# Math 107 Lecture 7

## Relational Operators and Branching

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on September 18, 2024

# » Announcements and Objectives

## Announcements

- Skill Check 2 is NEXT Wednesday (9/25, 60 mins then lecture)
- Pre-Notes due before start of next lecture
- Assignments Due Friday (9/20):
  - HW3 Handwritten Questions
  - HW3 Coding Problems
  - HW3 MATLAB File Upload
- Office Hours Update: All of my office hours are now offered in hybrid format.

## Objectives

- Introduce the programming concept of branching
- Use if/elseif/else and conditional statements in programming

# Relational Operators

## » Relational Operators

| | |
|---|---|
| < | less than |
| <= | less than or equal to |
| > | greater than |
| >= | greater than or equal to |
| == | equal |
| ~= | not equal |

These behave as questions that MATLAB either answers as True (1) or False (0).

To combine statements, you can use && (and) or || (or).

(statement 1) && (statement 2) ← This is true when BOTH statements are true

(statement 1) || (statement 2) ← This is true if EITHER statements are true

# » Relational Operators

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- Comparing two arrays (of the same size) results in an array (comparison is done elementwise).
- If a scalar is compared with an array, every element is compared to the scalar and the result is an array.

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  Example: Perform the comparison u==3.

## » Relational Operators

### Question

Question: Without runing the command, determine what the output of the following command would be:

```
y = (6<10) + (7>8) + (5*3==60/4)
```

# » Order of Precedence

**Order of Precedence:**

- Order of precedence: Arithmetic operations (+,-,*,/,\) have precedence over relational operations.
- Relational operations are performed from left to right.

**Example 3:**

a) Execute the command $3+4<16/2$.

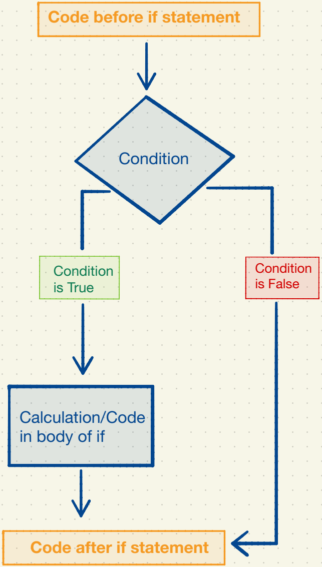
b) Execute the command $3+(4<16)$/2

# Branching

## » if Statement

```
if (condition)
    (calculation)
end
```

# if statement



Code before if statement

Condition

Condition is True

Condition is False

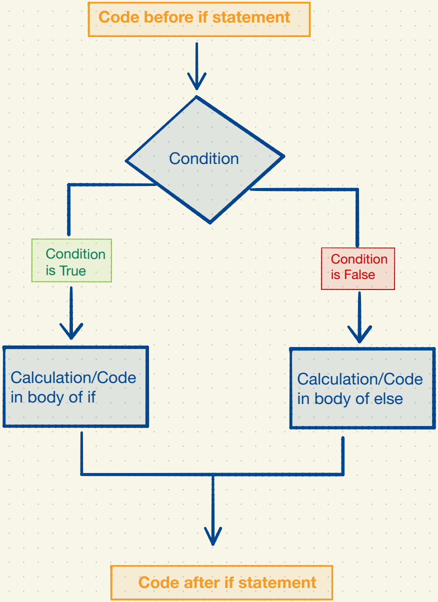
Calculation/Code in body of if

Code after if statement

## » if/else Statement

```
if (condition)
    (calculation A)
else
    (calculation B)
end
```

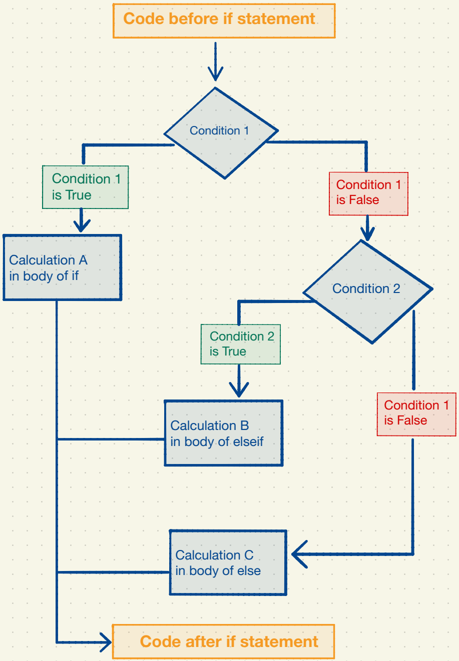
# if/else statement



## » if/elseif/else Statement

```
if (1st condition)
    (calculation A)
elseif (2nd condition)
    (calculation B)
else
    (calculation C)
end
```

# if/elseif/else statement



Code before if statement

Condition 1

Condition 1 is True

Condition 1 is False

Calculation A in body of if

Condition 2

Condition 2 is True

Calculation B in body of elseif

Condition 1 is False

Calculation C in body of else

Code after if statement

# » disp() Command

The **disp()** command displays a message in the Command Window.

**Syntax:** `disp('This is a message.')`

**Note:** The disp() command is not the same as the “output” of a function written in the editor.

## » Activity - gradeToLetter

Has the most pets (by weight)

↓

Has the smallest amount of pets (by weight)

**Reporter:** Ready to share out the group's observations and questions when the whole group comes together.

**Notetaker:** Takes notes on the group's progress.

**Facilitator:** Helps make sure the floor is shared so that everyone has a chance to contribute.

Task: Work together to write a script that prompts the user to input a number called `score` (possibly a decimal) between 0 and 100 and outputs the corresponding letter grade (e.g., `grade = 'A'`). The single quotes make the variable a string data type.

Use the scale [0, 60) is an F, [60,70) is a D, [70,80) is a C, [80,90) is a B, and [90,100] is an A. Test the script with a grade from each interval.