

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)

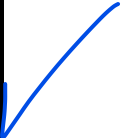
- ✓ i. If temperature less than 100, Turn "Engine Temperature Controller" ON and set temperature to 125
- ✓ ii. If temperature is greater than 150, Turn "Engine Temperature Controller" ON and set temperature to 125
- ✓ iii. If temperature is otherwise, Turn "Engine Temperature Controller" OFF

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.

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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)
 10. Check this video: <https://youtu.be/i89M2azHeWM>

Notes

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- 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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