

## C Programming Project

Implement the following Vehicle Control system with the specifications listed below.

1. Ask the user if he/she wants
  - a. Turn on the vehicle engine
  - b. Turn off the vehicle engine
  - c. Quit the system
2. If chose to "Quit the system": Quit program
3. If chose to "Turn off the vehicle engine": Ask him/her again what he/she wants to do (Requirement 1)
4. Once a choice has been chosen, print on screen the system state.
5. If chose to "Turn on the vehicle engine", display "Sensors set menu", menu that simulates the vehicle sensors readings.
  - a. Turn off the engine
  - b. Set the traffic light color.
  - c. Set the room temperature (Temperature Sensor)
  - d. Set the engine temperature (Engine Temperature Sensor)
6. While the engine is ON, menu in requirement 5 must be always displayed and waits for an answer.
7. Based on the answer of requirement 6.
  - a. Based on traffic light data (Take it as input from console, we will assume that this is the sensor read value)
    - i. If the traffic light is 'G' set vehicle speed to 100 km/hr
    - ii. If the traffic light is 'O' set vehicle speed to 30 km/hr
    - iii. If the traffic light is 'R' set vehicle speed to 0 km/h

- b. Based on room temperature data (Take it as input from console, we will assume that this is the sensor read value)
  - i. If temperature less than 10, Turn AC ON and set temperature to 20
  - ii. If temperature is greater than 30, Turn AC ON and set temperature to 20
  - iii. If temperature is otherwise, Turn AC OFF
- c. Based on engine temperature data (Take it as input from console, we will assume that this is the sensor read value)
  - i. If temperature less than 100, Turn "Engine TemperatureController" ON and set temperature to 125
  - ii. If temperature is greater than 150, Turn "Engine Temperature Controller" ON and set temperature to 125
  - iii. If temperature is otherwise, Turn "Engine TemperatureController" OFF
- d. If vehicle speed is 30 km/hr
  - i. Turn ON AC if it was OFF and set room temperature to:  $\text{current temperature} * (5/4) + 1$
  - ii. Turn ON "Engine Temperature Controller" if it was OFF and set engine temperature to:  $\text{current temperature} * (5/4) + 1$
- e. Display the current vehicle state after applying 7.a to 7.d
  - i. Engine state: ON/OFF
  - ii. AC: ON/OFF
  - iii. Vehicle Speed
  - iv. Room Temperature
  - v. Engine Temperature Controller State.
  - vi. Engine Temperature

8. If chose in menu of requirement 5 to “Turn off the engine”, the menu of requirement 1 must be displayed.
9. Bonus Requirement: Create `#define WITH_ENGINE_TEMP_CONTROLLER`, if this `#define` is 1 then compile/run the code lines that are related to the “Engine Temperature Controller, else do not compile/run. (Code that implements 5-d, 7-c, 7-d-ii, 7-e-v and 7-e-vi)

### Notes

- To get an character input use:  
`printf("a. Turn on the vehicle engine\n");`  
`printf("b. Turn off the vehicle engine\n");`  
`printf("c. Quit the system\n\n");`  
`scanf(" %c",&input);`  
Make sure you left a space before `%c` to prevent `scanf` function from take new line or enter from the above `printf` functions as `input`.
- For the bonus requirement, search for how to use preprocessor directive like below in C Language.

`#if (CONDITION)`

`...`

`#endif`

This topic will be discussed later in **C For Embedded Systems (Embedded C)** Course.

*Thanks and Good Luck*  
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