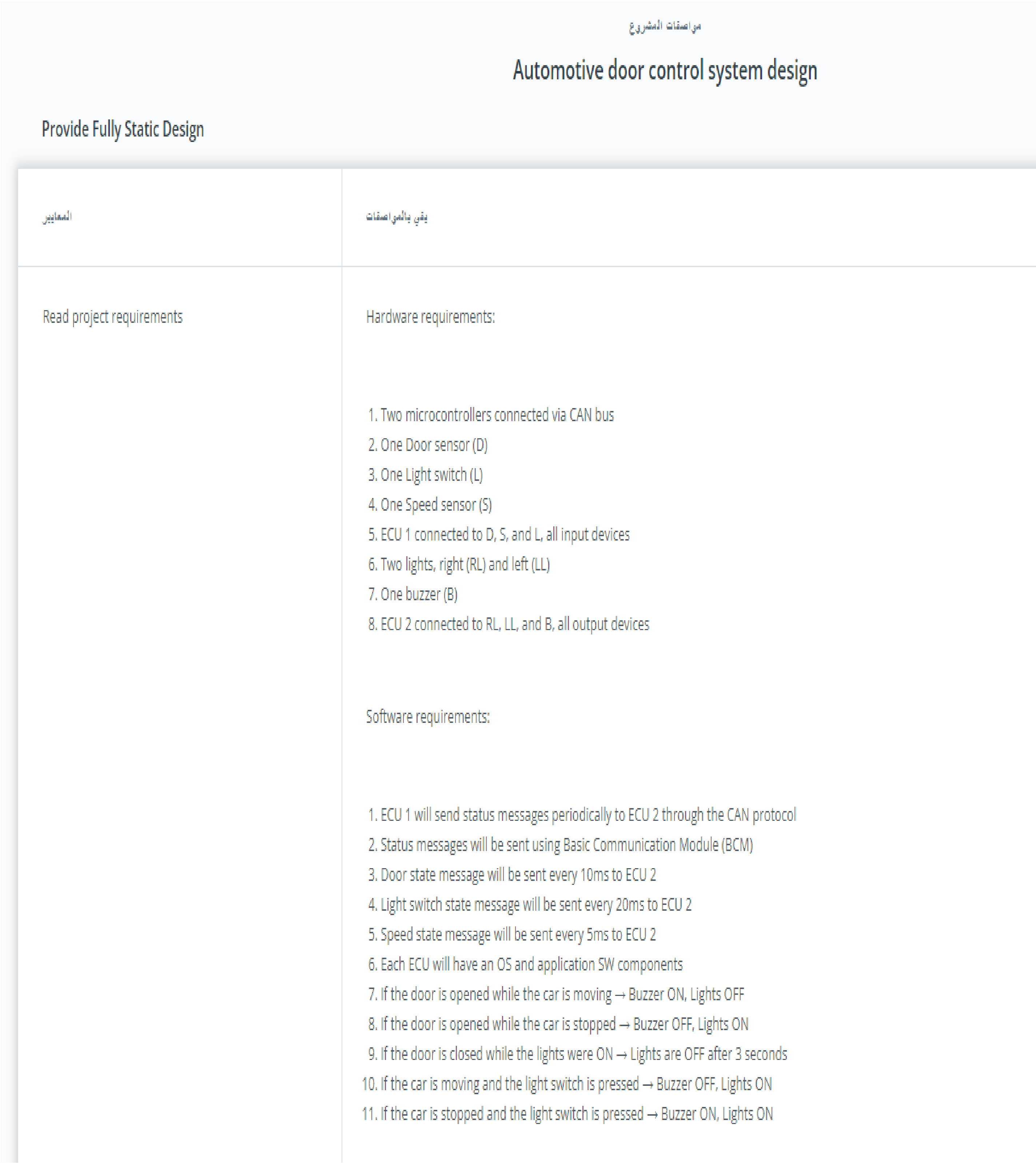

مواصفات المشروع

Automotive door control system design

Provide Fully Static Design

المعايير	يفي بالمواصفات
Read project requirements	Hardware requirements: 1. Two microcontrollers connected via CAN bus 2. One Door sensor (D) 3. One Light switch (L) 4. One Speed sensor (S) 5. ECU 1 connected to D, S, and L, all input devices 6. Two lights, right (RL) and left (LL) 7. One buzzer (B) 8. ECU 2 connected to RL, LL, and B, all output devices Software requirements: 1. ECU 1 will send status messages periodically to ECU 2 through the CAN protocol 2. Status messages will be sent using Basic Communication Module (BCM) 3. Door state message will be sent every 10ms to ECU 2 4. Light switch state message will be sent every 20ms to ECU 2 5. Speed state message will be sent every 5ms to ECU 2 6. Each ECU will have an OS and application SW components 7. If the door is opened while the car is moving → Buzzer ON, Lights OFF 8. If the door is opened while the car is stopped → Buzzer OFF, Lights ON 9. If the door is closed while the lights were ON → Lights are OFF after 3 seconds 10. If the car is moving and the light switch is pressed → Buzzer OFF, Lights ON 11. If the car is stopped and the light switch is pressed → Buzzer ON, Lights ON

2- Static design analysis

For ECU 1:

1. Make the layered architecture
2. Specify ECU components and modules
3. Provide full detailed APIs for each module as well as a detailed description for the used typedefs
4. Prepare your folder structure according to the previous points

For ECU 2:

1. Make the layered architecture
2. Specify ECU components and modules
3. Provide full detailed APIs for each module as well as a detailed description for the used typedefs
4. Prepare your folder structure according to the previous points

المعايير	يفي بالمواصفات
Dynamic design analysis	For ECU 1: 1. Draw a state machine diagram for each ECU component 2. Draw a state machine diagram for the ECU operation 3. Draw the sequence diagram for the ECU 4. Calculate CPU load for the ECU For ECU 2: 1. Draw a state machine diagram for each ECU component 2. Draw a state machine diagram for the ECU operation 3. Draw the sequence diagram for the ECU 4. Calculate CPU load for the ECU Calculate bus load in your system: With what percentage of system bus was busy per 1 second You should deliver a pdf file containing all your work and a video recording where you will discuss your work (maximum 5min long)