

## Practice Exercises on Conditional Statements

**Problem 1:** In this problem, you will be writing a MATLAB script that will compute and display a student's grade in a course. The student (user) will have to input his/her grades for Test 1, Test 2, and the Final Exam. The program computes the course average assuming Test 1 and Test 2 each count 30% and the Final Exam counts 40%. The program should round the course average to the nearest integer using *round*. The program will output the statement *Your Course Average is:* followed by the rounded course average. The program will then output the statement *Your Course Grade Is:* followed by the course grade. Assume the following grading scale:

$\geq 90$	A
80 – 89	B
70 – 79	C
60 – 69	D
$< 60$	F

- a. Based on the problem statement, decide what the inputs and outputs are.

Inputs

Outputs

- b. Create a flow chart for this program.
- c. Based on your flow chart, think about which type of conditional statement might work best (if or if ... elseif or if ... elseif ... else or switch). In the space below, do a rough outline of what your conditional statement might look.
- d. In MATLAB, create a new script file and write your program. Test the program when it is finished then have your instructor verify that the program works.

**Problem 2:** In this problem, you will be writing a MATLAB script that will determine a person's blood pressure category. The user will have to input his/her systolic and diastolic blood pressure readings. The program will determine the user's category and then output the statement ***Your Blood Pressure Reading Indicates:*** followed by the correct category. The following table will be of use.

Category	Systolic	Diastolic
Hypotension Low Blood Pressure	50-89	35-59
Normal	90-119	60-79
Pre-hypertension	120-139	80-89
Mild Hypertension (Stage 1)	140-159	90-99
Moderate Hypertension (Stage 2)	160-179	100-109
Severe Hypertension (Stage 3)	180-209	110-119
Very Severe Hypertension (Stage 4)	210-239	120-135

Other Requirements for the Program:

1. Your program should ***first check for invalid readings*** and should output an error message for invalid readings. Systolic or Diastolic readings that fall below or above the readings on the table indicate the user is either in a coma, in severe medical distress, or dead.
2. If a person's readings put them in two different categories, the higher category should be selected. For example, someone with a blood pressure reading of 118/85 would be categorized as normal for the systolic reading and pre-hypertension for the diastolic reading. The program should output pre-hypertension. *However, if a person has one reading that is normal and one reading in Hypotension (Low), they should be categorized as Hypotension (Low Blood Pressure).*

**Hint:** This is not as difficult as it first appears. Remember how the ***if.. elseif ... elseif*** construct works. You only get to an ***elseif*** statement when all the statements above it are false. So, your first ***if*** statement either discovers invalid readings and the program quits, or it rules out invalid readings and proceeds on. If the program proceeds and you choose to go from the top down, your next ***elseif*** statement should either discover Very Severe Hypertension or rule it out. If the program proceeds, you know that both Invalid Readings and Very Severe Hypertension are already ruled out. If you choose to go from the bottom up - same idea - just begin with Hypotension.

- a. Based on the problem statement, decide what the inputs and outputs are.

Inputs

Outputs

- b. Create a flow chart for this program.

- c. Based on your flow chart, think about which type or types of conditional statements might work best ( if or if ... elseif or if ... elseif ... else or switch). Sketch out a rough outline for your conditional statements.
- d. In MATLAB, create a new m-function (File → New → Function m-file) and write your program. Test the program when it is finished and then have your instructor verify that the program works.