

LAB 6: Using Conditional Statements

Problem 1: In this problem, you will be writing a MATLAB m-function 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:

≥ 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.

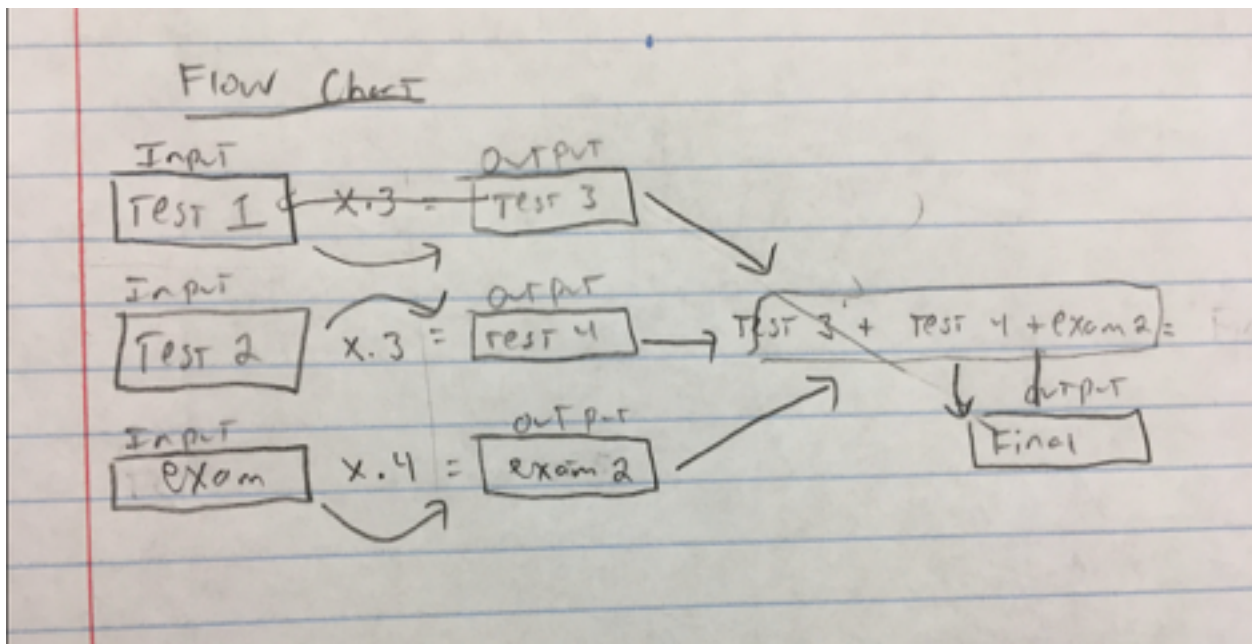
Inputs

Test 1
Test 2
Final Exam

Outputs

30% of grade
30% of grade
40% of grade
Final grade

- b. Create a flow chart for this program. When the flowchart is completed, have it checked by your instructor prior to proceeding to writing code.



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.

```
If Final Grade >= 90, A
else if 80 <= Final Grade < 90, B
else if 70 <= Final Grade < 80, C
else if 60 <= Final Grade < 70, D
else Final Grade < 60, F
```

d. In MATLAB, create a new m-function (File → New → Function m-file) and write your program. Test the program when it is finished then have your instructor verify that the program works.

Function file was not working

```
%Lab 6, problem 1B
%Input Output statements of students grades
%Alex Sullivan-- November 4th, 2016
function [Test3,Test4,Exam2 ] = FinalGrade_Function( Test1,Test2,Exam )
%Lab 6 Using conditional Statements
% This program will take in three different grades, and
% Compute them to produce an output of the final grade.
test1=input('What is your test one grade?');
test2=input('What is your test two grade?');
exam=input('What is your exam grade?');
test3=test1.*.3;
test4=test2.*.3;
exam2=exam.*.4;
final=test3+test4+exam2,round;
fprintf('Your Course Grade Is:%i ',final)
if final >= 90
    disp('A')
elseif 80 <= final && final < 90
    disp('B')
elseif 70 <= final && final < 80
    disp('C')
elseif 60 <= final && final < 70
    disp('D')
else final < 60;
    disp('F')
end
```

Your Course Grade Is:65 >> Lab6_Problem1B

What is your test one grade?100

What is your test two grade?90

What is your exam grade?100

Your Course Grade Is:97 A

Problem 2: In this problem, you will be writing a MATLAB m-function 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).**

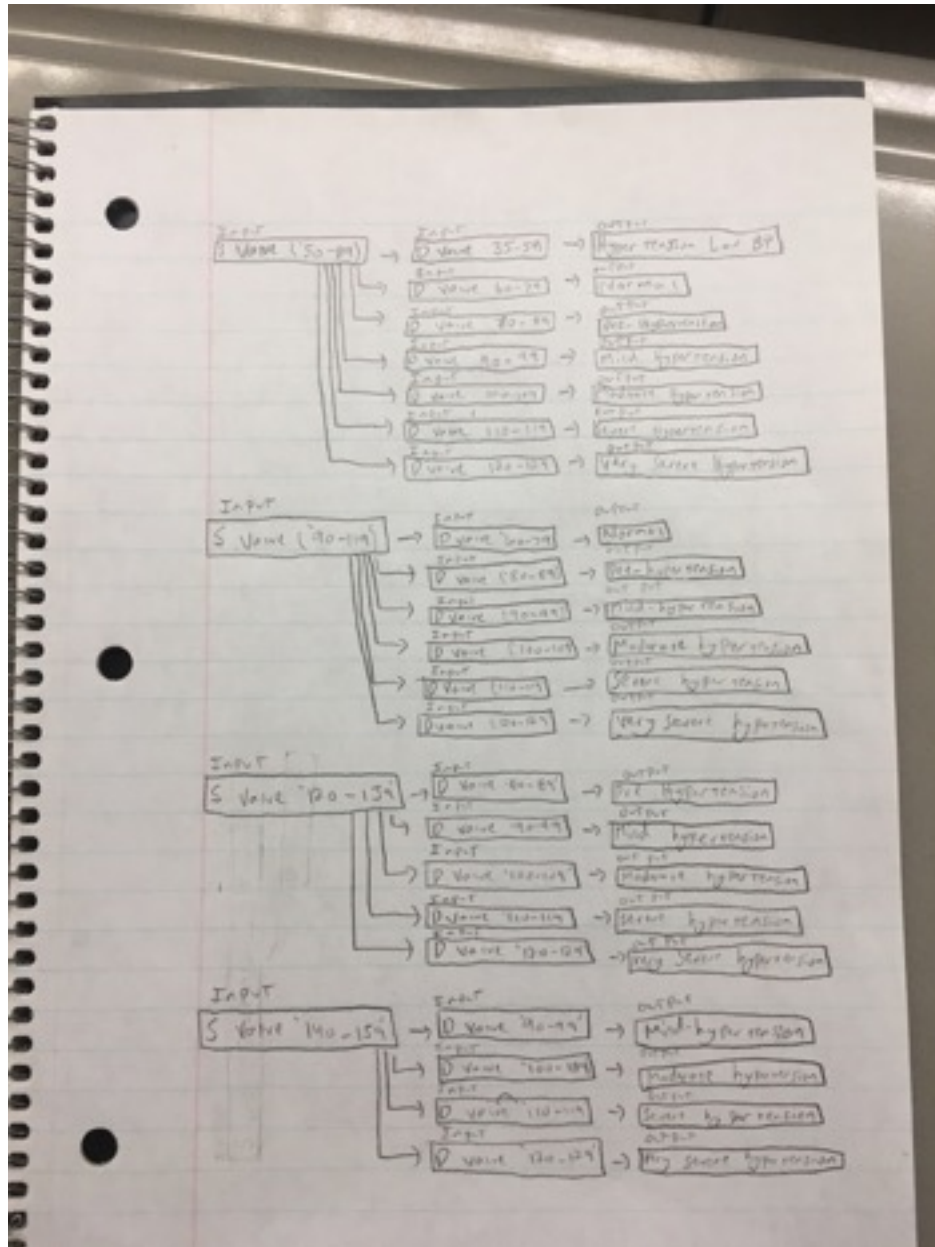
Hint: This is not as difficult as it first appears. Remember how the **if.. elseif ... elseif** construct works. You only get to an **elseif** statement when all the statements above it are false. So, your first **if** statement either discovers invalid readings and the program quits, or it rules out invalid

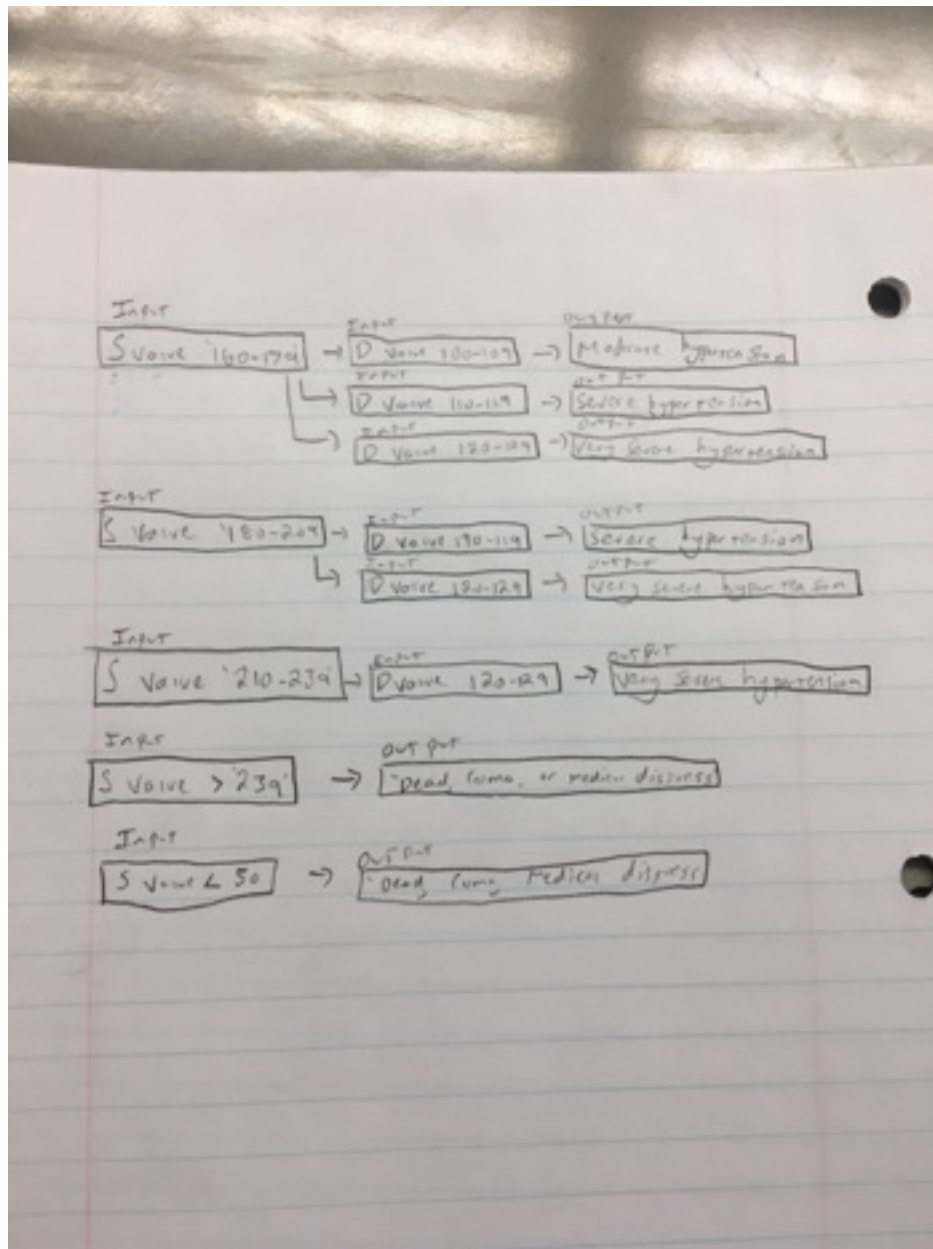
readings and proceeds on. If the program proceeds and you choose to go from the top down, your next *elseif* statement should either discover Very Severe Hypertension or rule it out. If the program proceeds, you know that both Invalid Readings and Very Severe Hypertension are already ruled out. If you 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.

<u>Inputs</u>	<u>Outputs</u>
systolic value (50-89)	
Diastolic value (35-59)	Hypertension Low Blood Pressure
Diastolic Value (60-79)	Normal
Diastolic value (80-89)	Pre-Hypertension
Diastolic value (90-99)	Mild Hypertension (stage 1)
Diastolic value (100-109)	Moderate Hypertension (stage 2)
Diastolic value (110-119)	Severe Hypertension (stage 3)
Diastolic value (120-135)	Very Severe Hypertension (stage 4)
systolic value (90-119)	
Diastolic Value (60-79)	Normal
Diastolic value (80-89)	Pre-Hypertension
Diastolic value (90-99)	Mild Hypertension (stage 1)
Diastolic value (100-109)	Moderate Hypertension (stage 2)
Diastolic value (110-119)	Severe Hypertension (stage 3)
Diastolic value (120-135)	Very Severe Hypertension (stage 4)
systolic value (120-139)	
Diastolic value (80-89)	Pre-Hypertension
Diastolic value (90-99)	Mild Hypertension (stage 1)
Diastolic value (100-109)	Moderate Hypertension (stage 2)
Diastolic value (110-119)	Severe Hypertension (stage 3)
Diastolic value (120-135)	Very Severe Hypertension (stage 4)
systolic value (140-159)	
Diastolic value (90-99)	Mild Hypertension (stage 1)
Diastolic value (100-109)	Moderate Hypertension (stage 2)
Diastolic value (110-119)	Severe Hypertension (stage 3)
Diastolic value (120-135)	Very Severe Hypertension (stage 4)
systolic value (160-179)	
Diastolic value (100-109)	Moderate Hypertension (stage 2)
Diastolic value (110-119)	Severe Hypertension (stage 3)
Diastolic value (120-135)	Very Severe Hypertension (stage 4)
systolic value (180-209)	
Diastolic value (110-119)	Severe Hypertension (stage 3)
Diastolic value (120-135)	Very Severe Hypertension (stage 4)
systolic value (210-239)	
Diastolic value (110-119)	Severe Hypertension (stage 3)
Diastolic value (120-135)	Very Severe Hypertension (stage 4)

- b. Create a flow chart for this program. When the flowchart is completed, have it checked by your instructor prior to proceeding to writing code.





- 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.

If the systolic value is in a certain range, and the diastolic value is in a certain range, then a certain category will be displayed.

- 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.

```

function [ cat ] = Lab6Prob2( sys,dias )
%Lab 6 Problem 2
% A user will input their blood pressure, and an output will
% tell the user what category they fall under
sys=input('What is your systolic blood pressure: ');
dias=input('What is your diastolic blood pressure: ');
if sys<50 || dias<35
    disp('error, please see doctor');
elseif sys<=89 && dias<=59
    disp('Your category is: Hypertension Low Blood Pressure')
elseif sys<=119 && dias<=79
    disp('Your category is: Normal')
elseif sys<=139 && dias<=89
    disp('Your category is: Pre-Hypertension')
elseif sys<=159 && dias<=99
    disp('Your category is: Mild Hypertension (Stage 1)')
elseif sys<=179 && dias<=109
    disp('Your category is: Moderate Hypertension (Stage 2)')
elseif sys<=209 && dias<=119
    disp('Your category is: Severe Hypertension (Stage 3)')
elseif sys<=239 && dias<=135
    disp('Your category is: Very Severe Hypertension (Stage 4)')
end

```

Turn in Next Week:

- **Flow charts for both programs**
- **Code for both programs. Make sure you use good programming practices (variable names that mean something and comments).**
- **Demonstrate the programs to the instructor if you haven't done so already.**