

MATLAB

Booleans and *find*

Tuesday, 1 October 13

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Boolean operators

A boolean operator or test returns a 0 (false) or a 1 (true). It is typically a comparison between two values.

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Boolean operators on numerics

```
>> 10 > 0
1
>> 10 < 3
0
>> 5==5
1
```

A boolean operator or test returns a 0 (false) or a 1 (true). It is typically a comparison between two values.

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Boolean operators on vectors

Arrays can also be used in comparisons. When we use the result of a comparison in an index, we only get those values that satisfy the condition.

```
>> vector = [0, 10, 20, 30];
>> vector < 25
[ 1  1  1  0 ]
>> vector (vector < 25)
[0 10 20]
```

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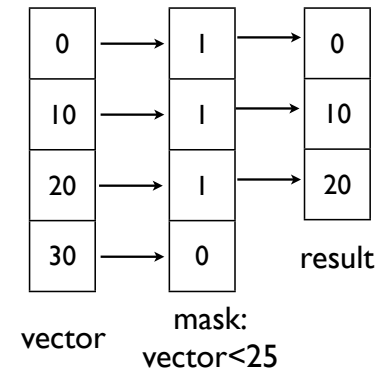
Boolean operators as masks

Another term for an index from a comparison is a mask, because the boolean array masks all of the elements of vector that fail the condition.

```
>> vector = [0, 10, 20, 30];
>> vector (vector < 25)
[0 10 20]
```

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Boolean and the *if-then* construct

The *if-then* construct exists in all programming languages. It tests a condition, and then has a specified action to carry out if the condition is true.

```
>> if 10>0
disp('yes!')
end
yes
```

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Boolean and the *find* function

The *find* function identifies indices of a vector or matrix which satisfy a condition (a Boolean)

```
>> vector = [0, 10, 20, 30];
>> find(vector>15)
3 4
```

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Boolean and the *find* function

You have two vectors, one with SST and one with the latitudes of those measurements.

```
>> sst1 = [14 21.2 17.3 22.1]
lat1=[54 35 44 30];
```

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Boolean and the *find* function

Then you wanted to find the SST value at latitude 44.

```
>> sst1 = [14 21.2 17.3 22.1]
lat1=[54 35 44 30];

>> find(lat1==44)
3

>>sst1( find(lat1==44))
17.3
```

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Review

- Booleans are tests or conditions. They evaluate to true (1) or false (0).
- Two examples of how Booleans are useful is with the *if-then* construct, or the *find* function.

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