Elevator Unified Model Language Diagram Initial Draft

Classes:

1. **ElevatorCar**
2. **FloorNode**
3. **MotorController**
4. **SupervisoryController**
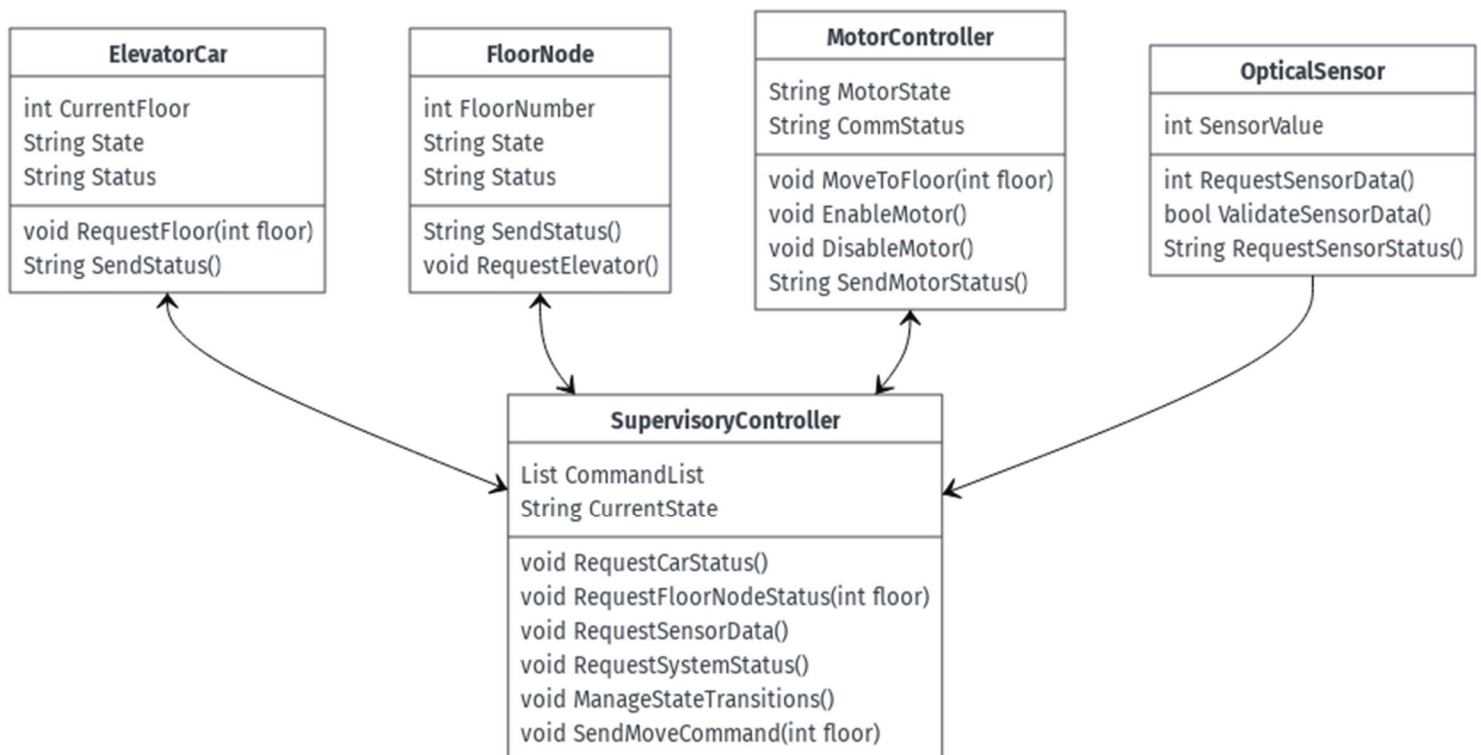5. **OpticalSensor**

Figure 1) UML Class Diagram for Basic Elevator System

Attributes and Methods:

ElevatorCar

- **Attributes:**

  - CurrentFloor: int: Tracks the current floor location of the elevator car.

  - State: String: Indicates whether the car is moving up, moving down, or stationary.

  - Status: String: Provides a general status report, including operational and communication statuses.

- **Methods:**

  - RequestFloor(floor: int): void: Requests the car to move to a specified floor.

  - SendStatus(): String: Sends the current status and state of the elevator car to the SupervisoryController.

FloorNode

- **Attributes:**

  - FloorNumber: int: Identifies the floor associated with this node.

  - State: String: Shows the operational state of the floor node.

  - Status: String: Reports the node's status, including operational and communication statuses.

- **Methods:**

  - SendStatus(): String: Sends the node's current status to the SupervisoryController

  - RequestElevator(): void: Requests the SupervisoryController to call the elevator to this floor.

MotorController

- **Attributes:**

  - MotorState: Indicates whether the motor is enabled & stationary, enabled & moving, or disabled.

  - CommStatus: String: Confirms active communication with the SupervisoryController

- **Methods:**

- o MoveToFloor(floor: int): void: Moves the elevator to the specified floor as commanded by the SupervisoryController.

- o EnableMotor(): void: Enables the motor for operation.

- o DisableMotor(): void: Disables the motor to stop operation (Stops Motor).

- o SendMotorStatus(): String: Sends the current status of the motor to the SupervisoryController.

SupervisoryController

- **Attributes:**

  - o CommandList: List<int>: Lists the commands currently being processed.

  - o CurrentState: String: Describes the current state of the SupervisoryController.

- **Methods:**

  - o RequestCarStatus(): void: Requests the status of the ElevatorCar.

  - o RequestFloorNodeStatus(floor: int): void: Requests the status of a specific FloorNode.

  - o RequestSensorData(): void: Receives data from the OpticalSensor.

  - o RequestSystemStatus(): void: Broadcasts a request for status updates from all nodes and sensors.

  - o ManageStateTransitions(): void: Manages state transitions based on FSM logic.

  - o SendMoveCommand(floor: int): void: Directs the MotorController to move the car to a specified floor.

OpticalSensor

- **Attributes:**

  - o SensorValue: int: The current reading from the optical sensor.

- **Methods:**

  - o RequestSensorData(): int: Retrieves the sensor value.

  - o ValidateSensorData(): bool: Validates sensor data based on expected behavior.

  - o RequestSensorStatus(): String: Retrieves the sensor's status, indicating if it is functioning correctly.