

Practice Exercises for Conditional Statements

Problem 1: Do this problem by hand then double check your answer in MATLAB.

(a) What will the two *disp* statements produce?

```
a = 5; b = 6; c = 3;
if a > 3 && c < 7
    result = a + b*c;
elseif a > 1 && b == 3
    result = a*c;
elseif b == 5 || c < 5
    result = b-15;
end
disp('result = ');disp(result)
```

(b) What will the two *disp* statements produce?

```
a = 5; b = 6; c = 3;
if a > 3 && c < 7
    result = a + b*c;
end
if a > 1 && b == 3
    result = a*c;
end
if b == 5 || c < 5
    result = b-15;
end
disp('result = ');disp(result)
```

(c) Explain why the code in part (a) produces a different value for result than the code in part (b)

Problem 2: Resistor Value Calculator based on Color Code

Figure 1 shows a picture of as well as the symbol used for a resistor in a circuit diagram.

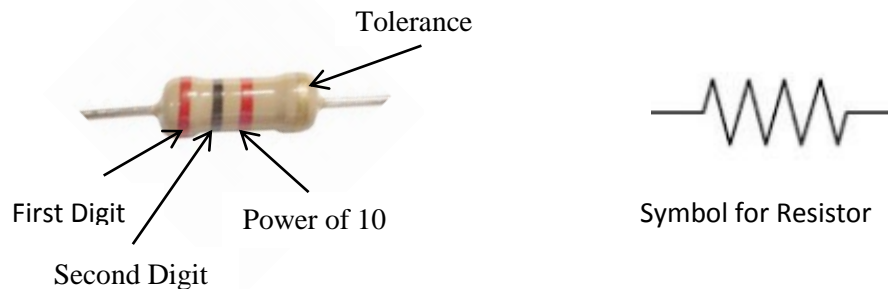


Figure 1: Resistor and Resistor Circuit Symbol

The colored bands on the resistor can be used to identify the resistance. Each color corresponds to a number as shown in the table below.

Resistor Color Code				
Color Bands 1-3	Numerical Value		Color for 4 th Band	Tolerance
Black	0		Missing	20%
Brown	1		Silver	10%
Red	2		Gold	5%
Orange	3			
Yellow	4			
Green	5			
Blue	6			
Violet	7			
Gray	8			
White	9			

The nominal value of the resistor can be determined from the color bands on the resistor:

$$\text{Nominal Value of R} = (\text{FirstColorValue} * 10 + \text{SecondColorValue}) * 10^{\text{ThirdColorValue}}$$

The tolerance indicates how much the actual value of resistance can vary from the nominal value. The manufacturer's range for the resistor would then be:

$$\text{Range} = \text{Nominal Value} \pm \text{Tolerance} * \text{Nominal Value}$$

Example: Suppose the color bands on the resistor are YELLOW VIOLET ORANGE GOLD

Nominal Value: $(4 * 10 + 7) * 10^3 = 47000 \, \Omega = 47 \, \text{k}\Omega$

Range: $47 \pm 0.05 * 47 \, \text{k}\Omega$ or 44.65 to 49.35 k Ω .

(a) Write a script file to do the following:

- Prompt the user for the four colors on the resistor using menu statements
- Calculate the nominal value for the resistor and the range of resistance
- Display (fprintf) the nominal value and range in ohms if the nominal resistance value is smaller than 1000 Ω , in kohms if the nominal resistance value is at least 1000 Ω but less than 1,000,000 Ω and in Mohms if the nominal resistance value is 1,000,000 Ω or higher. Make sure to include units in your fprintf statements. Display two places behind the decimal point for range. Display zero places behind the decimal point if the resistance is in Ω and display one place behind the decimal point if the resistance is in k Ω or M Ω
- Test your script file using the YELLOW VIOLET ORANGE GOLD example from the previous page to make sure your program is working properly.

- (b) Run your script for the three cases shown in the table below and paste the output in the MATLAB Command window below the table.

Color Band 1	Color Band 2	Color Band 3	Tolerance Band
Gray	Brown	Black	None
Green	Blue	Red	Silver
Orange	Orange	Blue	Gold

Script Output for: Gray-Brown-Black-None

Script Output for: Green-Blue-Red-Silver

Script Output for: Orange-Orange-Blue-Gold