

Elevator System, Low Level Design | Amazon SDE Design interview question | Design Elevator System

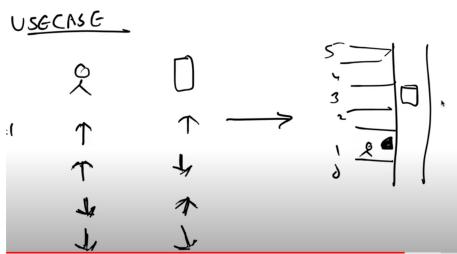
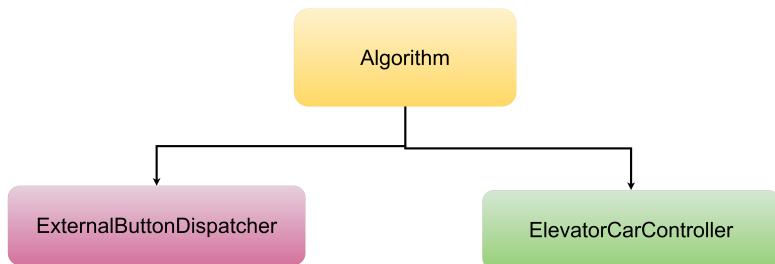
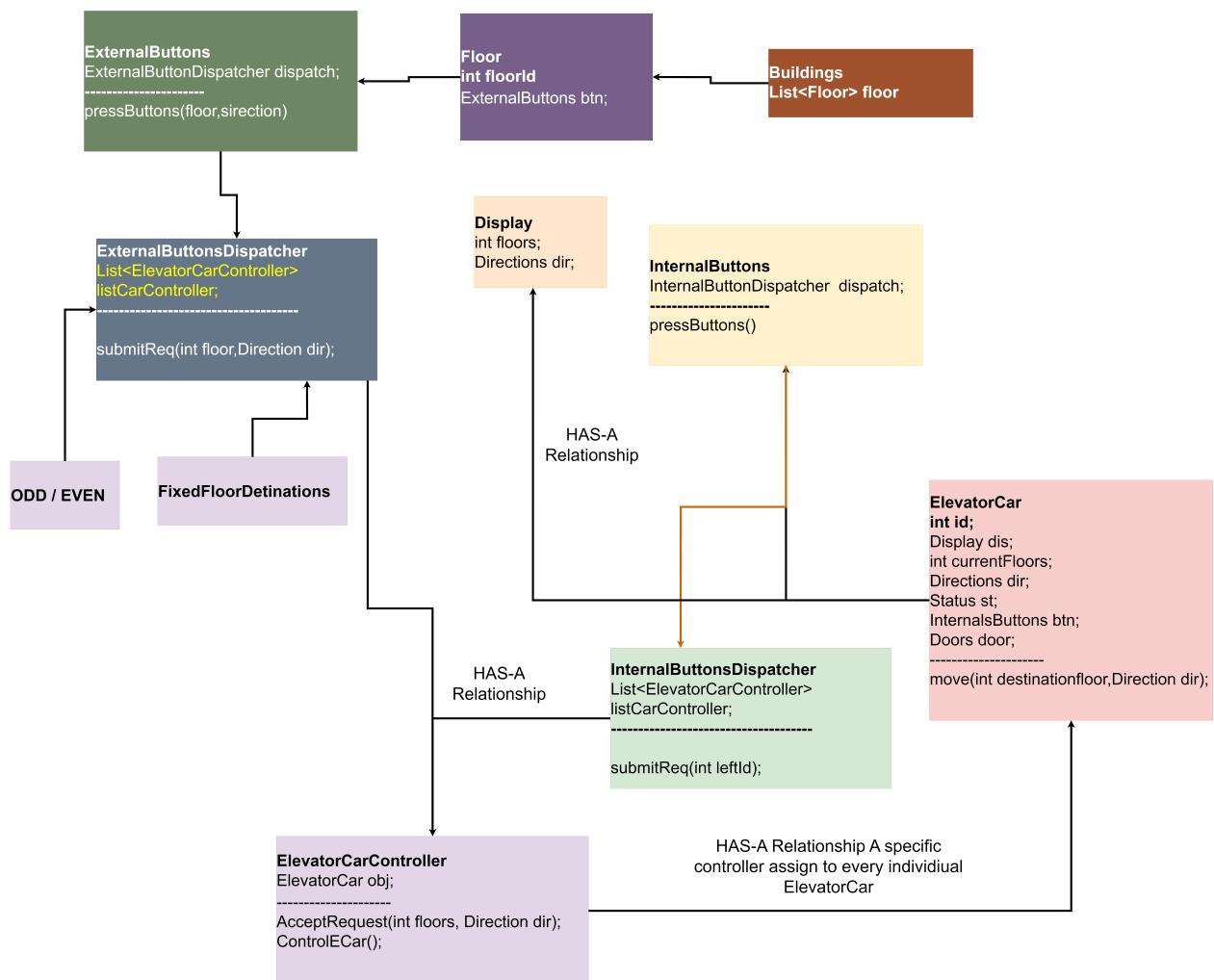
Request clarification:

- How many Floors?
- How many leift ?
- Leift's either go up's and down
- n ☐ no of left
- Leift dispatch algo
 - ☐Odd or even
 - ☐a left cannot serve for 1,2 and 3 floor[functionality].

Objects:

- Buildings
- Floor
- External Button
- Elevator Car
 - ☐It's don't have any algo so it's dumb object, only contain move method.
 - ☐ Display
 - ☐Current floor
 - ☐Direction[ENUM]
 - ☐Status ☐ moving or ideal
 - ☐internal buttons
 - ☐Doors
- Display
- Internal buttons
- Doors

Design



Algorithm

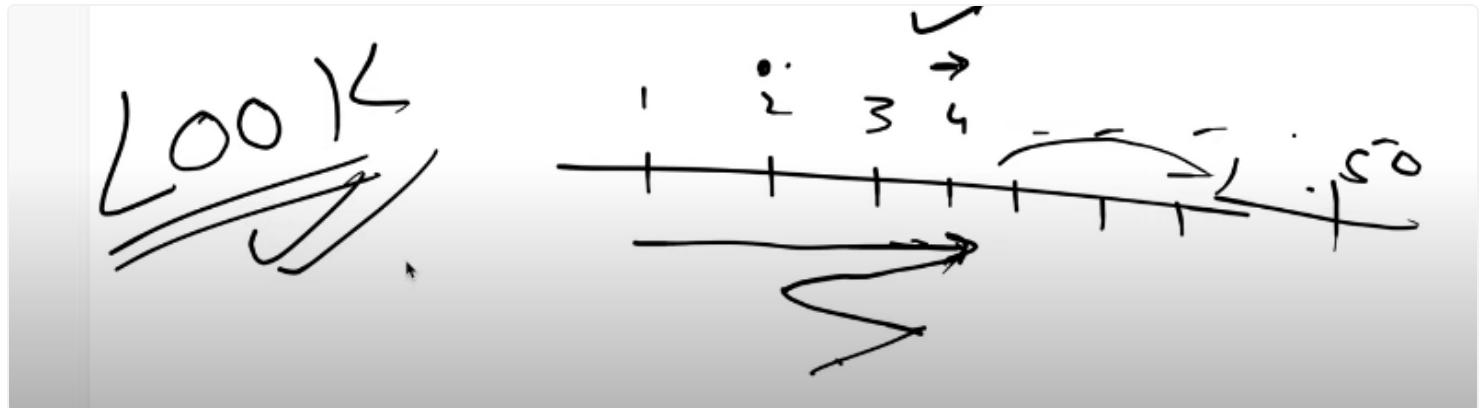
SCAN Algorithm or Elevator Algo:

- it's scan the request for direction as same as moving direction of lift until the last floor and full fill the request.

DisAdvantages:

- If lift has request below from 5th floor, but in that case lift still going to move and scan until last floor
- like if 1000 floors it's going to scan 1000 of floors

Look Algorithm:



- It always seen one step ahead if any request is there then it's gonna scan.
- It's not going to scan whole floor.
- Ascending order in up direction
 - request □ 5,4,3
 - follow □ 3,4,5
- Descending direction in down direction
 - request 2,9,7,8,10
 - follow 10□9□8□7□2
- For Up direction using min heap
- for down direction using max heap
- we can say we are using priority queue.
- we have pending job queue.

- now leift has current position of 2 floor in Up direction.
- now a request is comming for 6th floor
- so, for up direction we can push 6th to min priority queue. 2@6
- now new reques has come for 4th floor in Up direction
- 4th will also push into min priority queue
- 2@4@6 @up@minPriority
- now we are getting request for 7th floor for down direction
- 7th floor push to max priority queue for down direction
- 7@down @ maxPriority
- now we are getting request for 8th floor in down direction.
- 8@7@down
- leift is already crosses the 2nd floor in up direction but it's get's request but it's get the request for 2nd floor and fist floor,
- 2 will goes into pending job queue
- now leift has full fill the request for 4th floor in up direction
- 6 in min_priority
- now for 6th floor it is also full filled . now min priority queue is empty.
- now left change the direction and push the pending job into priority queue
- 1@2 in min priority queue. in direction down
- now it's check for max priority queue.
- and full fill the request 8th floor and 7th floor.
- in mean tilme during full filling request of 7th floor in down direction getting request for 9th floor.
- so 9th floor goes into pending jobs.
- and so on.