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", menuthat 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 TemperatureController" 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:current temperature * (5/4) + 1
 - ii. Turn ON "Engine Temperature Controller" if it was OFF and set engine temperature to: 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)
- 10. Check this video: https://youtu.be/i89M2azHeWM

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 Eng | Mohamed Tarek