Conditional Statements
ENGR 1187
MATLAB 7
Conditional Statements in Real Life

A Fluorescence Activated Cell Sorter (FACS) sorts cells based on predetermined conditions. Based on which conditions are met, one of 3 events occur: (1) a positive charge is applied to the cell, (2) a negative charge is applied, or (3) there is no charge applied. Based on charge, the cells will be sorted according to these conditions.
Today's Learning Objectives

- Explain how conditional statements (e.g., if-end, if-else-end, switch-case) are used to make decisions.
Review from Prep Reading:

- Conditional statements allow MATLAB to make decisions based on whether a certain condition is met.

- If it is met: a specified set of actions is taken.

- If it is not met: a different set of actions is taken.
Example

Suppose you buy a lottery ticket.

Your subsequent actions will likely be different depending whether or not you win...
Example

If I win the lottery I will...

- Quit my job!
- Buy a lake house!
- Throw a huge party!

If I do not win I will...

- Keep attending work
- Continue making awesome PowerPoints about MATLAB
If-End Statements in MATLAB

- Each 'if' must have a corresponding 'end'
- The conditional expressions can contain relational/logical operators

```matlab
if conditional expression
    ...program code
end
```
If-Else-End Structures

if \( x < 1 \)
  ...code 1
else
  ...code 2
end

- If the condition evaluates to true, code 1 is executed and code 2 is skipped.
- Otherwise... if the condition is not met, code 2 is executed and code 1 is skipped.
Lottery Example

Lottery = input('Did you win the lottery? 1=yes, 0=no')

if lottery == 1
    quit job
    buy lake house
    throw huge party

else
    keep job
    keep making PPTs

end
If - Elseif - Else - End

if conditional
  ...code 1
elseif conditional
  ...code 2
else conditional
  ...code 3
end
If – Elseif – Else – End Example

Calculate a tip based on a restaurant bill:

- Bill less than $10:
  Tip is $1.80
- Bill between $10 and $60
  Tip is 18%
- Bill above $60
  Tip is 20%
If – Elseif – Else – End Example

bill = input('Enter the amount of the bill in dollars: ')

if (bill <= 10)
    tip = 1.8;

elseif (bill > 10) & (bill <= 60)
    tip = bill * 0.18;

else
    tip = bill * 0.2;

end
Important Takeaways

- Every `if` MUST have an `end`

- Programs can have as many `if` statements as you want

- Programs can perform the same task using different combinations of `if-end`, `if-else-end`, and `if-elseif-else-end` statements

- `Else` is optional and it doesn't require a conditional statement.
Preview of Next Class

- For Loops 1
  - How do we repeat code 10 times? 1000 times? $10^{10}$ times?
  - Examples of basic for-end loops
  - For-end loops with vectors
  - Array accessing in for-end loops with vectors
What’s Next?

- Review today’s Quiz #07
- Open the in-class activity from the EEIC website and we will go through it together.
- Then, start working on MAT-07 homework.
- Prepare for next class by reading about Advanced For Loops