Matlab Tutorial 4: If statements

So far, we have focused on automating repetitive tasks in Matlab using for-loops. These loops repeat the same action again and again. In addition to this level of automation, sometimes we will want to make decisions in an unsupervised way. Such decisions can be made using if-statements.

To make decisions using if-statements, we first need to understand how boolean questions (questions with a yes or no answer) are asked in Matlab. For example, we can ask whether 0 is equal to 1 using the `==` operator.

```
0 == 1
```

```
ans =
0
```

Note that the answer was 0, which means false, or no. In contrast, we could have asked whether 1 is larger than 0

```
1 > 0
```

```
ans =
1
```

and in this case we get 1, which corresponds to true or yes.

If statements take these kinds of inputs: a yes/no answer. The idea is that if the answer if yes, then one action will take place. If the answer is no, then a different action or no action at all can be carried out. Let's start with a simple example where we ask whether `a` is equal to `b`. If that's true, we will display "a and b are equal". Let's start by defining the `a` and `b` variables.

```
a = 10;
b = 10;
```

Now, let's write our if-statement

```
if a == b
    display('a and b are equal')
end
```

```
a and b are equal
```

Note the structure of the statement. First, you write "if condition", where condition is a boolean question. Then, after you press enter, Matlab automatically tabulates what you write next. The idea is to indicate that the following lines are contained within the if-statement. If the condition is true, these lines will be executed. Finally, you have to close the if-statement using `end`.

Finally, we might want to have our if-statement do something in the case that the condition is not met. This is done with the extra function `else`. For example,

```
if a == b
    display('a and b are equal')
else
```

```
```
These if-statements will be extremely helpful as we increase the complexity of the code we write throughout the course.