## Elevator Simulator Design Exercise

### Summary

Our client is looking for a software application that can simulate the movement of a bank of elevators. They want to be able to use this simulator to test and evaluate different elevator movement algorithms and determine how many elevators will be needed to handle various traffic patterns. The simulator must allow for the simulated movement of the elevators based on customer provided algorithms.

The client intends to use this simulator in a number of ways:

1. Determine the optimum elevator configuration (number of banks and number of elevators per bank) for a given building size and given traffic patterns.
2. Research different movement algorithms to handle optimal elevator loitering to minimize wait times.
3. Forecast maximum traffic for a given bank / elevator configuration to plan for potential growth.

Before they approve the contract to write the application, they want to see a design which describes the proposed implementation. They have identified the following requirements.

### Requirements

1. The elevator contains no logic or processing capability. It only has state and can notify the controller of which floors have been selected.
2. There is a single software controller that is used to direct the movements of the individual elevators.
3. The software controller should be able to provide the current state of each elevator.
4. The software controller should be able to use different algorithms for managing the elevator movement without having to re-code the application.
5. This release should not model the entire functionality of the elevator.
6. The user can call the elevator at each floor by pressing an UP button or DOWN button on each floor outside the elevator.
7. The user can direct the elevator by selecting the desired floor.
8. The algorithms provided by the customer are in narrative form – not actual code. The actual code for the algorithms will need to be written by us and delivered for use in the simulator.
9. The simulation needs to account for the time it takes to move the elevator between floors. For the purpose of this simulation, the speed of the elevator can be assumed to be constant and therefore, the time between floors will be constant.

### Notes

1. This is not an exercise in modeling the mechanical workings of the elevator. It is a simulator that is software only.
2. Think in general terms and do not get bogged down in the details of the inner workings of the elevator itself.
3. Present the design as a collection of one or more diagrams. ote any assumptions / tradeoffs that were made when completing the design.

