2 Conditionals

All programming languages have conditionals.

2.1 If

A typical conditional in MATLAB can be used to report some error condition:

```matlab
if ( numItems == 0 )
    disp( 'Cannot compute average' );
end
```

(Note the double-equals.) When these lines of code are executed, if `numItems` is zero, we will get the error message; otherwise there will be no message. The `end` indicates where the “body” of the conditional stops: there could be multiple statements that are only executed if the condition is true.

The brackets around the condition are optional. It is good programming practice to lay out the code using indentation and white space to help the reader. But note that the command executor does not care.

Here is code to calculate the absolute value of `num`:

```matlab
if num > 0
    abs = num;
else
    abs = -num;
end
```

2.2 Relational operators

Logical variables are either `true` (equal to 1) or `false` (equal to 0). One can combine logical variables and expressions using relational operators. MatLab uses ~ for not, && for and, and || for (inclusive) or.
Here is code to report where a value is within range.

```matlab
% script: isInRange
% goddard 2020
minVal=2;
maxVal=22;
fprintf( "min is %d max is %d\n", minVal, maxVal );
x = input('give me a value ');
if (x >= minVal) && (x <= maxVal)
    disp('Value within specified range.');</
elseif (x > maxVal)
    disp('Value exceeds maximum value.');</
else
    disp('Value is below minimum value.');</
end
```