

Conditional Execution

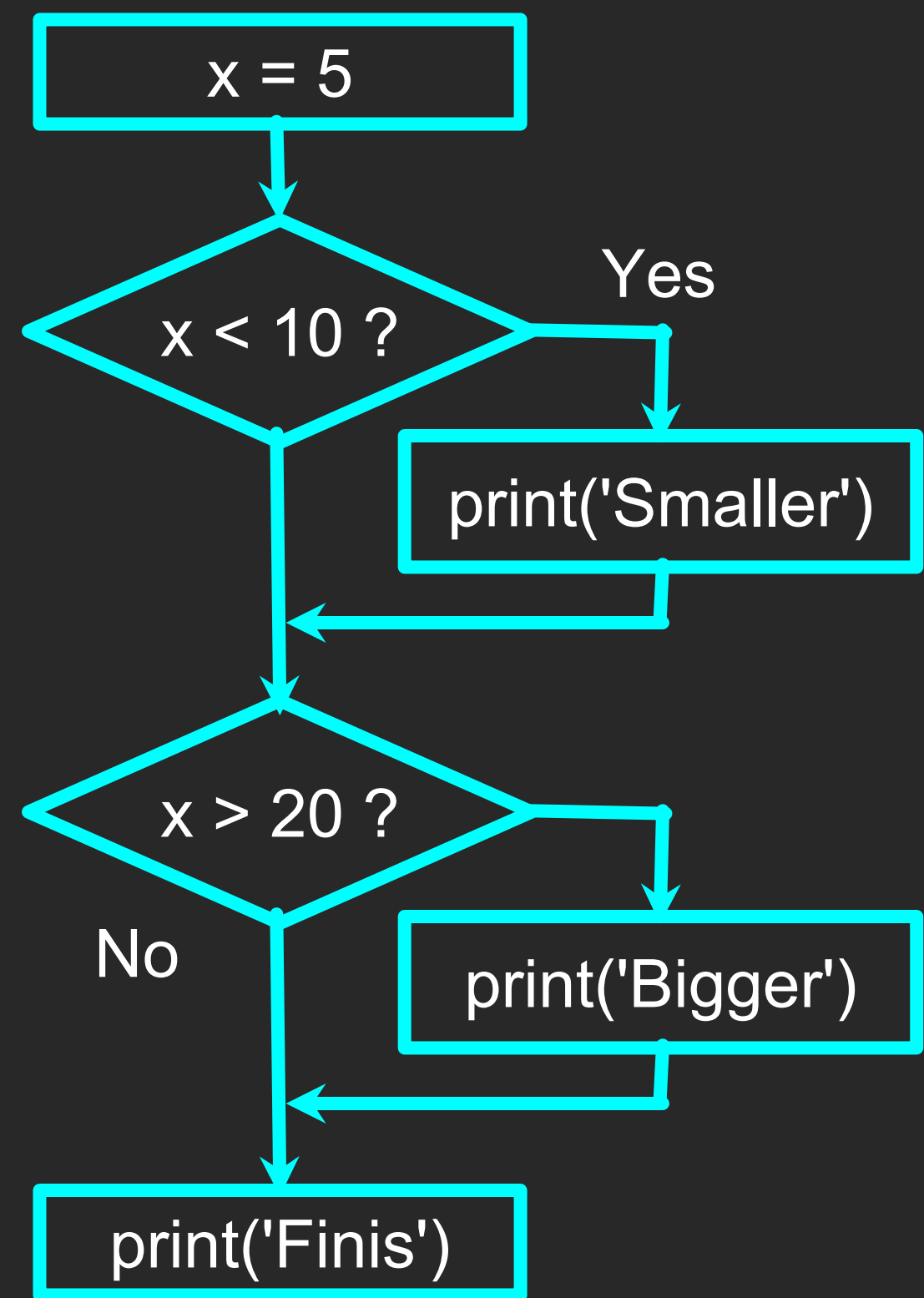
Chapter 3



Python for Everybody
www.py4e.com



Conditional Steps



Program	Output
<code>x = 5</code>	
<code>if x < 10:</code> <code>print('Smaller')</code>	Smaller
<code>if x > 20:</code> <code>print('Bigger')</code>	
<code>print('Finis')</code>	Finis

Comparison Operators

- **Boolean expressions** ask a question and produce a Yes or No result which we use to control program flow
- **Boolean expressions** using **comparison operators** evaluate to True / False or Yes / No
- Comparison operators look at variables but do not change the variables

Python	Meaning
<	Less than
<=	Less than or Equal to
==	Equal to
>=	Greater than or Equal to
>	Greater than
!=	Not equal

Remember: “=” is used for assignment.

http://en.wikipedia.org/wiki/George_Boole

Comparison Operators

```
x = 5
```

```
if x == 5 :
```

```
    print('Equals 5')
```

Equals 5

```
if x > 4 :
```

```
    print('Greater than 4')
```

Greater than 4

```
if x >= 5 :
```

```
    print('Greater than or Equals 5')
```

Greater than or Equals 5

```
if x < 6 : print('Less than 6')
```

Less than 6

```
if x <= 5 :
```

```
    print('Less than or Equals 5')
```

Less than or Equals 5

```
if x != 6 :
```

```
    print('Not equal 6')
```

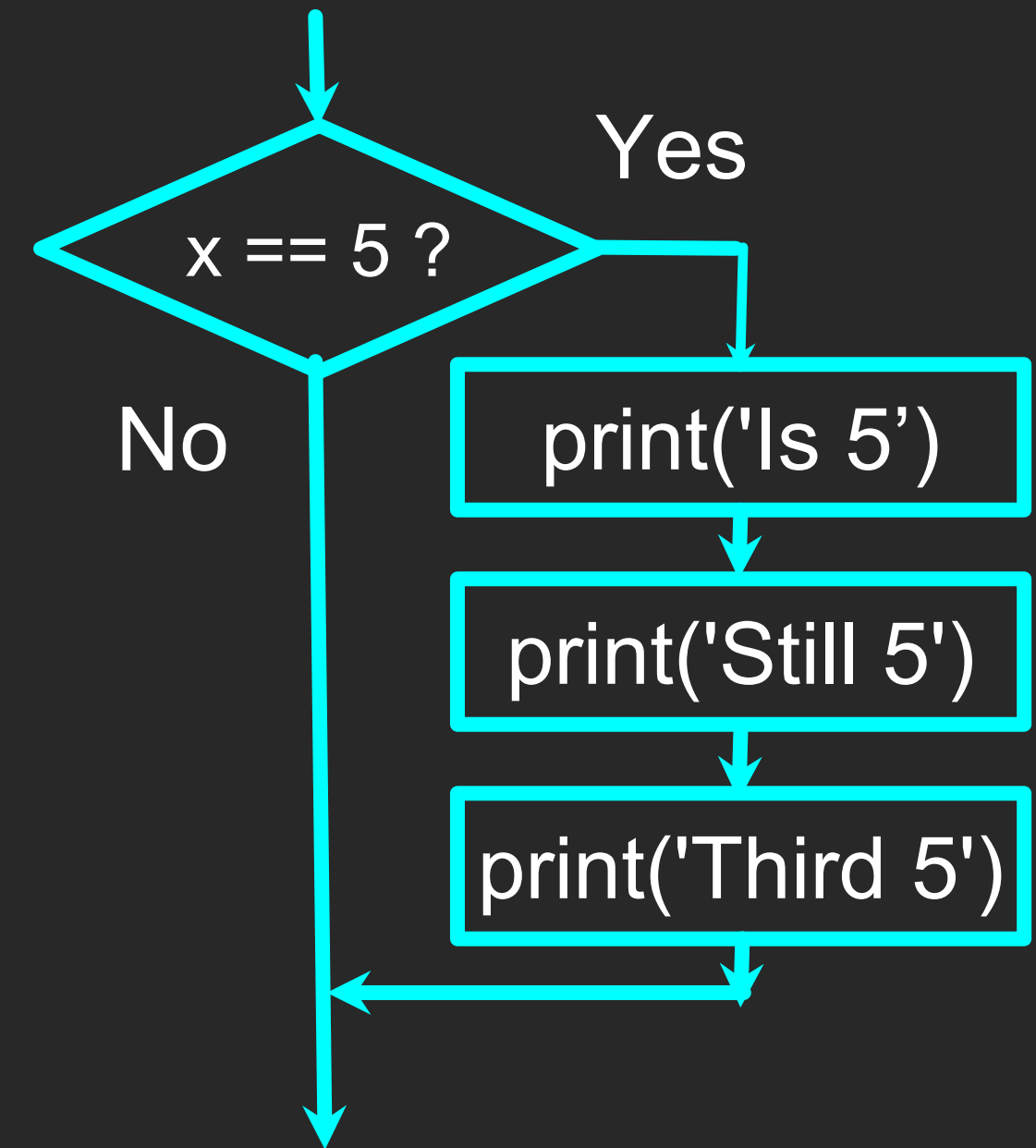
Not equal 6

One-Way Decisions

```
x = 5
print('Before 5')
if x == 5 :
    print('Is 5')
    print('Is Still 5')
    print('Third 5')
print('Afterwards 5')
print('Before 6')
if x == 6 :
    print('Is 6')
    print('Is Still 6')
    print('Third 6')
print('Afterwards 6')
```

Before 5
Is 5
Is Still 5
Third 5
Afterwards 5
Before 6
Afterwards 6

Arrows indicate the flow of execution: a blue arrow points from the first `print('Is Still 5')` to the corresponding output, and a green arrow points from the first `print('Is 6')` to the corresponding output.



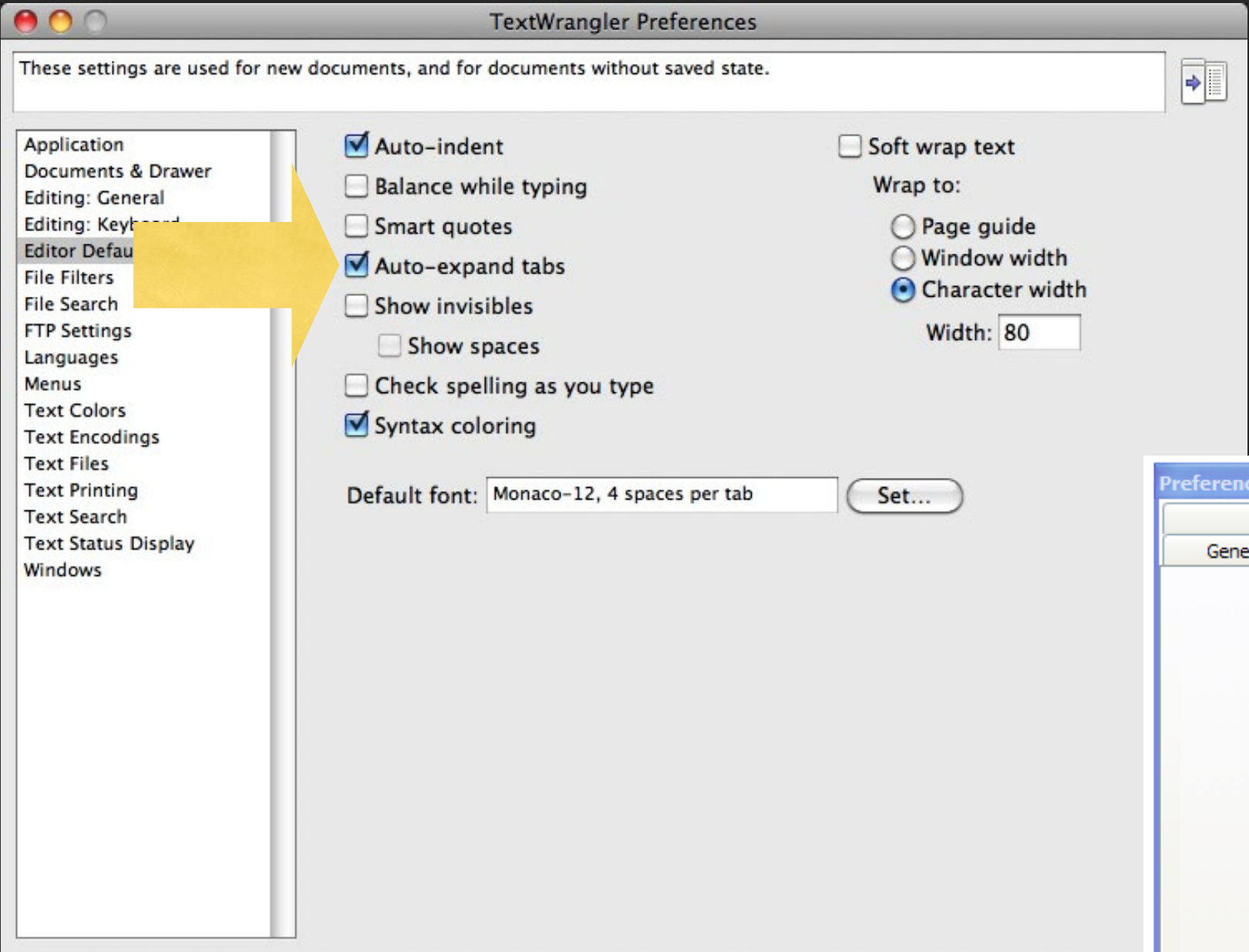
Indentation

- **Increase indent** indent after an **if** statement or **for** statement (after :)
- **Maintain indent** to indicate the **scope** of the block (which lines are affected by the **if/for**)
- **Reduce indent** back to the level of the **if** statement or **for** statement to indicate the end of the block
- **Blank lines** are ignored - they do not affect **indentation**
- **Comments** on a line by themselves are ignored with regard to **indentation**

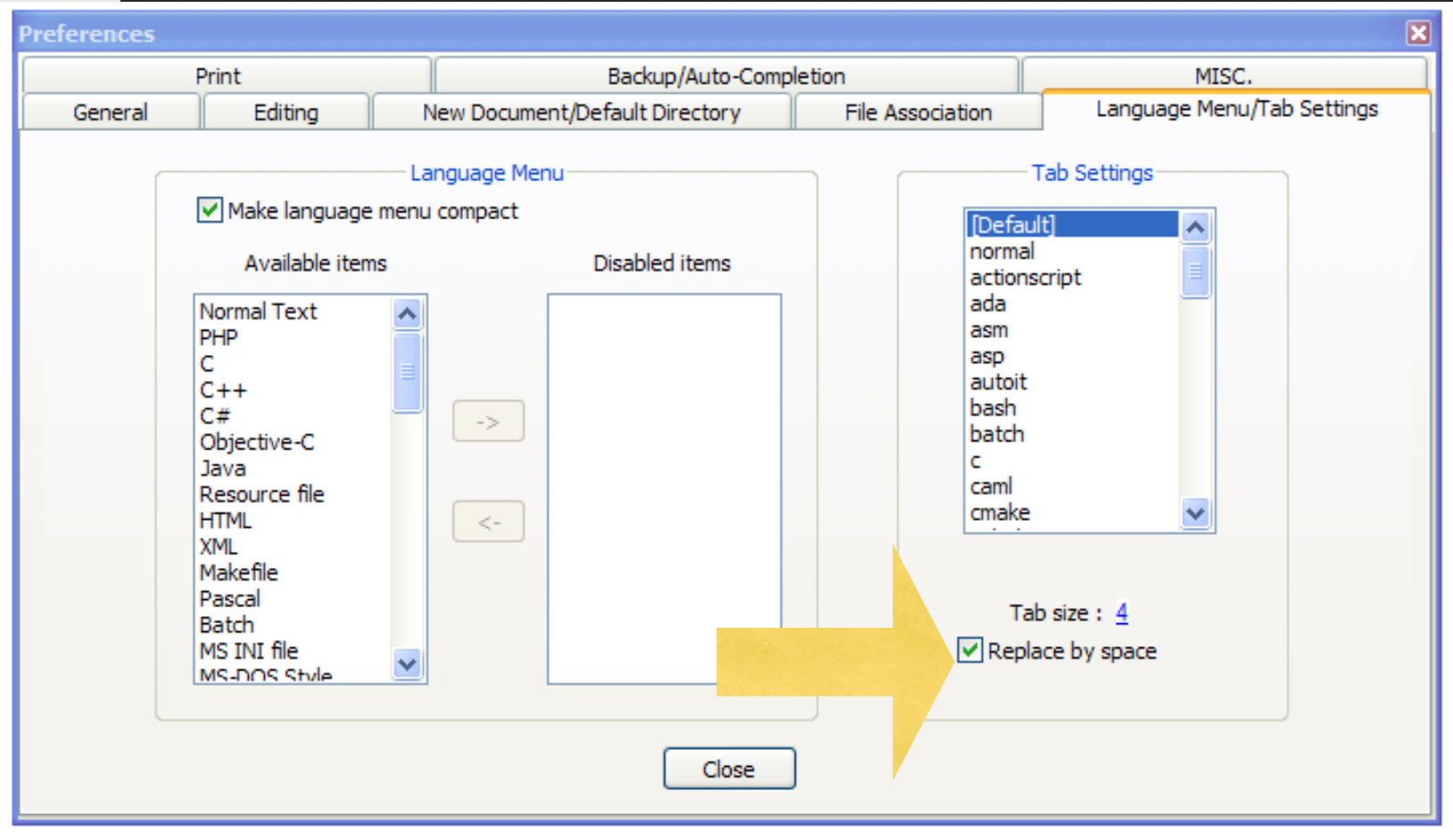
Warning: Turn Off Tabs!!

Atom automatically uses spaces for files with ".py" extension (nice!)

- Most text editors can turn **tabs** into **spaces** - make sure to enable this feature
- Python cares a *lot* about how far a line is indented. If you mix **tabs** and **spaces**, you may get “**indentation errors**” even if everything looks fine



This will save you much unnecessary pain.



→ increase / maintain after if or for
← decrease to indicate end of block

→

←

→

→
←
←

```
x = 5
if x > 2 :
    print('Bigger than 2')
    print('Still bigger')
print('Done with 2')

for i in range(5) :
    print(i)
    if i > 2 :
        print('Bigger than 2')
    print('Done with i', i)
print('All Done')
```

Think about begin/end blocks

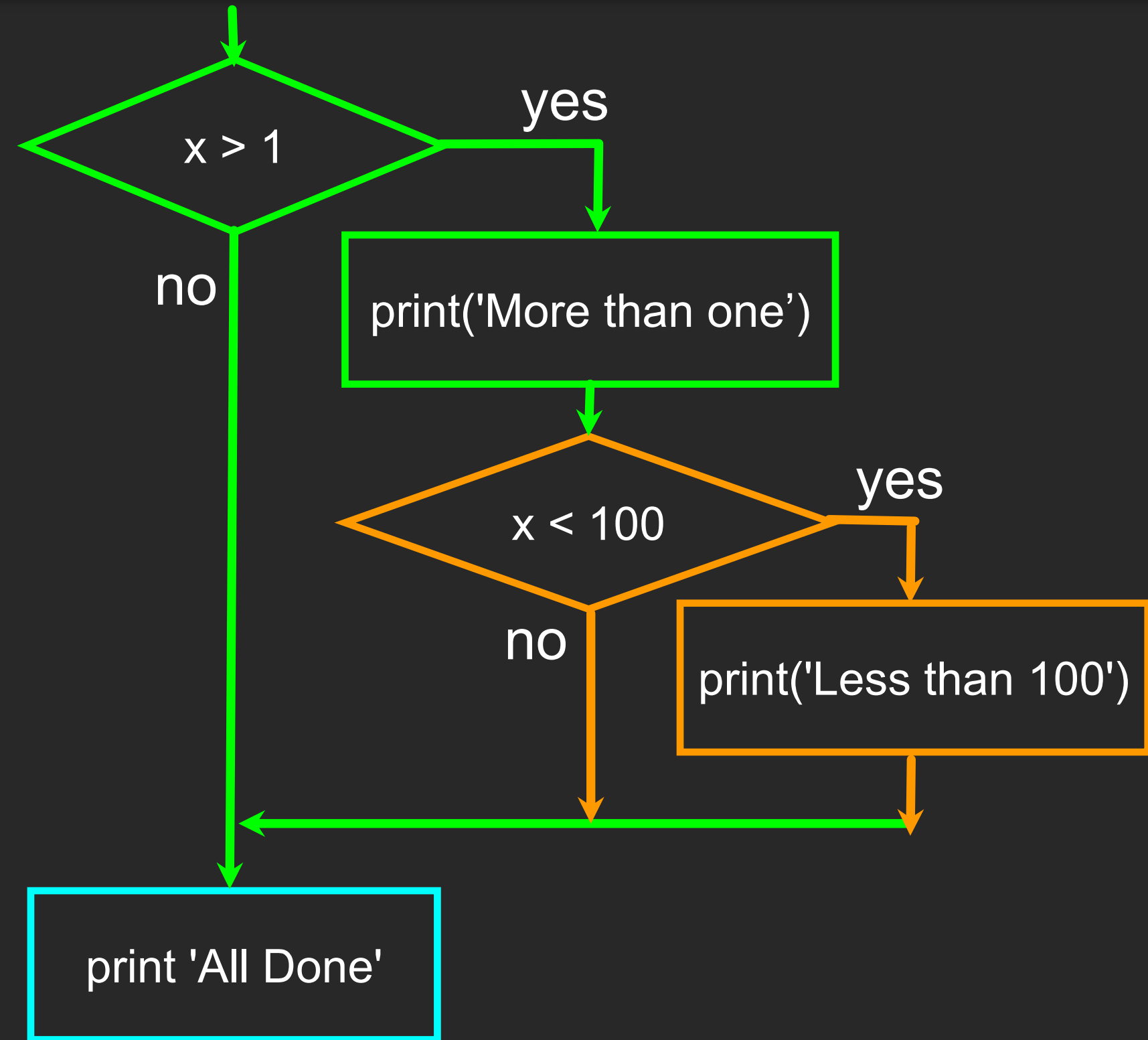
```
x = 5
```

```
if x > 2 :  
    print('Bigger than 2')  
    print('Still bigger')  
print('Done with 2')
```

```
for i in range(5) :  
    print(i)  
    if i > 2 :  
        print('Bigger than 2')  
    print('Done with i', i)  
print('All Done')
```

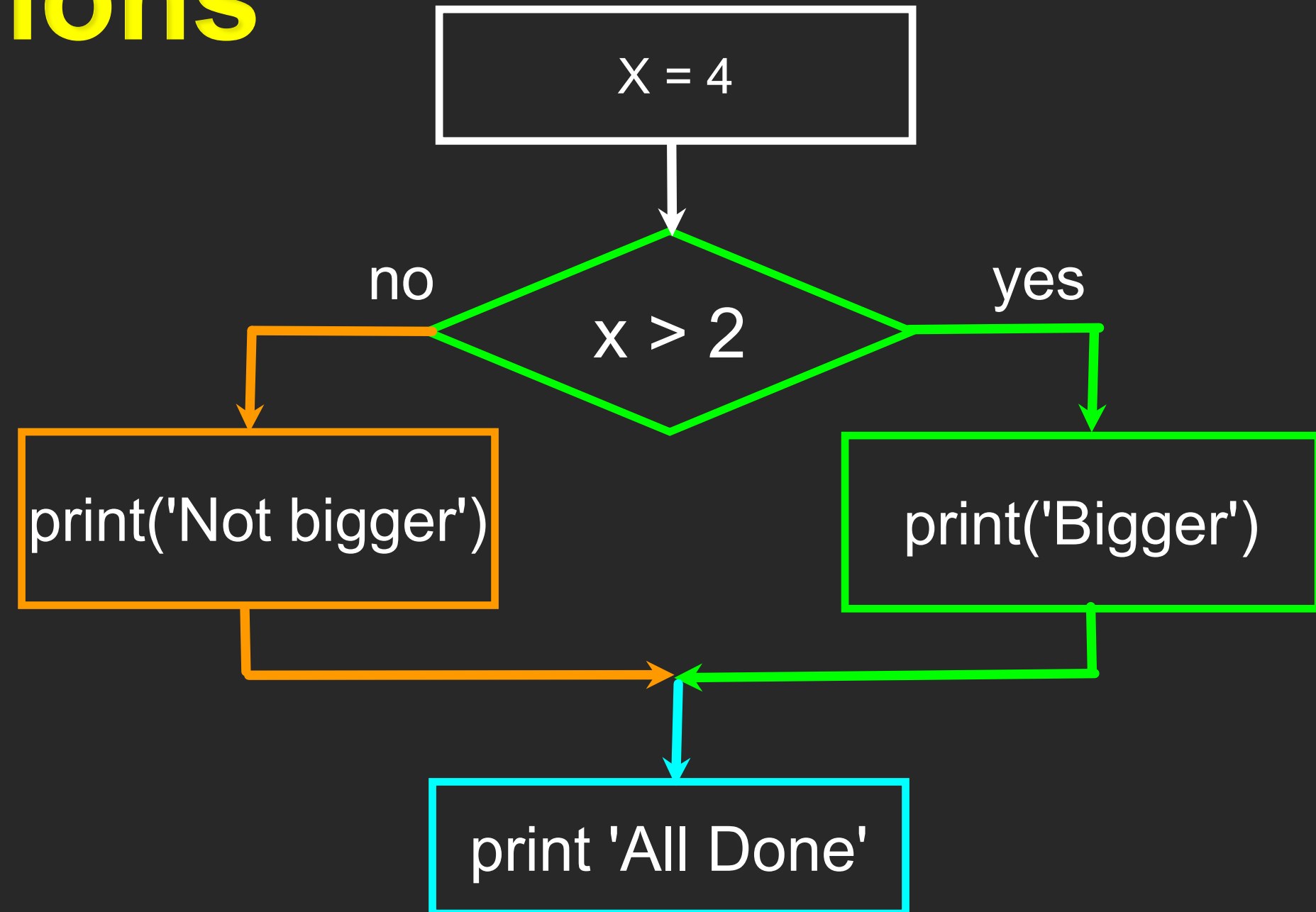
Nested Decisions

```
x = 42
if x > 1 :
    print('More than one')
    if x < 100 :
        print('Less than 100')
print('All done')
```



Two-way Decisions

- Sometimes we want to do one thing if a logical expression is true and something else if the expression is false
- It is like a fork in the road - we must choose **one or the other** path but not both

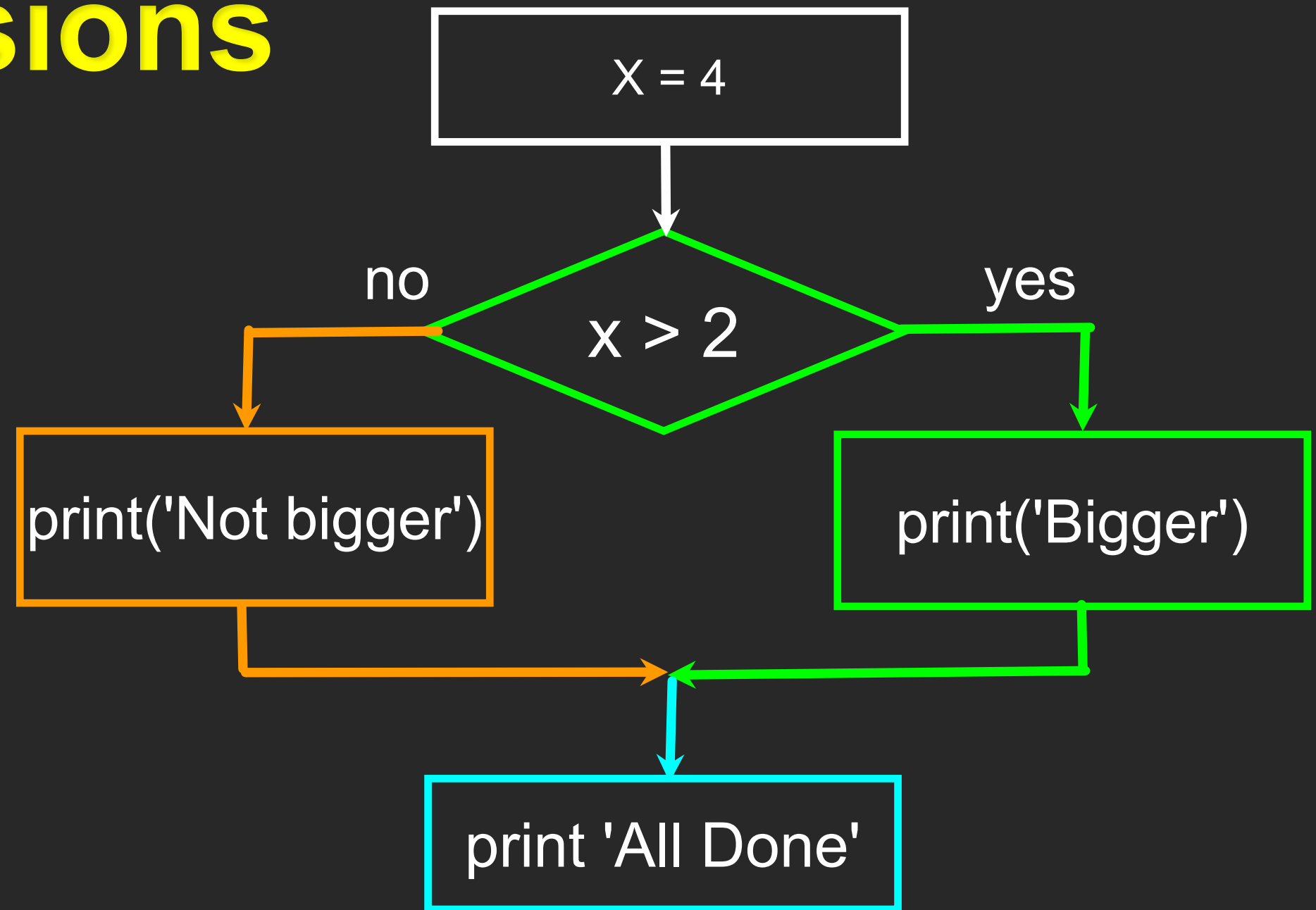


Two-way Decisions with else:

```
x = 4
```

```
if x > 2 :  
    print('Bigger')  
else :  
    print('Smaller')
```

```
print 'All done'
```



More Conditional Execution Patterns