CPET 1120 – C Programming for Engineering Technology

LAB 3

Write a program to compute the power dissipated in a resistor, the voltage measured across the resistor, and whether it's voltage or power ratings are okay or exceeded. The user inputs the resistance value of the resistor and the current that flows through it. The power equation variables are P for power, R for ohms, I for current and V for volts.

$$P = I^2 * R \text{ (Watts) and } V = I * R \text{ (Volts)}$$

The program has 3 functions:

main()   Explains what the program accomplishes and then prompts the user to; input a value for the circuit current (I) and input a value for the circuit resistance (R). Main calls user functions power(), volts(), and display().

volts()   A type int function that calculates the voltage and then displays the voltage on the screen. The voltage is then tested using relational operators and only "if" statements for the return value. Return a 0 if voltage ≤ 50 volts (V) and a 1 if voltage > 50 V.

power()   A type int function that calculates the power and then displays the power in watts on the screen. The power is then tested using relational operators and if-else statements for the return value. Return a 0 if power ≤ 1 watt (W) and a 1 if power > 1 W.

display()   A type void function that displays if the Resistor's power and/or voltage ratings are OK or if any of the ratings have been exceeded.

If the power dissipated is over 1 watt, display the message: "The power in the Resistor is too high and the Resistor will be damaged".

If the power dissipated is less than or equal to 1 watt, display the message: "The power dissipated in the Resistor is OK".

If the voltage is 50 V or less, display the message: "The voltage across the Resistor is OK".

If the voltage across the resistor is over 50 volts, display the message: "The voltage across the Resistor is too high and the Resistor will be damaged".

If the power and voltage ratings are both exceeded, display the message: "Both resistor ratings for power and voltage have been exceeded and the Resistor failed".

Use relational and logical/Boolean testing with if or if-else statements – you decide.

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*************************************************************************************
Test case: R = 2200        R = 1500         R = 3600      R = 1250        units of ohms
           I = .040        I = 10 e-3       I = 16.66 e-3 I = 40e-3       units of amps
           P = 3.52        P = .150         P = 1.0       P = 2.0         units of watts
           V = 88.0        V = 15.0         V = 60.0      V = 50.0        units of volts
*************************************************************************************
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LAB REQUIREMENTS

- *Print the program and user inputted text to computer screen.*
- *Print the program output results to screen.*
- ***Mark the beginning of main, and each of the user generated function definitions, with the format used on your previous labs.***
- *Attach a copy of the Source Code with the Program output results to this page and turn it in.*