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CHAPTER 3

Operators & Conditional Statement

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AGENDA

- Overview
- Operators
- Conditional Operators
- Short Circuit Evaluations
- Dual Nature =
- Conditional Statements - if

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Overview

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Operators, Conditions, Conditional Statements

- **Conditional Statements**: A piece of code that would divert to different actions based on different conditions
- **Conditions**: to represent a criteria in code, evaluate as a boolean
- **Operators**: to operate on variables (e.g. + - * /)

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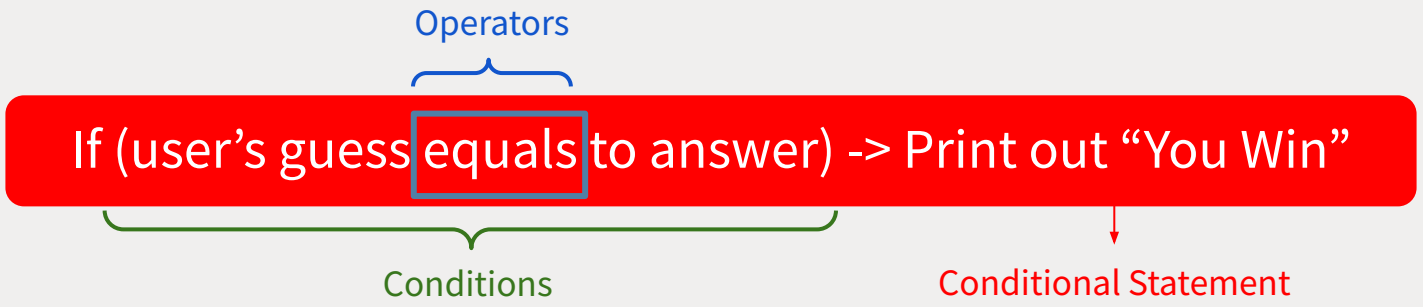
Operators, Conditions, Conditional Statements



Now your turn, which one is operators, condition and conditional statement?:

If (user's guess is not equal to answer) -> Print out "Try Again"

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Operators

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What are Operators?

- Basically + - * /
- But there are some non-mathematical operators as well
- Quick shortcut for you to manipulate variables

What Operators are Available?

Operator	Description
+	Addition
-	Subtraction
*	Multiplication
**	Exponentiation (e.g. 2**4 => 2^4)
/	Division
%	Modulus (Remainder from Division)

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Modulus %

- modulus (the remainder of division)
- 21/5 = 4...1
- 21%5 = 1

```
1  a = 21 % 5
2  print(a)
```


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Variations of Assignment Operators

Operator	Same as
=	x = y
x += y	x = x + y
-=	x = x - y
*=	x = x * y
/=	x = x / y
%=	x = x % y

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Conditional Operators

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Conditional Operators

- Easy, but super important
- Basically it means comparisons, and return the boolean result (either True or False)

Conditional Operators

Operator	Same as
==	equal to
!=	*not equal*
>	greater than
<	less than
>=	greater than or equal to
<=	less than or equal to
is	equal to for Boolean

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How to Use Conditional Operators?

```
1  # Sample Condition
2  a = 10
3  b = 20
4
5  c = a == b        # c = False
6  d = b >1          # d = True
```

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AND

a and b is True only if **both a and b are True**

a	b	Result
True	True	True
True	False	False
False	True	False
False	False	False

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OR

`a or b` is False only if **both a and b are False**

a	b	Result
True	True	True
True	False	True
False	True	True
False	False	False

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NOT

Returns the opposite value

a	Result
True	False
False	True

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How to Use Conditional Operators?

```
1   # Complex Condition
2   a = 10
3   b = 20
4   c = 30
5
6   d = (a > b and c > b)    # d = False
7   e = (a > b or c > b)     # e = True
8   f = not e                # f = False
```

a	b	a and b
True	True	True
True	False	False
False	True	False
False	False	False

a	b	a or b
True	True	True
True	False	True
False	True	True
False	False	False

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Short-circuit Evaluation

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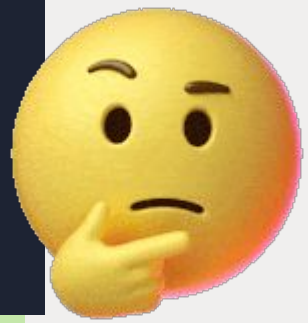
Logical Operators != True/False

Give a guess on the results of the following statements:

```
1   a = True and "dog"
2   b = False and "dog"
3   c = "cat" and "dog"
4
5   d = True or "dog"
6   e = False or "dog"
7   f = "cat" or "dog"
```



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Short-circuit Evaluation

For “and”:

if the first part is **False**, then the second part will not be evaluated

For “or”:

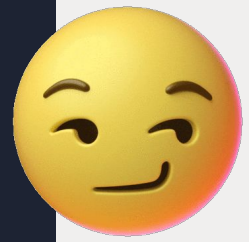
if the first part is **True**, then the second part will not be evaluated

Note: **`False`**, **`0, 0.0, None`** are considered as False, other values are all considered as True

Logical Operators != True/False

Give a guess on the results of the following statements:

```
1   # For &&: if the first part is False,
2   # Then the second part will not be evaluated
3   a = True and "dog"      # "dog"
4   b = False and "dog"     # False
5   c = "cat" and "dog"     # "dog"
6
7   # For or: if the first part is True,
8   # then the second part will not be evaluated
9   d = True or "dog"       # True
10  e = False or "dog"      # "dog"
11  f = "cat" or "dog"      # "cat"
```



Dual Nature of “=”

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Very Very Important

Dual Nature of “=”

Assignment

```
1  a = 12
2  b = 5
3  a = b
4  b = 10
```

// what are the values of a and b?

Equals to

```
1  a = 5
2  if a == 5:
3      print('hi')
```

// What is the value of a?

Very Very Important

Dual Nature of “=”

=

means **assigning** the right hand side value to left hand side variable

==

means **comparison**, check if the left hand side is equals to right hand side

Conditional Statement - IF

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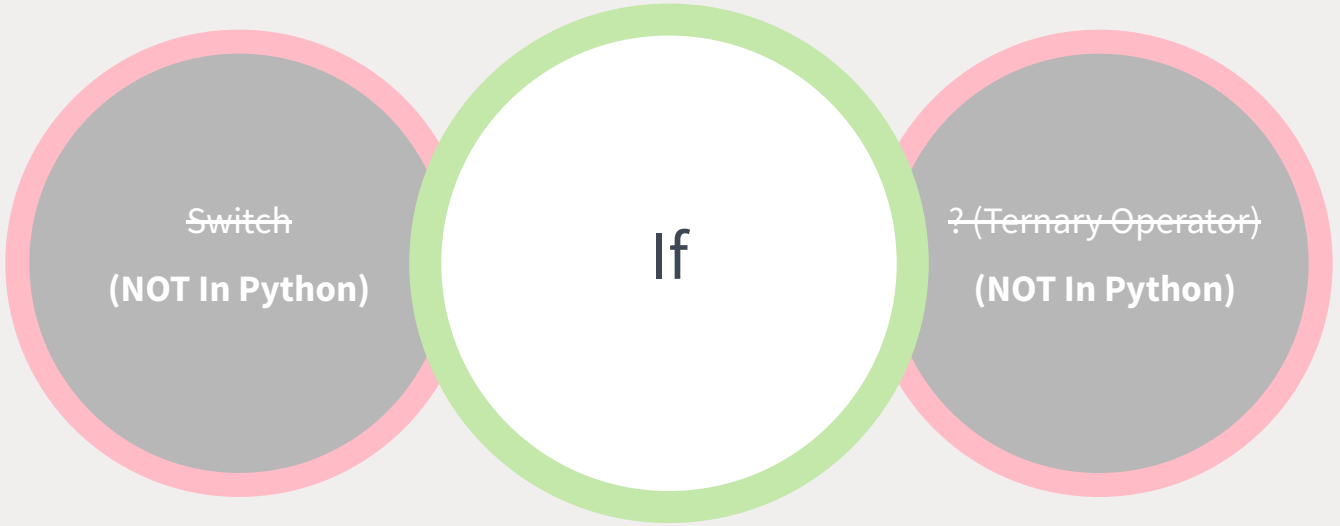
Finally, Conditional Statements

There are **only 1 type** of Conditional Statements



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Conditional Statements - IF

```
1  #if complete example
2
3  if a==10:
4      #do something
5  elif a==5:
6      #do something
7  else:
8      #do something else
```