

## PROBLEM 2.

The floors in a building are numbered sequentially with the integers 0, 1, 2, ..., N ( $N \leq 15$ ). There are K ( $1 \leq K \leq 4$ ) lifts in the building. Lift control is centralized, and accepts two types of request, entered by pressing buttons. External buttons (one for request to move up and one - to go down) can be found on each floor, and are common for all lifts. Internal buttons (requests to move to a given floor) are found in each lift.

Build a program to model lift group control on the following conditions:

1. There is a single lift in the building ( $K=1$ ), and it can accept a single request at a time. Any other request is accepted after completion of the first one.
2. There are several lifts in the building ( $K \geq 1$ ). Each of them accepts an internal request only if it is not executing an other request. The lift control device can register several incoming request at the same time. Internal requests are fulfilled by the lift, where they were entered. The control device selects a suitable free lift to fulfill each external request.
3. Consider the same case as in 2, with the restriction that even-numbered lifts can stop at even-numbered floors, and odd-numbered lifts - at odd-numbered floors only. All lifts stop at floor zero.
4. Consider the case in 3, and suppose that there can be several pending internal requests from each lift, not just one. All internal requests are accepted and registered, no matter whether a lift is free or not.

### Additional instructions

One could accept that all lifts are synchronized, and at equal time intervals (clock ticks) each lift is located at a given floor. During the next tick, a lift could go one floor up or down, or remain at the same floor. Requests (program input) can be entered at any tick, and they are of the following types:

- a, external - <floor number, direction of movement (up or down)>;
- b, internal - <lift number, floor number>

Several or none requests can be entered at each tick.

At each tick the program should display information about the location of each lift.

The lifts are large enough and cannot be overloaded.

The program should control the lifts so that their behaviour shows as much "intelligence" as possible.

There should be explicit explanations of the lift control strategy.