

# Introduction and lists

DATA TYPES IN PYTHON



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# Data types

- Data type system sets the stage for the capabilities of the language
- Understanding data types empowers you as a data scientist

# Container sequences

- Hold other types of data
- Used for aggregation, sorting, and more
- Can be mutable ( `list` , `set` ) or immutable ( `tuple` )
- Iterable

# Lists

- Hold data in order it was added
- Mutable
- Index

# Accessing single items in list

```
cookies = ['chocolate chip', 'peanut butter', 'sugar']
```

```
cookies.append('Tirggel')
```

```
print(cookies)
```

```
['chocolate chip', 'peanut butter', 'sugar', 'Tirggel']
```

```
print(cookies[2])
```

```
sugar
```

# Combining lists

- Using operators, you can combine two lists into a new one

```
cakes = ['strawberry', 'vanilla']
```

```
desserts = cookies + cakes
```

```
print(desserts)
```

```
['chocolate chip', 'peanut butter', 'sugar', 'Tirggel', '']
```

- `.extend()` method merges a list into another list at the end

```
cookies.extend(cakes)
```

# Finding elements in a list

- `.index()` method locates the position of a data element in a list

```
position = cookies.index('sugar')  
  
print(position)
```

```
3
```

# Removing elements in a List

- `.pop()` method removes an item from a list and allows you to save it

```
name = cookies.pop(position)
```

```
print(name)
```

```
sugar
```

```
print(cookies)
```

```
['chocolate chip', 'peanut butter', 'Tirggel']
```



# Iterating over lists

- **List comprehensions** are a common way of iterating over a list to perform some action on them

```
titlecase_cookies = [cookie.title() for cookie in cookies]
print(titlecase_cookies)
```

```
Chocolate Chip
Peanut Butter
Tirggel
```

# Sorting lists

- `sorted()` function sorts data in numerical or alphabetical order and returns a new list

```
print(cookies)
```

```
['chocolate chip', 'peanut butter', 'Tirggel']
```

```
sorted_cookies = sorted(cookies)
```

```
print(sorted_cookies)
```

```
['Tirggel', 'chocolate chip', 'peanut butter']
```

# Let's practice!

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# Meet the tuples

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# Tuple, tuple

- Hold data in order
- Index
- *Immutable*
- Pairing
- Unpackable

# Zippping tuples

- Tuples are commonly created by zipping lists together with `zip()`
- Two lists: `us_cookies` , `in_cookies`

```
top_pairs = list(zip(us_cookies, in_cookies))  
print(top_pairs)
```

```
[('Chocolate Chip', 'Punjabi'), ('Brownies', 'Fruit Cake Rusk'),  
( 'Peanut Butter', 'Marble Cookies'), ('Oreos', 'Kaju Pista Cookies'),  
( 'Oatmeal Raisin', 'Almond Cookies')]
```

# Unpacking tuples

- Unpacking tuples is a very expressive way for working with data

```
us_num_1, in_num_1 = top_pairs[0]  
print(us_num_1)
```

Chocolate Chip

```
print(in_num_1)
```

Punjabi

# More unpacking in Loops

- Unpacking is especially powerful in loops

```
for us_cookie, in_cookie in top_pairs:  
    print(in_cookie)  
    print(us_cookie)
```

```
Punjabi  
Chocolate Chip  
Fruit Cake Rusk  
Brownies  
# ..etc..
```



# Enumerating positions

- Another useful tuple creation method is the `enumerate()` function
- Enumeration is used in loops to return the position and the data in that position while looping

```
for idx, item in enumerate(top_pairs):  
    us_cookie, in_cookie = item  
    print(idx, us_cookie, in_cookie)
```

```
(0, 'Chocolate Chip', 'Punjabi')  
(1, 'Brownies', 'Fruit Cake Rusk')  
# ..etc..
```

# Be careful when making tuples

- Use `zip()`, `enumerate()`, or `()` to make tuples

```
item = ('vanilla', 'chocolate')  
print(item)
```

```
('vanilla', 'chocolate')
```

- Beware of trailing commas!

```
item2 = 'butter',  
print(item2)
```

```
('butter',)
```

# Let's practice!

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# Strings

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# Creating formatted strings

- f-strings (formatted string literals) - `f"""`

```
cookie_name = "Anzac"  
cookie_price = "$1.99"  
  
print(f"Each { cookie_name } cookie costs { cookie_price }.")
```

```
"Each Anzac cookie costs $1.99."
```

# Joining with strings

- `"".join()` uses the string it's called on to join an iterable

```
child_ages = ["3", "4", "7", "8"]  
  
print(", ".join(child_ages))
```

```
"3, 4, 7, 8"
```

```
print(f"The children are ages {','.join(child_ages[0:3])}, and {child_ages[-1]}.")
```

```
"The children are ages 3, 4, 7, and 8."
```

# Matching parts of a string

- `.startswith()` and `.endswith()` methods will tell you if a string starts or ends with another character or string

```
boy_names = ["Mohamed", "Youssef", "Ahmed"]  
print([name for name in boy_names if name.startswith('A')])
```

```
["Ahmed"]
```

- Be careful as these and most string functions are case-sensitive.

# Searching for things in strings

- The `in` operator searches for some value in some iterable type like a string.

```
"long" in "Life is a long lesson in humility."
```

```
True
```

```
"life" in "Life is a long lesson in humility."
```

```
False
```



# An approach to being case insensitive

- `.lower()` method returns a lower case string

```
"life" in "Life is a long lesson in humility.".lower()
```

```
True
```

# Let's practice!

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