Building Design

This is a complicated project. The purpose of this design step is to help you succeed in this project. We have asked you to build a UML diagram of the entire class structure.

Include the UML Question 9 and 10 will assess this.

Answer the following questions in this document and upload with your UML diagram.

1) How are you storing your elevators in your Building model.

In the Building model, elevators are stored in an array called elevators, which is of type ElevatorInterface. This array is initialized in the constructor of the Building class, where each elevator is instantiated and assigned to an element in the array, based on the number of elevators specified for the building.

2) How are you storing the incoming requests so you can distribute them to the elevators.

private final List<Request> upRequests = new ArrayList<>();
private final List<Request> downRequests = new ArrayList<>();
Incoming requests are stored in two ArrayList collections, named upRequests and downRequests, in the Building class. These lists categorize the requests based on the direction of travel: upRequests for requests to move upwards, and downRequests for requests to move downwards.

3) How are you distributing your downRequests and your upRequests to the elevators?

Requests to go up are given to elevators at the ground floor, and requests to go down are given to elevators at the top floor. This is done by checking each elevator's current floor and whether it can take requests. Then, based on the elevator's capacity, a certain number of requests are selected from the appropriate list (up or down) and passed to the elevator for processing.

4) How are you removing all requests when a takeOutOfService request is received.

When a takeOutOfService request is received, the system effectively removes all pending upRequests and downRequests by clearing these lists.

5) How does your step method handle updating the elevators?

The stepElevatorSystem method progresses each elevator by one step, such as moving floors or processing requests. It checks if all elevators are on the ground floor when stopping the system and sets the system to outOfService.

6) How do you start processing requests?

Requests are processed once the startElevatorSystem method sets the system to running. This allows elevators to start accepting and handling requests based on their current position and the system's needs.

7) How do you take the building out of service?

The building is taken out of service by calling the stopElevatorSystem method. This method changes the system's status to outOfService and signals all elevators to stop accepting requests and to prepare for shutdown. If the system is already stopping or out of service, an exception is thrown to prevent redundancy.

8) How do you take the elevators out of service?

Elevators are taken out of service by iterating through each elevator in the system and calling the takeOutOfService method on them, as part of the stopElevatorSystem process. This action transfers each elevator to an out-of-service state, stopping them from accepting new requests and preparing them to halt operations.