Conditional statements and operators

INTRODUCTION TO PYTHON FOR DEVELOPERS

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Booleans

```
# Boolean variable
the_truth = True
print(the_truth)
```

```
True
```

- Used to make comparisons

Operators

- Comparison operators
  - Symbols or combinations of symbols
  - Used to compare things
  - Similar to symbols for calculations such as `*`, `+`, `-` etc.
- Check if two things are equal
  - `==`

Checking for equality

```
# Compare if 2 is equal to 3
2 == 3
```

```
False
```

```
# Check that 2 is not equal to 3
2 != 3
```

```
True
```

- Common use-case: checking login details

Numeric comparison operators

```
# Is 5 less than 7?
5 < 7
```

```
True
```

```
# Is 5 greater than 7?
5 > 7
```

```
False
```

```
# Is 5 less than or equal to 7?
5 <= 7
```

```
True
```

```
# Is 5 greater or equal to 7?
5 >= 7
```

```
False
```

Other comparisons

```
# Is James greater than Brian
"James" > "Brian"
```

```
True
```

- Strings are evaluated in alphabetical order

Conditional statements

- If `True` perform a task
  - otherwise, do nothing
- `if` > condition is met > perform action

```
# Target units sold and actual units sold
sales_target = 350
units_sold = 355

# Compare sales
if units_sold >= sales_target
```

Conditional statements

```
# Target units sold and actual units sold
sales_target = 350
units_sold = 355

# Compare sales
if units_sold >= sales_target:
```

Conditional statements

```
# Target units sold and actual units sold
sales_target = 350
units_sold = 355

# Compare sales
if units_sold >= sales_target:
    print("Target achieved")
```

```
'Target achieved'
```

Indentation

```
# Target units sold and actual units sold
sales_target = 350
units_sold = 355

# Compare sales
if units_sold >= sales_target:
print("Target achieved") # This line is not indented
```

```
    print("Target achieved")
    ^
IndentationError: expected an indented block
```

Elif statement

```
# Target units sold and actual units sold
sales_target = 350
units_sold = 325
# Compare sales
if units_sold >= sales_target:
    print("Target achieved")
# Check if we were close to the target
elif units_sold >= 320:
    print("Target almost achieved")
```

- Can use as many `elif` keywords as we like!

Else statement

```
# Compare sales
if units_sold >= sales_target:
    print("Target achieved")
# Check if we were close to the target
elif units_sold >= 320:
    print("Target almost achieved")
# Otherwise...
else:
    print("Target not achieved")
```

Comparison operators cheat sheet

Operator	Function
`==`	Equal to
`!=`	Not equal to
`>`	More than
`>=`	More than or equal to
`<`	Less than
`<=`	Less than or equal to

Keyword	Function	Use
`if`	If condition is met	First in the workflow
`elif`	Else check if condition is met	After `if`
`else`	Else perform this action	After `elif`

Let's practice!

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For loops

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Individual comparisons

```
# Prices list
prices = [9.99, 8.99, 35.25, 1.50, 5.75]
prices[0] > 10
```

```
False
```

```
prices[0] < 5
```

```
False
```

```
prices[0] >= 5 and prices[0] <= 10
```

```
True
```

For loop syntax

```
for value in sequence:
    action
```

- `for` each `value` in `sequence`, perform `action`
  - `action` is indented because of the colon in the previous line
- `sequence` = iterable e.g., list, dictionary, etc
- `value` = iterator, i.e., the index
  - Placeholder (can give it any name), `i` is common.

Print individual values

```
# Prices list
prices = [9.99, 8.99, 35.25, 1.50, 5.75]

# Print each value in prices
for price in prices:
    print(price)
```

```
9.99
8.99
35.25
1.5
5.75
```

Conditional statements in for loops

```
for price in prices:
```

Conditional statements in for loops

```
for price in prices:
    # Check if the price is more than 10
    if price > 10:
```

Conditional statements in for loops

```
for price in prices:
    # Check if the price is more than 10
    if price > 10:
        print("More than $10")
```

Conditional statements in for loops

```
for price in prices:
    # Check if the price is more than 10
    if price > 10:
        print("More than $10")
    # Check if the price is less than 5
    elif price < 5:
        print("Less than $5")
```

Conditional statements in for loops

```
for price in prices:
    # Check if the price is more than 10
    if price > 10:
        print("More than $10")
    # Check if the price is less than 5
    elif price < 5:
        print("Less than $5")
    # Otherwise print the price
    else:
        print(price)
```

Conditional statements in for loops

```
9.99
8.99
More than $10
Less than $5
5.75
```

Looping through strings

```
username = "george_dc"
# Loop through username and print each character
for char in username:
    print(char)
```

```
g
e
o
r
g
e
_
d
c
```

Looping through dictionaries

```
products_dict = {"AG32":87.99, "HT91":21.50,
                 "PL65":43.75, "OS31":19.99,
                 "KB07":62.95, "TR48":98.0}

# Loop through keys and values
for key, val in products_dict.items():
    print(key, val)
```

```
AG32 87.99
HT91 21.5
PL65 43.75
OS31 19.99
KB07 62.95
TR48 98.0
```

Looping through dictionaries

```
# Loop through keys
for key in products_dict.keys():
    print(key)
```

```
AG32
HT91
PL65
OS31
KB07
TR48
```

```
# Loop through values
for val in products_dict.values():
    print(val)
```

```
87.99
21.5
43.75
19.99
62.95
98.0
```

Range

- Can use `for` loops to update variables

```
range(start, end + 1)
```

- `start` = inclusive
- `end` = not inclusive

```
for i in range(1, 6):
    print(i)
```

```
1
2
3
4
5
```

Building a counter

```
# No visits yet
visits = 0
# Loop through numbers 1-10
for i in range(1, 11):
    # Add one to visits during each iteration
    visits += 1 # Same as visits = visits + 1

print(visits)
```

```
10
```

Let's practice!

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While loops

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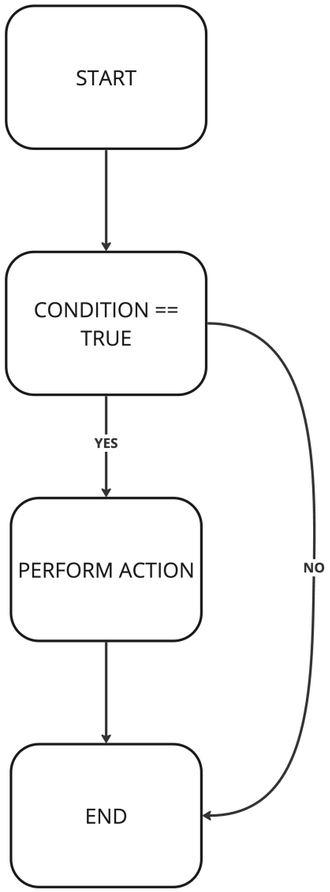
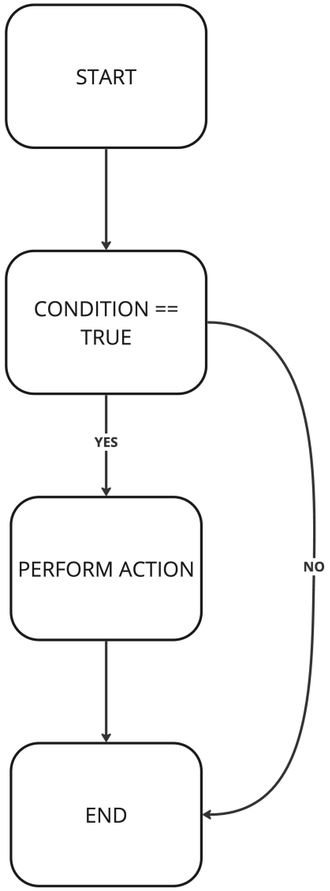
If statement

If statement

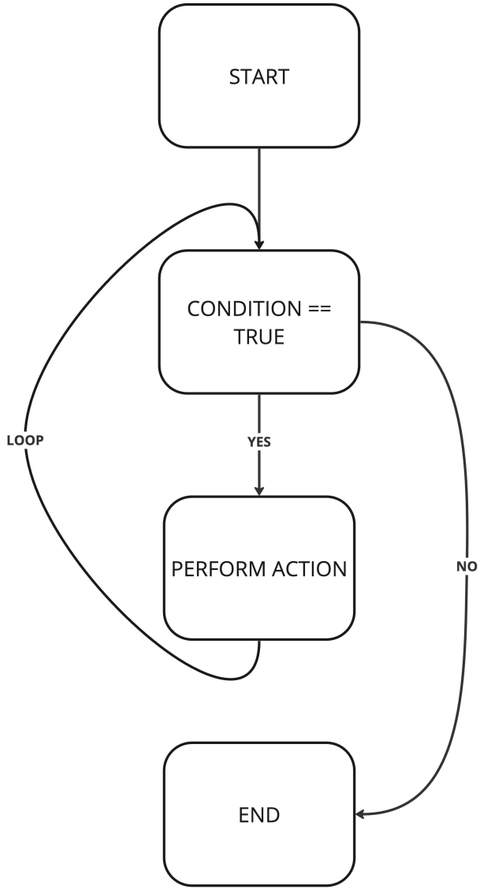


If statement versus while loop

If statement



While loop



While loop

```
while condition:
    action
```

- Any continuous task
  - Accelerate `while` a button is pressed
  - Monitor `while` below/above a threshold

[1] https://unsplash.com/@joaoscferrao

While loop

```
# Stock limit
stock = 10

# Number of purchases
num_purchases = 0

# While num_purchases < stock limit
while num_purchases < stock:
    # Increment num_purchases
    num_purchases += 1
    # Print remaining stock
    print(stock - num_purchases)
```

Output

```
9
8
7
6
5
4
3
2
1
0
```

A word of caution

- `while` runs continually while the condition is met

```
# Stock limit
stock = 10
# Number of purchases
num_purchases = 0

# While num_purchases < threshold
while num_purchases < stock:

    # Print remaining stock
    print(stock - num_purchases)
```

Running forever

```
10
10
10
10
10
10
10
10
10
10
10
10
10
10
```

Breaking a loop

```
# While num_purchases < threshold
while num_purchases < stock:

    # Print remaining stock
    print(stock - num_purchases)

    # Terminate the loop
    break
```

- `break` can also be used in `for` loops
- If the code is already running: Control + C / Command + C

Conditional statements within while loops

```
# While num_purchases < threshold
while num_purchases < stock:
    # Increment num_purchases
    num_purchases += 1
    # Conditional statement inside the loop
    if stock - num_purchases > 7:
        print("Plenty of stock remaining")
    elif stock - num_purchases > 3:
        print("Some stock remaining")
    elif stock - num_purchases != 0:
        print("Low stock!")
    else:
        print("No stock!")
```

Conditional statements output

```
Plenty of stock remaining
Plenty of stock remaining
Some stock remaining
Some stock remaining
Some stock remaining
Some stock remaining
Low stock!
Low stock!
Low stock!
No stock!
```

Let's practice!

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Building a workflow

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Complex workflows

- Loops through data structures
  - `for`, `while`
- Evaluate multiple conditions
  - `if`, `elif`, `else`, `>`, `>=`, `<`, `<=`, `==`, `!=`
- Update variables
  - `+=`
- Return outputs
  - `print()`

The "in" keyword

- `in` = check if a value is **in** a variable/data structure

```
products_dict = {"AG32": 10, "HT91": 20,
                 "PL65": 30, "OS31": 15,
                 "KB07": 25, "TR48": 35}

# Check if "OS31" is a key in products_dict
if "OS31" in products_dict.keys():
    print(True)
else:
    print(False)
```

```
True
```

The "not" keyword

- `not` = check if a condition **is not** met

```
# Check if "OS31" is not a key in products_dict
if "OS31" not in products_dict.keys():
    print(False)
else:
    print(True)
```

```
True
```

The "and" keyword

- `and` = check if **multiple conditions** are met

```
# Check if "HT91" is a key and the minimum price of all products is > 5
if "HT91" in products_dict.keys() and min(products_dict.values()) > 5:
    print(True)
else:
    print(False)
```

```
True
```

The "or" keyword

- `or` = check if one (**or more**) condition is met

```
# Check if "HT91" is a key or that the minimum price of all products is < 5
if "HT91" in products_dict.keys() or min(products_dict.values()) < 5:
    print(True)
else:
    print(False)
```

```
True
```

Adding/subtracting from variables

- Combine keywords with other techniques to build complex workflows

```
sales_count = 0
for sale in range(1, 10):
    # sales_count = sales_count + 1
    sales_count += 1
stock = 10
for sale in range(1, 10):
    # sales_count = sales_count - 1
    stock -= 1
```

- Other ways to update variables

Appending

- Store information that meets specific criteria in a list

```
# Create an empty list
expensive_products = []

# Loop through the dictionary
for key, val in products_dict.items():

    # Check if price is 20 dollars or more
    if val >= 20:

        # Append the product ID to the list
        expensive_products.append(key)
```

Appending

```
print(expensive_products)
```

```
['HT91', 'PL65', 'KB07', 'TR48']
```

Let's practice!

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Congratulations!

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Chapter 1 recap

Syntax	Action	Example	Output
`*`	Multiply	`4 * 10`	`40`
`+`	Addition	`7 + 9`	`16`
`-`	Subtract	`23 - 4`	`19`
`/`	Division	`27 / 3`	`9`
`**`	Power	`3 ** 2`	`9`
`%`	Modulo	`7 % 4`	`3`

```
# Define total_spend
total_spend = 3150.96

# Single quotes
customer_name = 'George Boorman'

# Double quotes also work
customer_name = "George Boorman"
```

Chapter 2 recap

```
current_top_album = "For All The Dogs"

# Convert to lowercase
current_top_album = current_top_album.lower()
```

```
# List of prices
prices = [10, 20, 30, 15, 25, 35]
# Get the value at the first index
prices[0]
```

```
# Creating a dictionary
products_dict = {"AG32": 10, "HT91": 20,
                 "PL65": 30, "OS31": 15,
                 "KB07": 25, "TR48": 35}
```

```
# Create a prices set
prices_set = {10, 20, 30,
              15, 25, 35}
# Create a prices tuple
prices_tuple = (10, 20, 30,
                15, 25, 35)
```

Chapter 3 recap

Operator	Function
`==`	Equal to
`!=`	Not equal to
`>`	More than
`>=`	More than or equal to
`<`	Less than
`<=`	Less than or equal to

Keyword	Function	Use
`if`	If condition is met	First in the workflow
`elif`	Else check if condition is met	After `if`
`else`	Else perform this action	After `elif`

Chapter 3 recap

```
# Prices list
prices = [9.99, 8.99, 35.25, 1.50, 5.75]

# Print each value in prices
for price in prices:
    print(price)
```

```
9.99
8.99
35.25
1.5
5.75
```

Chapter 3 recap

```
# Stock limit
stock = 10
# Number of purchases
num_purchases = 0

# While num_purchases < stock limit
while num_purchases < stock:
    # Increment num_purchases
    num_purchases += 1
    # Print remaining stock
    print(stock - num_purchases)
```

Chapter 3 recap

Keyword	Function
`and`	Evaluate if multiple conditions are true
`or`	Evaluate one or more conditions are true
`in`	Evaluate if a value is in a data structure
`not`	Evaluate if a value is not in a data structure

- `list.append()`

Next steps

- Additional built-in functions
  - `zip()`
  - `enumerate()`
- Packages and modules
  - `os`
  - `time`
  - `venv`
  - `pandas`
  - `requests`
  - `numpy`
- Building custom functions

Congratulations!

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