LIFT MANAGEMENT SYSTEM

Presented by-

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Contents

Purpose-

It's my first learning college project, for understanding the basic concepts of java. It provides the information related to OOPs, swings, multithreading and many more.

This requirement specification describes the functions and requirements specifies for this lift management system. In this project we will learn about how to simulate the projects with real world. This project is based on lift management system i.e. how a lift works. The lift is a type of vertical transport equipment that efficiently moves people or goods between floors (levels) of a building, vessel or other structures. This project is based on the algorithm-"Continue traveling in the same direction while there are remaining requests in that same direction."

Document conventions-

- *UC-use case*

- *SRS- system requirement specification*

- *Lift door -Refers to the door on an elevator cab at the same floor at which the elevator cab is currently stopped at.*

Project scope-

In buildings and construction sites.

Considering this, as part of a simulation development for the work efficiency of lifts, one of the major factors in a high-rise building construction, this research aims to develop an algorithm to predict and operate the optimal lift operation time, when two or more lifts are simultaneously but independently operated, based on the "Continue traveling in the same direction while there are remaining requests in that same direction." algorithm, and to present the optimal operation expectation of the lift in a quantitative way.

The primary function of the lift controller is essentially to receive and process a variety of signals from several different components of a whole lift system. It is able to send signals in response to the ones it receives in order to operate all of the other components in the system. This exchange of signals is how the lift controller is able to keep the lifts running smoothly on a day-to-day basis.

References –

- *http://www.jaysonjc.com/programming/how-to-write-a-software-requirements-specification-srs-document.html*
  - *For study of srs format.*

- *https://cs.uwaterloo.ca/~dberry/ATRE/ElevatorSRSs/FinalSRSes/SRS-Alex-Kalaidjian.pdf*
  - *For how to write srs on lift management.*

- *http://en.wikipedia.org/wiki/Elevator_algorithm*
  - *For writing the algorithm.*

System description-

This is the simulation of lift management system. It will describe the basic feature of how lift works based on the "Continue traveling in the same direction while there are remaining requests in that same direction." algorithm. This system includes the description of building. It contains descriptions of all of the other lift components that the controller interacts with, as well as a context diagram that illustrates the entire lift system. It also lists product functions, constraints, and assumptions about the controller. It contains more detail and presents the requirements with many different diagrams that illustrate the functional requirements of the elevator controller. There is also a part that describes the interface between the controller and the rest of the lift system as a set of signals. The SRS contains supplementary information required to complete the document's breadth. It includes points of all of the functional and non-functional requirements, as well as points for each UC of the elevator controller.

The product described in this document is software for a lift controller. The controller is part of a larger lift system comprised of several components other than the controller that are required to operate the lift on a day-to-day basis. The lift controller is responsible for directing the operation of most of the other components of the system. If it functions correctly, the controller allows passengers to use the lift system in an intuitive and efficient manner.

Note that this particular system is comprised of more than one lift shafts, each with their own cab. The lifts provide service to 15 floors.

System features-

Building-

- *Having 15 floors.*
- *More than 1 lift.*
- *Height of each floor- _px.*
- *Each floor having lift facility.*
- *Each floor is having the facility to call the lift by pressing summon button.*
- *On floor's lift panel user can see the displays regarding floor number and direction.*

Lift-

- *More than one lift.*
- *Each lift works independently.*
- *Height of lift door will be 60% of floor's height.*
- *Automatic functionality.*
- *If lift is carrying passenger, than will first drop that passenger and then move to the calling place.*
- *User can call a lift by pressing summon button.*
- *User can indicate the lift that on which floor controller wants to go by pressing floor request button.*
- *Automatic opening and closing of door.*
- *User can see the display regarding the direction and floor number.*

Use case-

Summon Buttons-

These buttons are on a button panel on the outside of the lift shafts and are used by potential passengers to call a lift to the floor that the pressed summon button is located on. There are two summon buttons on each floor – one for up, another for down, except on the top floor where there is only down and on the bottom floor where there is only up.

Floor Request Buttons-

This particular lift controller will be controlling lifts that are in a building with 15 floors. Consequently, each cab has 15 floor request buttons labeled 1 through 15 that passengers can use to direct the lift to the floor that they would like to go to. These buttons are located on a button panel on the interior of each lift.

Lift movements-

All the lifts will work simultaneously but independently. Having the automatic functionality. If a lift is moving upwards, first it will complete its work and then move to further position, same follows with downward direction.

Floor Number Display-

The interior of each lift cab has a display that indicates to its passengers which floor the lift cab is currently on. Some lift systems have this floor number display on every floor outside of the lift doors, but this system does not. The controller interacts with this display by sending a signal that tells it which floor number to display.

Direction Display-

The interior of each lift cab has a display that indicates the current direction of a lift cab; it is either up or down. The controller interacts with this display by sending it a signal that tells it which direction to display.

Technical requirement (non- functional)-

Algorithm-

This system is based on the algorithm "Continue traveling in the same direction while there are remaining requests in that same direction."

The operation of lifts within one or more buildings can be thought of as a hierarchy of functions. At the bottom of the hierarchy, the most basic function is to move lifts from floor to floor responding to calls registered by passengers. At the next level, that of Group Control, passenger calls on different landing levels are assigned amongst the individual lifts in a group of lifts according to pre-programmed rules (known as an Algorithm).

Performance-

- *Lift works independently.*
- *Automatic functionality.*
- *Provides feedback to passengers through the lights on some of the buttons and the floor number and direction displays in each cab*

Scalability-

- **Bell Sound-**

  - *When lift stops at required floor.*
  - *When any button is pressed.*
  - *When door opens and closes.*

- *Can simulate with real lift management system.*
- *Security can also be added.*

Maintainability-

Usability-

- *Used in construction sites.*
- *Used in buildings.*

Multi-lingual support-

- *English*

Logging-

Availability-

- **Desktop**

General Constraints-

The hardware that the elevator controller software will be running on may constrain some design decisions pertaining to timing and performance, as well as signal communication.
Also, certain rules about public safety impose specific requirements on the elevator controller. The following is a list of constraints pertaining to the safety of the elevator system that the controller must manage:

- *The inner doors of a cab should not be opened unless the cab is at a correct floor position and is stopped.*
- *The outer doors of a shaft should not be opened at a particular floor unless there is a cab stopped at that floor.*
- *An elevator cab should not start to move until its doors are completely closed.*
- *The acceleration and deceleration of a cab must be gradual enough to prevent the injury of any of the passengers inside.*
- *If the total weight in a cab has exceeded the safety limit, it should not resume Normal operation until the total weight in the cab has been lowered below the*