

A decorative graphic on the left side of the slide, consisting of a network of white lines and small circles on a dark blue background, resembling a circuit board or a neural network.

COMPUTER SCIENCE 1

BOOLEAN AND IF STATEMENTS IN PYTHON

BOOLEAN VALUES

- In Python the values True and False are special types called bool – short for boolean named after mathematician George Boole

```
boolex.py ×  
1 a = True  
2 b = False  
3 print(type(a))
```

Output:

```
>>> %Run boolex.py  
<class 'bool'>
```

BOOLEAN OPERATORS

- Not – changes True to False and vice-versa
- And – evaluates to True if both operands are True
- Or – evaluates to True if either operands are True

```
1 a = True
2 b = False
3 print(not a)
4 print(not b)
5 print(a and b)
6 print(a or b)
```

Output:

```
False
True
False
True
```

RELATIONAL EXPRESSIONS

- Relational Expressions evaluate to bool values True and False

```
1 x = 5
2 y = 8
3 z = 5
4 print(x < y) # x less than y
5 print(x > y) # x greater than y
6 print(x == y) # x equal to y
7 print(x <= z) # x less than or equal to z
8 print(y >= z) # y greater than or equal to z
9 print(x != z) # x not equal to z
```

Output:

```
True
False
False
True
True
False
```

RELATIONAL EXPRESSIONS

- We can combine relational operators with boolean operators

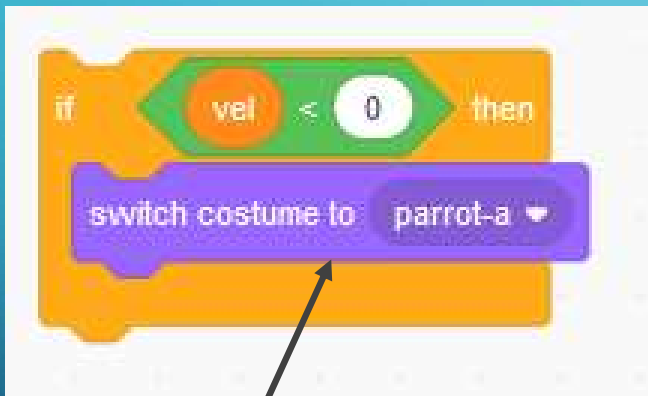
```
1 x = 5
2 y = 8
3 z = 5
4 print(x < y and x == z)
5 print(x > y or y > z)
6 print(not x == z)
7 print(not x == y and y < 20) # not before and
```

Output:

```
True
True
False
True
```

IF STATEMENTS

SCRATCH



Code to run if $vel < 0$ is inside the orange block.

PYTHON

```
if vel < 0:  
    set_costume('parrot_a')
```

Code to run is indented 4 spaces.

IF STATEMENTS SYNTAX

```
1 x = 5
2 y = 8
3 z = 5
4
5 if x < y and x == z:
6     print('I am in the if block')
7     print('as am I!')
8 print('I am not in the if block')
9
10 if x > y or x != z:
11     print('inside')
12 print('outside')
```

Thonny will automatically indent after the :

When done putting code in the if block, use shift-tab to dedent back

Output:

```
I am in the if block
as am I!
I am not in the if block
outside
```


IF — ELSE STATEMENTS

SCRATCH



PYTHON

```
if key == SPACE:  
    cat.y -= 5  
else:  
    cat.y += 5
```


IF-ELSE SYNTAX

```
1 x = 4
2 y = 10
3
4 if x < y:
5     x += y
6 else:
7     x -= y
8
9 print(x)
```

Output:

14

IF — ELIF - ELSE STATEMENTS

SCRATCH

(These statements are not easily done in Scratch)



PYTHON

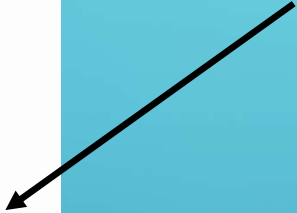
```
if key == UP:  
    cat.y -= 5  
elif key == DOWN:  
    cat.y += 5  
else:  
    cat.y = 0
```

elif means
“else if”


IF-ELIF-ELSE SYNTAX

```
1 score = 75
2
3 if score < 70:
4     print('F')
5 elif score < 80:
6     print('C')
7 elif score < 90:
8     print('B')
9 else:
10    print('A')
```

score is less than 80 so
print C



Because a previous “branch” was
executed, even though score is less
than 90, this block will not run!



Output:

C