

# Repeating commands smarter

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# Logical Expression

- Equations or terms that are either true or false
- Used frequently in loops or conditional statements
- Typically used to compare two things

$x < y$

$x \leq y$

$x == y$

$x \geq y$

$x > y$

$x \neq y$

- Be careful with numerical precision  $4.99999 == 5.000001?$
- Sometimes better to use - `np.absolute(x - y) < 1e-6`

# Logical Expression

- We also have other logical comparisons 0 and, or, not
- Try some of the following in the terminal

True and False

False and True

(5 < 6) and (6 < 8)

# Conditional Statements

- Allows for your code to branch
- Uses `if` and `else` statements

```
if logical_expression:  
    do something  
elif logical_expression:  
    do something else  
else:  
    do the rest
```

# Loops

- There are two basic kinds of loops, **for** and **while**
- **for** loops: let us repeat statements a fixed number of times

```
array = np.arange(0, 100, 1)
for val in array:
    print(val)
```

- Can loop over any **iterable** item - lists, arrays, etc.

# While loop

- Loop until a condition is no longer true

```
x = 0
while x < 10:
    print(x)
    x = x + 1
```

- Be careful about the logic - you can create infinite loops