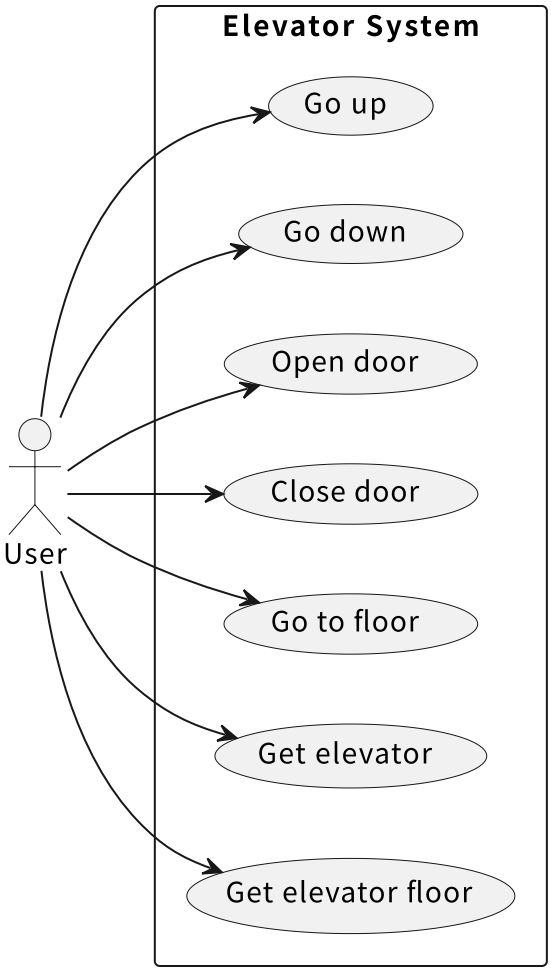
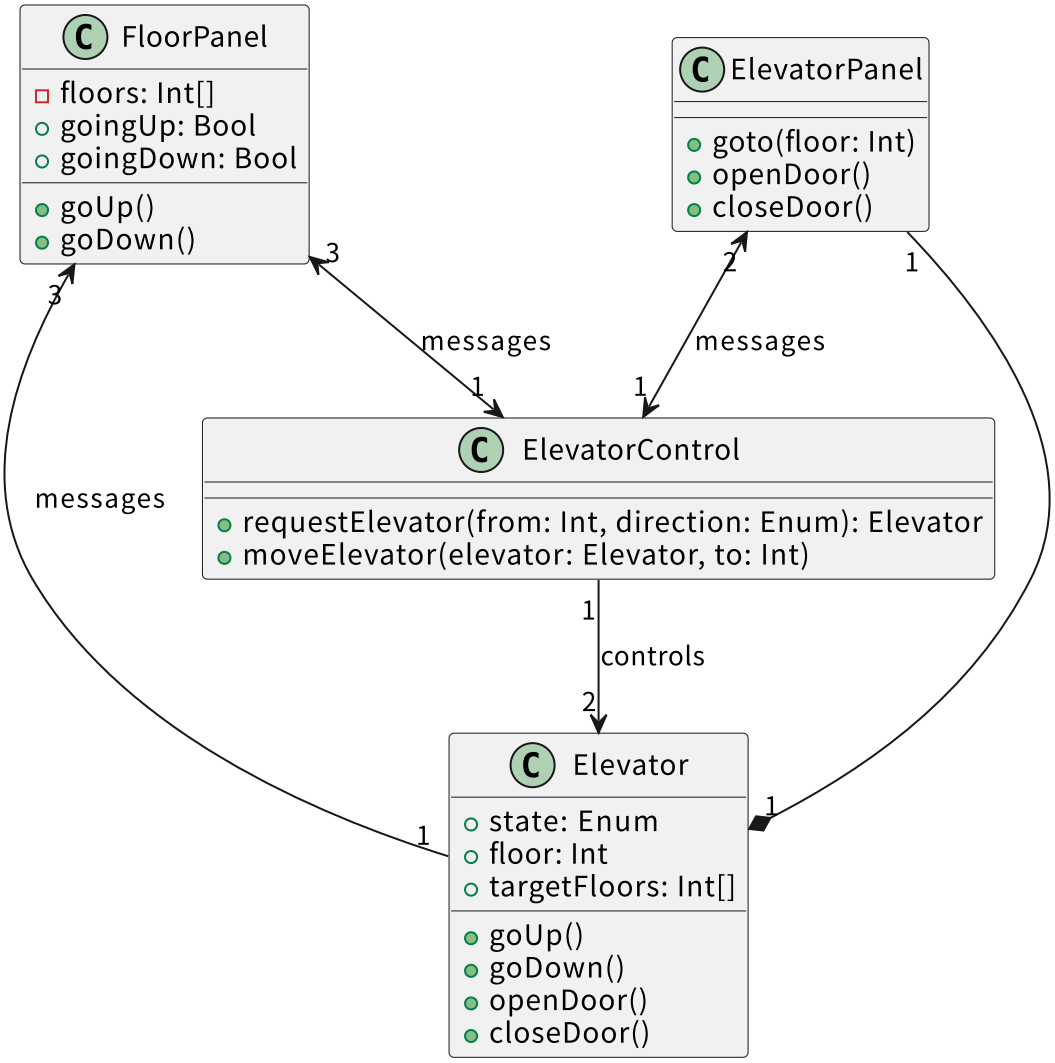
Elevator System Requirement

Diagrams

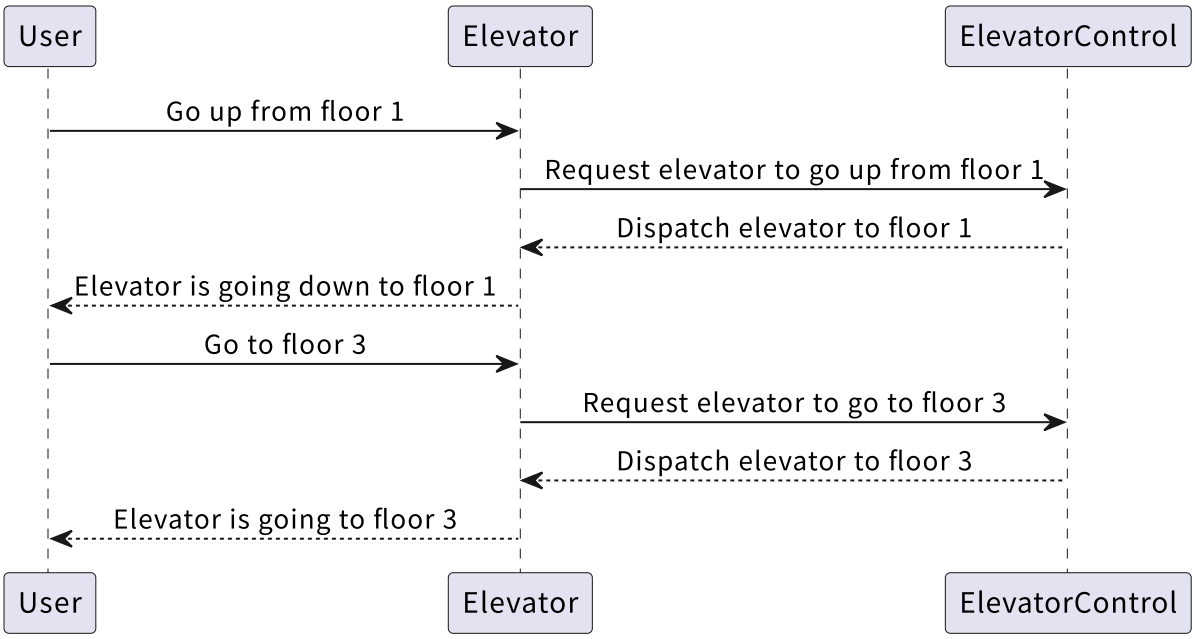
Use Case Diagram



Class Diagram



Sequence Diagram



Requirements

- R1: User Interface
  - R1.1: Floor Panel
    - R1.1.1: Display real-time current floor and movement direction of each elevator.
    - R1.1.2: Allow calling an elevator (Up/Down) from any floor panel.
    - R1.1.3: Indicate which elevator has been assigned to each call.
  - R1.2: Elevator (Car) Panel
    - R1.2.1: Display current floor, movement direction, and queued destinations.
    - R1.2.2: Allow selecting destination floors.
    - R1.2.3: Provide Open Door/Close Door controls.
- R2: Control Logic
  - R2.1: Elevator Operation
    - R2.1.1: Move up/down according to user requests.
    - R2.1.2: Open/close doors at floors when requested.
  - R2.2: System Dispatch
    - R2.2.1: Assign the most suitable elevator to floor calls.
    - R2.2.2: Process in-car destination requests.
    - R2.2.3: Handle concurrent requests from multiple users.
  - R2.3: Input Validation
    - R2.3.1: Ignore invalid or duplicate button presses.
- R3: Localization

    - R3.1: Support runtime switching between English and Chinese.
    - R3.2: Load all UI text from resource files.
    - R3.3: Cover localization logic with unit tests.
- R4: Theming
    - R4.1: Detect and apply OS light/dark preference on startup.
    - R4.2: Enable runtime theme toggling via the UI.
    - R4.3: Apply theme changes immediately without restart.
- R5: ZeroMQ External API
    - R5.1: Expose commands for door control, floor calls, destination selection, and reset.
    - R5.2: Publish events on door state changes and floor arrivals.
    - R5.3: Validate API behavior with integration tests.
- R6: Runtime Configuration
    - R6.1: Allow live adjustment of number of elevators, travel duration, and door timings.
    - R6.2: Provide GUI controls for updating these parameters.
    - R6.3: Apply new settings immediately to subsequent operations.