Statements We Will Use in Flow Control

- **for loops**
  - repeat a set of commands *for* a specified number of times

- **while loops**
  - repeat a set of commands *while* a specified condition is true

- **if, else, elseif**
  - execute a set of commands if a specified condition is true (*if*) or execute an alternative set of commands if the specified condition is false (*else, elseif*)

Statements Used in *if, elseif* and *while loops*

- Relational Operators
  - `==` equal
  - `~=` not equal
  - `<` less than
  - `<=` less than or equal
  - `>` greater than
  - `>=` greater than or equal

- Logical Operators
  - `&` AND
  - `|` OR
  - `~` NOT

Relational and Logical Operators

- Order of evaluation:
  - arithmetic, relational, logical

- Example:
  - `a+b > 1 & b-2 > 0`
  - is equivalent to:
    - `((a+b) > 1) & ((b-2) > 0)`
  - but which is clearer?

- See *ops* and *relop* help

*while loop*

- Syntax:
  - `while <a specified condition is true>
  
  Matlab commands
  
  This may be several lines
  
  Repeat this set of commands until the condition is no longer true
  
  end`

- Usually used when you do NOT know how many times you may need to repeat the given Matlab commands.
**while loop Example**

- Dr Raman’s Push Bike

<table>
<thead>
<tr>
<th>Time (sec)</th>
<th>Speed (ft/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>0.5</td>
<td>2.1</td>
</tr>
<tr>
<td>1.0</td>
<td>3.2</td>
</tr>
<tr>
<td>1.5</td>
<td>4.1</td>
</tr>
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**while loop Example**

`vel = [0.0  2.1  3.2  4.1  3.5]`
`t = [0.0  0.5  1.0  1.5  2.0]`

`ii  = 1
while vel(ii)< 3.0
   ii = ii + 1
end`

`vexceed = vel(ii)
texceed = t(ii)`

<table>
<thead>
<tr>
<th>Cycle</th>
<th>Value of ii</th>
<th>Value of vel(ii)</th>
</tr>
</thead>
</table>

**while loop continued**

- **Step 1**: Identify the specified condition (test) that must be **TRUE** to **STOP** the operation.
- **Step 2**: Use the **OPPOSITE** form of the test in Step 1 as the while loop condition statement.
- **Step 3**: Set up a way of changing (incrementing) the test condition **INSIDE** the while loop so that the loop will eventually end. Set up calculations.
- **Step 4**: **BEFORE** the while loop, set up (initialize) all necessary variables so the test condition and all calculations will evaluate properly the first time.