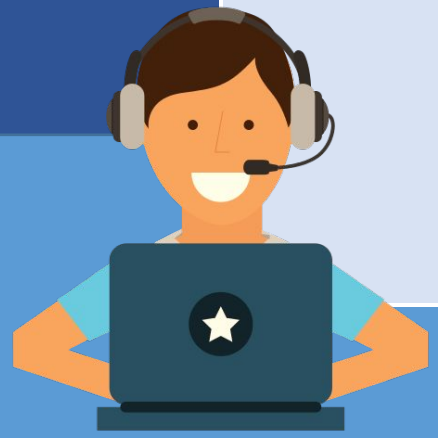
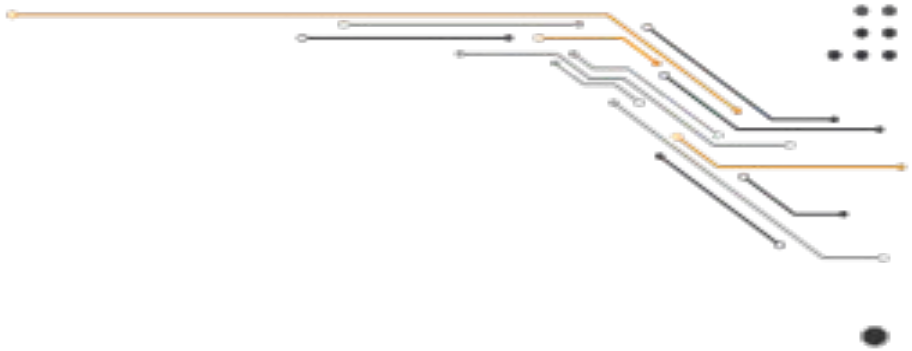
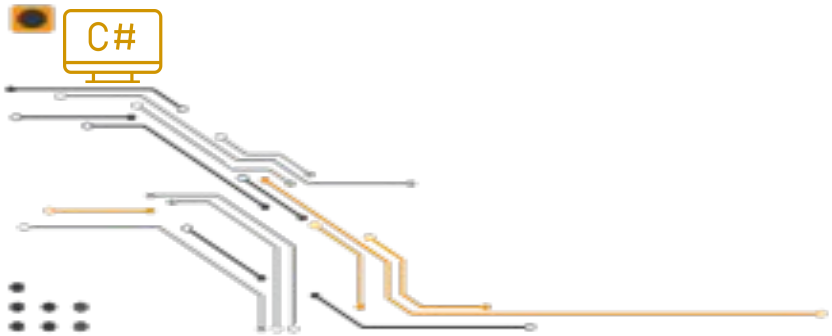
Exam project

Concurrent Programming with C# and TPL





Elevator for Base “Area 51”

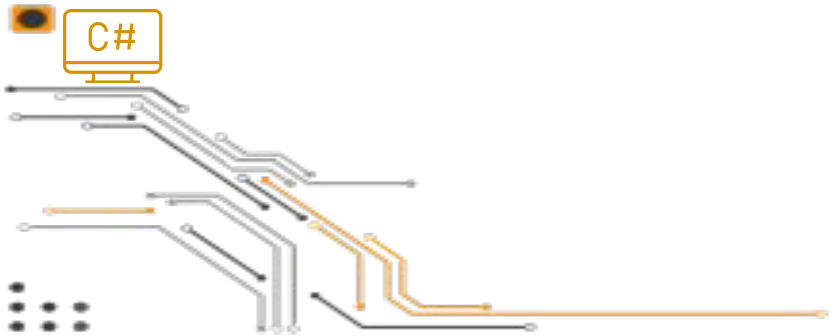


Base “Area 51”

- The base has four floors:
  - G – ground floor
  - S – secret floor with nuclear weapons
  - T1 – secret floor with experimental weapons
  - T2 – top-secret floor that stores alien remains
- Agents
  - Three security levels: Confidential, Secret, Top-secret
  - Confidential can access only G floor
  - Secret can access G and S
  - Top-secret can access G, S, T1 and T2

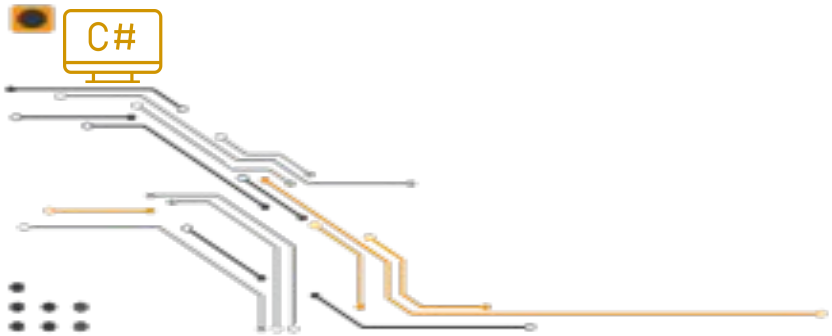
Functional Requirements for the Elevator

- On each floor there is a button to call the elevator
- Inside elevator: four buttons for each floor
  - When a button is pressed, all others are disabled until the elevator arrives
- When the elevator reaches the floor, the door opens only if the agent inside has the required security credentials.
  - If the agent doesn’t have the required credentials, he can press another button to go to another level
- The speed of the elevator is 1 floor per 1 sec.



Your Task

- Implement the elevator system as a C# a program and test it by letting agents of different security levels use the elevator repeatedly
  - Model the elevator, agents, the elevator door (security check) and the buttons of the elevator
  - Implement a simulation of agent's arriving at the Base, moving around and eventually leaving
  - Implement the movement of the elevator and button functionality as required
  - Implement the security check before opening the door and letting the agent out
- It is enough to allow one agent in the elevator at a time
  - Bonus points if you support more; however, in this case door decides how to open based on the agent with lowest security credentials



Requirements

- Each agent is serviced by a separate thread
  - Moving around is randomly generated
- Elevator is serviced by a separate thread
- Agents “call” the elevator by “pressing” the elevator button on their current floor;
  - Just like in real-life, then need to wait for the elevator to come