Multiple Elevator System

Assumptions

Let the number of floors in the building be N (for dry run we will assume it to be 200)
Let the number of people requesting be M
Let the maximum number of person lift can carry be **10**
Average time required by elevator to move from one floor to next floor be **5 secs**

Requirements

- An elevator can move in two directions :-
  - Up
  - Down
- An elevator can have two states :-
  - Intransit
  - Hault
- A user can make a request for the elevator from controller present at the floor and then once he gets in the elevator the he can set his destination floor from the controller present inside the elevator : -
  - **InternalRequest**
  - **ExternalRequest**
- Then once request is made we need to process that request and find the elevator to optimize the waiting time of the user using **dispatcher algorithm.**

Algorithm

Our algorithm focuses on completing multiple requests at the same time, we will store the all the elevator classes in a TreeSet with there current floor as a comparable.

In this algorithm whenever a new request comes from a user a job thread is created and then the thread finds an elevator having free spaces and is going in the same direction as required and coming from a lower level if the user wants to go up and vice versa.

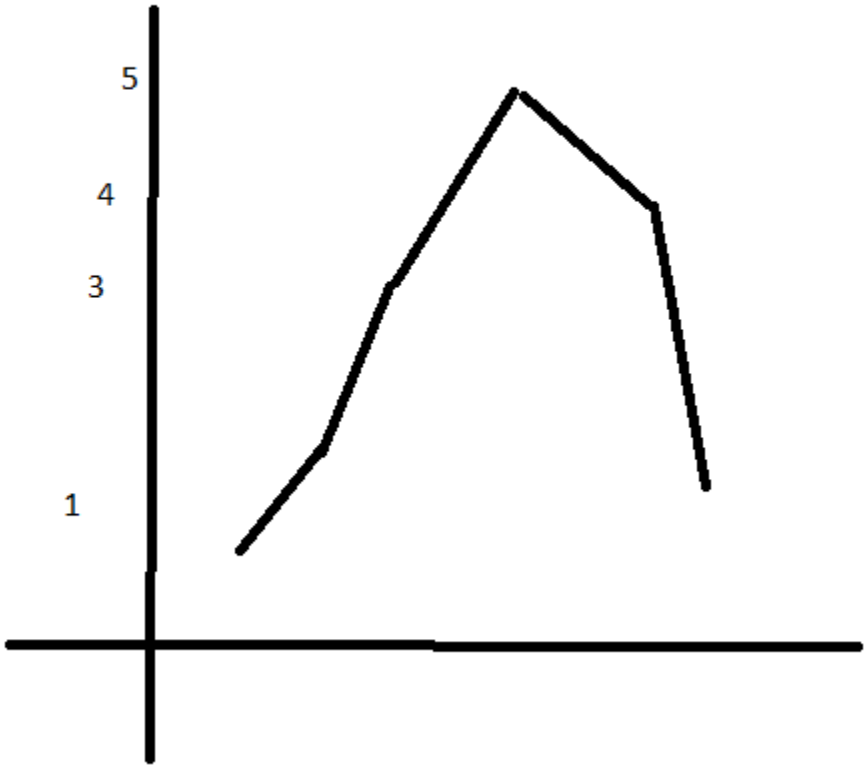
The algorithm, finds the nearest elevator from ther treeSet of elevators and adds the request's destination in the destinationsSet as well minding the present load of the elevators should not exceed.

Working of the elevator

During morning office hours:

The elevators are scheduled to be in the ground floor by a Thread between the hours 9:00 to 10:00, and the elevator starts from the GF and then on the way takes passengers going on the same direction till the maximum level from the “DestiantionSet” maximum floor is reached then the direction is set to neutral and the next direction depends on the new request.

Similar goes for last hours and mid hours, in last office hours the elevators are set to rest in top floors and in normal or mid hours the elevators are set to rest in a binary form , for example if 10 floors are there and 3 elevators are present then first elevator will be in ground floor, second floor will be in last floor and the third will be in the middle floor.



This graph shows the lift movement representation of a single elevator starting from first floor taking passengers from 3 and 4 and after all the destinations are reached then taking a new request and changing its directions.