Welcome to this CoGrammar Lecture: Sequences

The session will start shortly...

Questions? Drop them in the chat. We'll have dedicated moderators answering questions.

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Software Engineering Session Housekeeping

- The use of disrespectful language is prohibited in the questions, this is a supportive, learning environment for all - please engage accordingly. **(Fundamental British Values: Mutual Respect and Tolerance)**
- No question is daft or silly - **ask them!**
- There are **Q&A sessions** midway and at the end of the session, should you wish to ask any follow-up questions. Moderators are going to be answering questions as the session progresses as well.
- If you have any questions outside of this lecture, or that are not answered during this lecture, please do submit these for upcoming Academic Sessions. You can submit these questions here: **Questions**

Software Engineering Session Housekeeping cont.

- For all **non-academic questions**, please submit a query: [**www.hyperiondev.com/support**]

- Report a **safeguarding** incident: [**www.hyperiondev.com/safeguardreporting**]

- We would love your **feedback** on lectures: [**Feedback on Lectures**]

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Skills Bootcamp
8-Week Progression Overview

Fulfil 4 Criteria to Graduation

✅ **Criterion 1: Initial Requirements**

Timeframe: First 2 Weeks
Guided Learning Hours (GLH): Minimum of 15 hours
Task Completion: First four tasks

Due Date: 24 March 2024

✅ **Criterion 2: Mid-Course Progress**

60 Guided Learning Hours

Data Science - **13 tasks**
Software Engineering - **13 tasks**
Web Development - **13 tasks**

Due Date: 28 April 2024

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Skills Bootcamp Progression Overview

✅ Criterion 3: Course Progress

Completion: All mandatory tasks, including Build Your Brand and resubmissions by study period end
Interview Invitation: Within 4 weeks post-course
Guided Learning Hours: Minimum of 112 hours by support end date (10.5 hours average, each week)

✅ Criterion 4: Demonstrating Employability

Final Job or Apprenticeship Outcome: Document within 12 weeks post-graduation
Relevance: Progression to employment or related opportunity

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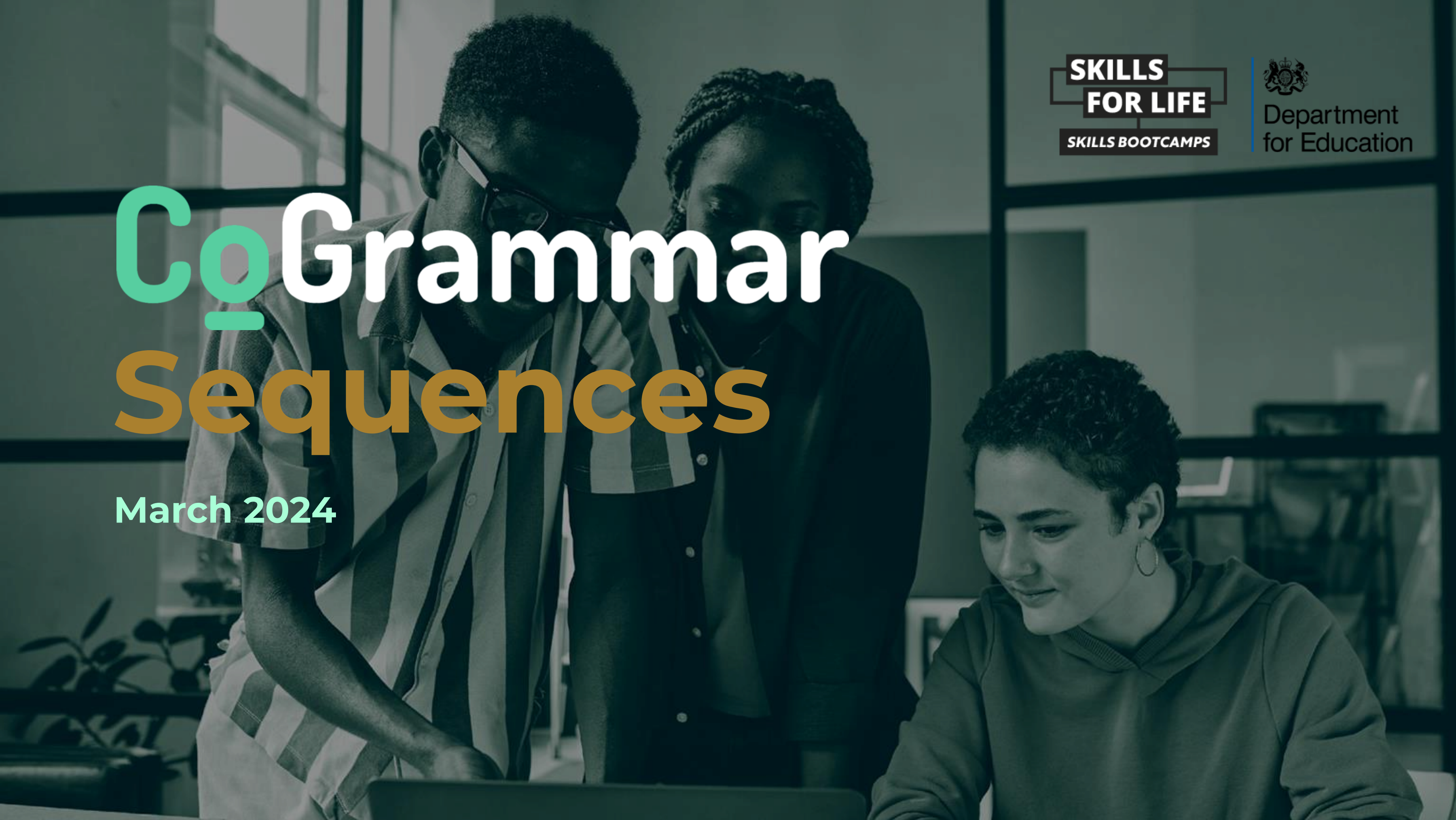

SKILLS FOR LIFE

SKILLS BOOTCAMPS

Department for Education

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Sequences

March 2024

String Handling

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Agenda

- ❖ **Define** and **construct strings** in Python.
- ❖ Master **key string methods** for effective **text manipulation** in Python.
- ❖ Effectively **extract characters** and **substrings** from strings using **indexing** and **slicing**.
- ❖ Utilize **string concatenation** and **formatting techniques** in Python.

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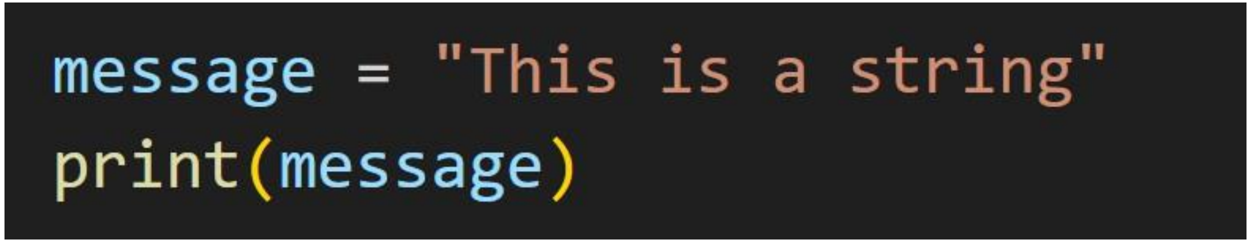
String Creation & Initialization

Strings in Python are **sequences of characters**, enclosed within either single quotes (' '), double quotes (" "), or triple quotes (''' ''')



```
message = "This is a string"
print(message)
```

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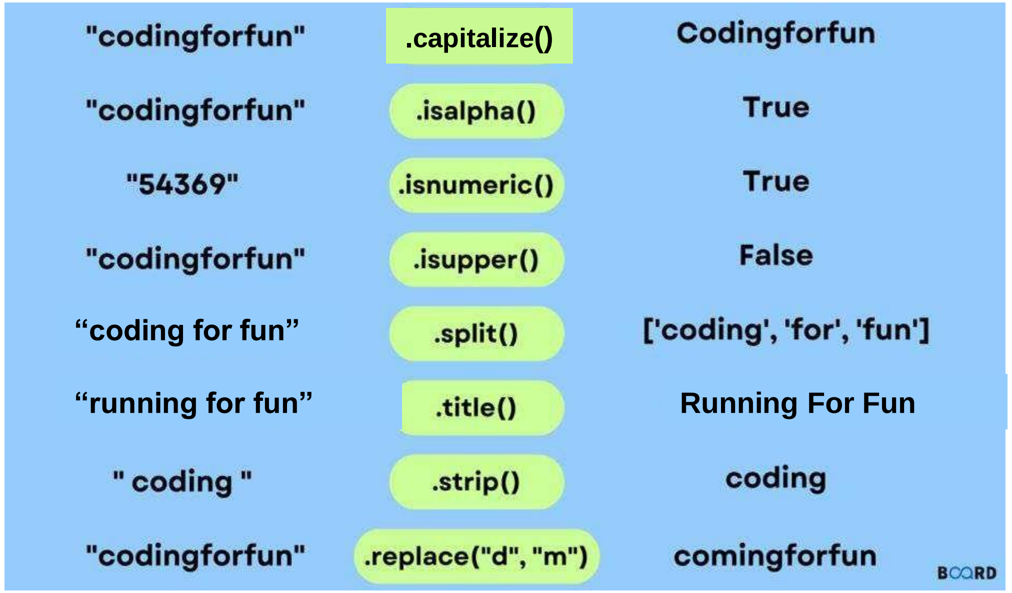
Basic String Methods



"codingforfun"	.capitalize()	Codingforfun
"codingforfun"	.isalpha()	True
"54369"	.isnumeric()	True
"codingforfun"	.isupper()	False
“coding for fun”	.split()	['coding', 'for', 'fun']
“running for fun”	.title()	Running For Fun
" coding "	.strip()	coding
"codingforfun"	.replace("d", "m")	comingforfun

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Strings cont.

Strings are Immutable

- When an object is **immutable** it means the ***object cannot be changed***.
- When we apply methods to a string that appear to make changes, they are actually **creating** and **returning new string objects**.
- This means we have to **store** the changes we make in a **variable** to be **reused**.

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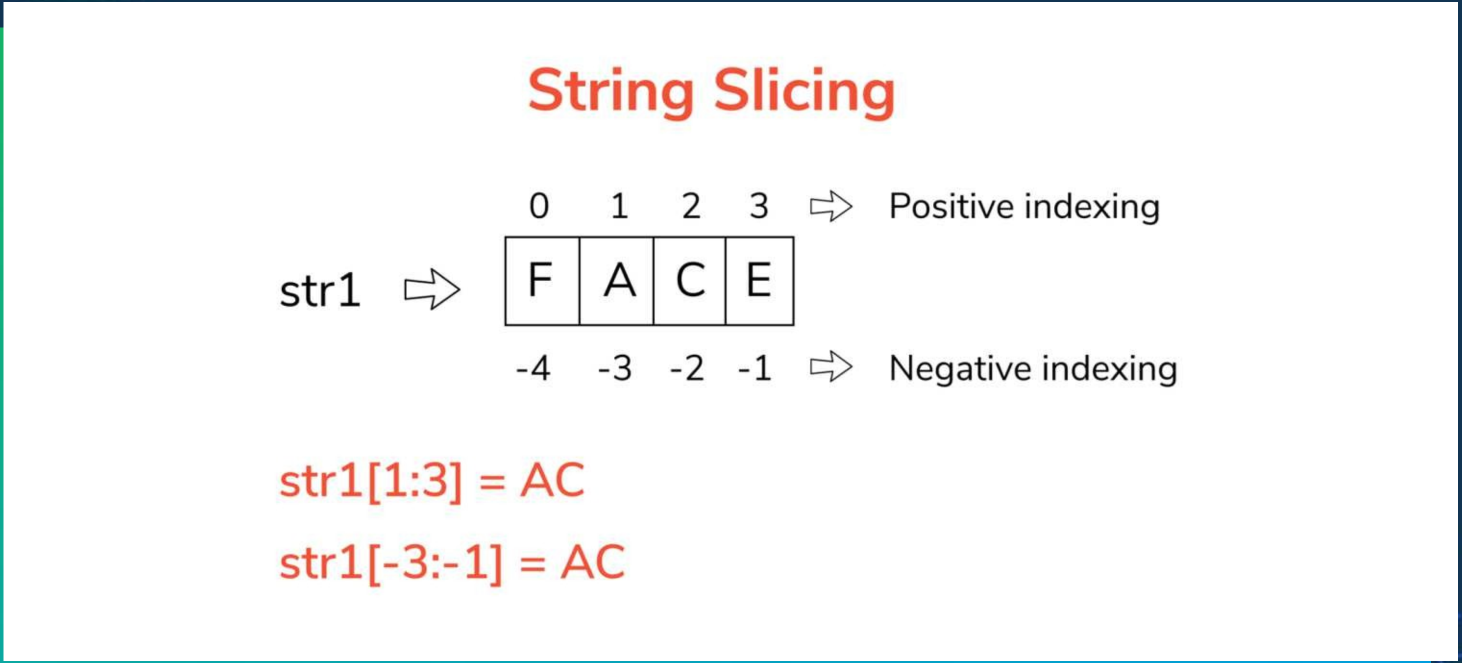
Strings Indexing



str1[1:3] = AC

str1[-3:-1] = AC

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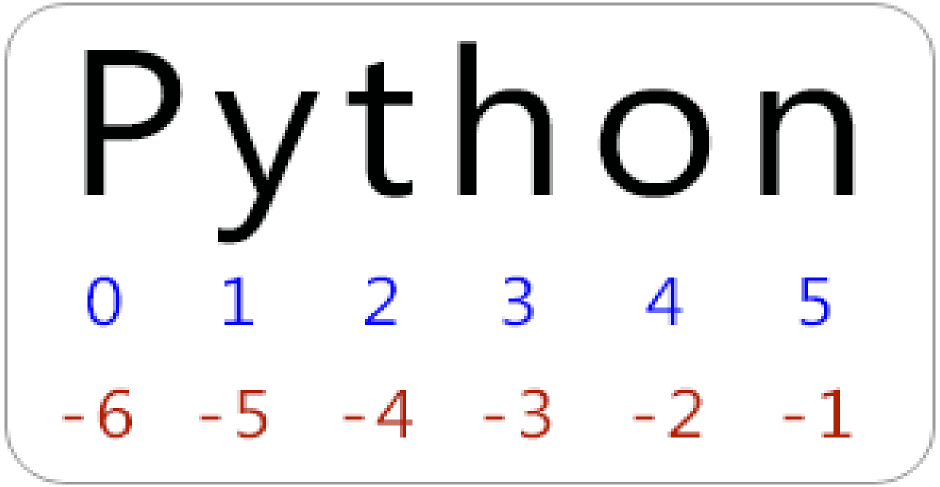
Strings Indexing



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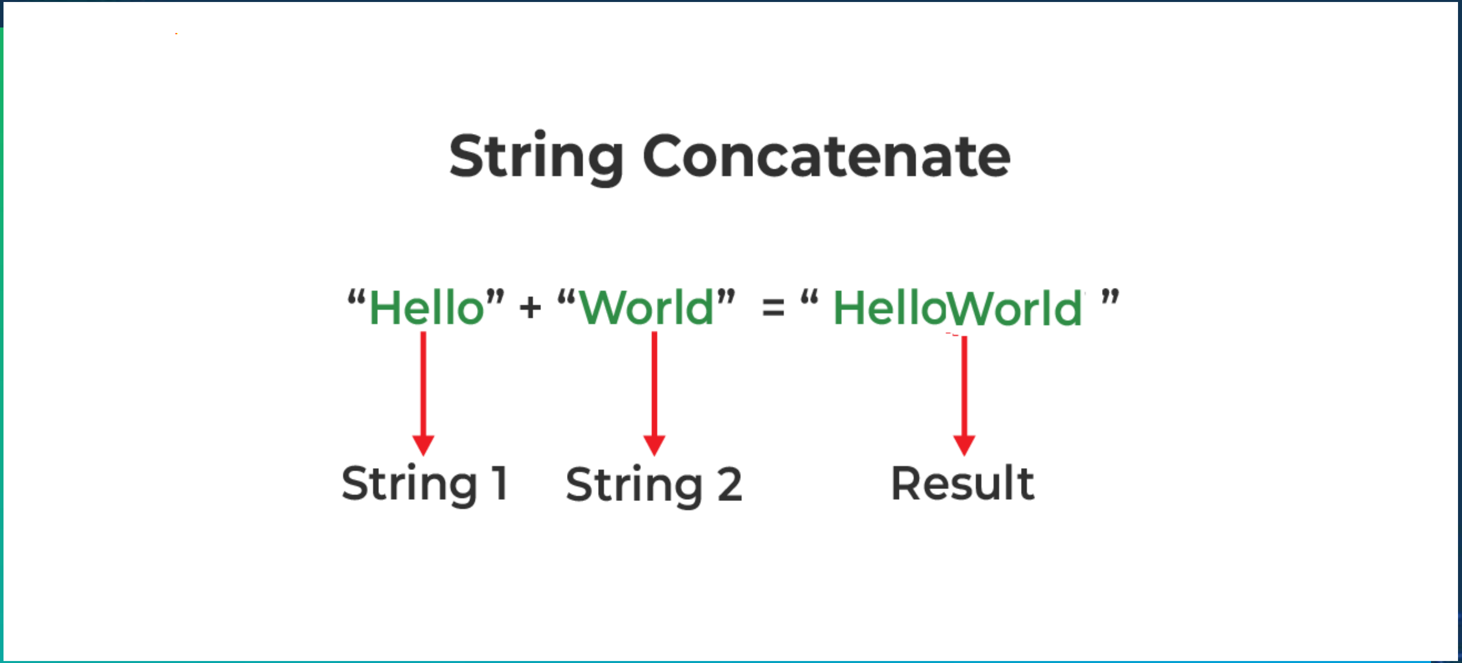
String Concatenation & Formatting

❖ *String concatenation* is the process of **joining** strings together, while **formatting** allows you to **insert dynamic values** into strings.

❖ *String formatting* in Python refers to the process of creating strings where **dynamic values** are **inserted** into **predetermined locations** within the string.

String Concatenation



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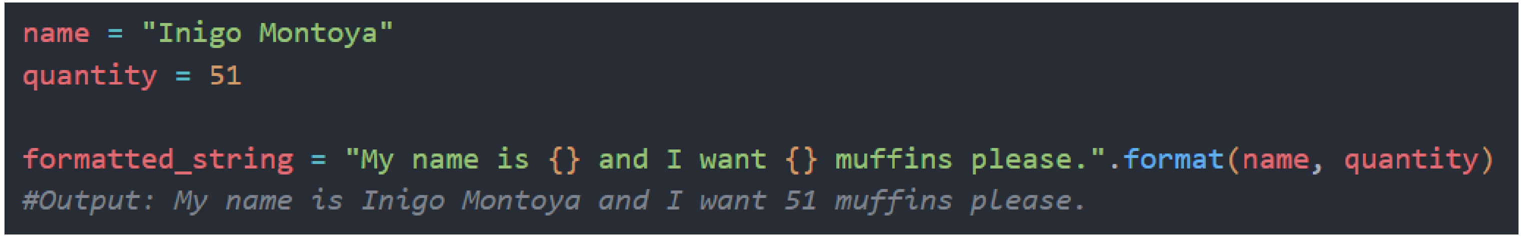
String Formatting

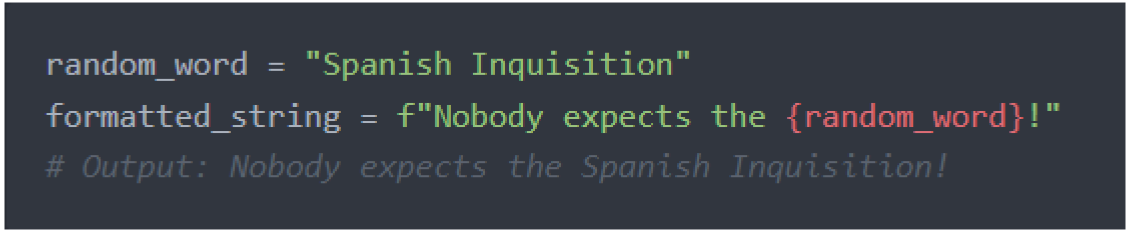
Format() Function



```python
name = "Inigo Montoya"
quantity = 51

formatted_string = "My name is {} and I want {} muffins please.".format(name, quantity)
#Output: My name is Inigo Montoya and I want 51 muffins please.
```

f-String



```python
random_word = "Spanish Inquisition"
formatted_string = f"Nobody expects the {random_word}!"
# Output: Nobody expects the Spanish Inquisition!
```

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Summary

String Methods

❖ **Built-in functions** that operate on strings, providing various functionalities such as **manipulating case**, **finding substrings**, determining **length** and many more.

String Indexing and Slicing

❖ It's all about **accessing characters** within a string using their position and extracting a substring from a string.

String Formatting

❖ The process of inserting **values** and **expressions** into a string to create informative output.

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Lists in Python

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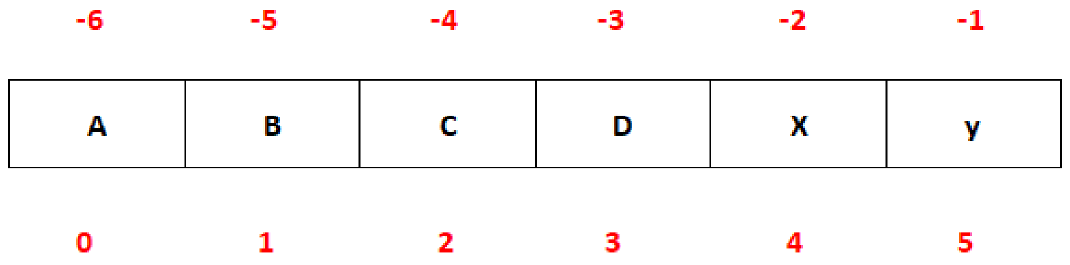
Agenda

- ❖ Recall the **fundamental characteristics** of Lists.
- ❖ Explain the concept of **indexing** in a list.
- ❖ Apply knowledge of lists to **manipulate** elements.

Lists

- A list is a **data type** that allows us to store **multiple values** of any type together and a list can **contain duplicates.**
- We can access **individual values** using **indexing** and **multiple values** using **slicing**.
- We can **iterate** over lists using a **for loop**.



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Lists cont.

- ❖ Lists are **mutable**. This means the values inside a list can be **changed** and *unlike a string won't return a new list* when changes have been made.
- ❖ We can apply **methods** to our lists *without having to restore them inside our variables*.
- ❖ To create a list, we can surround comma separated values with square brackets. []

  E.g. my_list = [value1, value2, value3]

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Lists cont.

Key List functions

❖ **Adding Elements**	*append(), insert()*
❖ **Removing Elements**	*remove(), pop() and ‘del'*
❖ **Manipulating elements**	sorting, reversing and slicing

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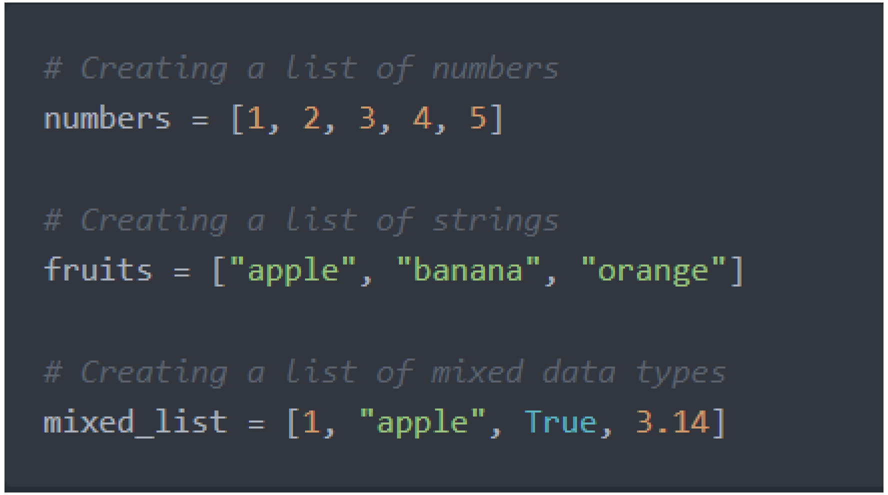
Lists Examples

Creating lists



```python
# Creating a list of numbers
numbers = [1, 2, 3, 4, 5]

# Creating a list of strings
fruits = ["apple", "banana", "orange"]

# Creating a list of mixed data types
mixed_list = [1, "apple", True, 3.14]
```

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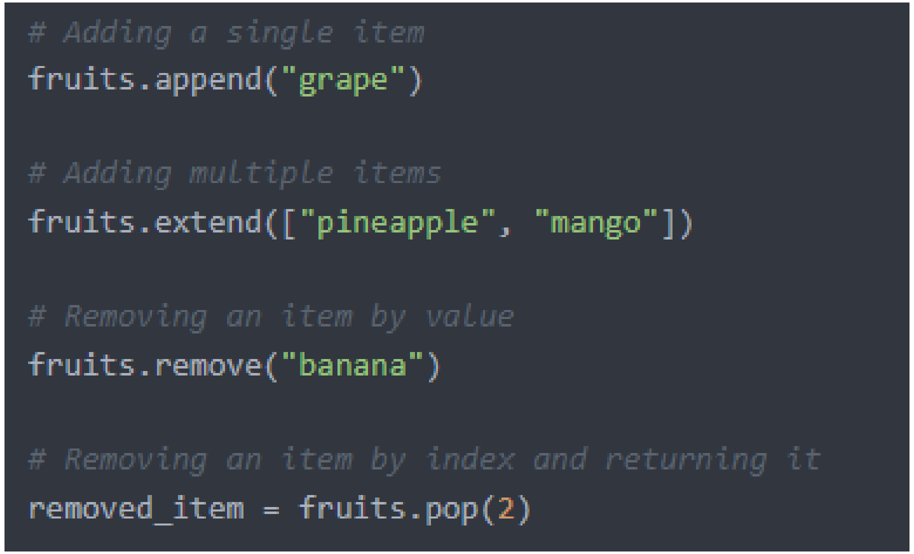
Lists Examples

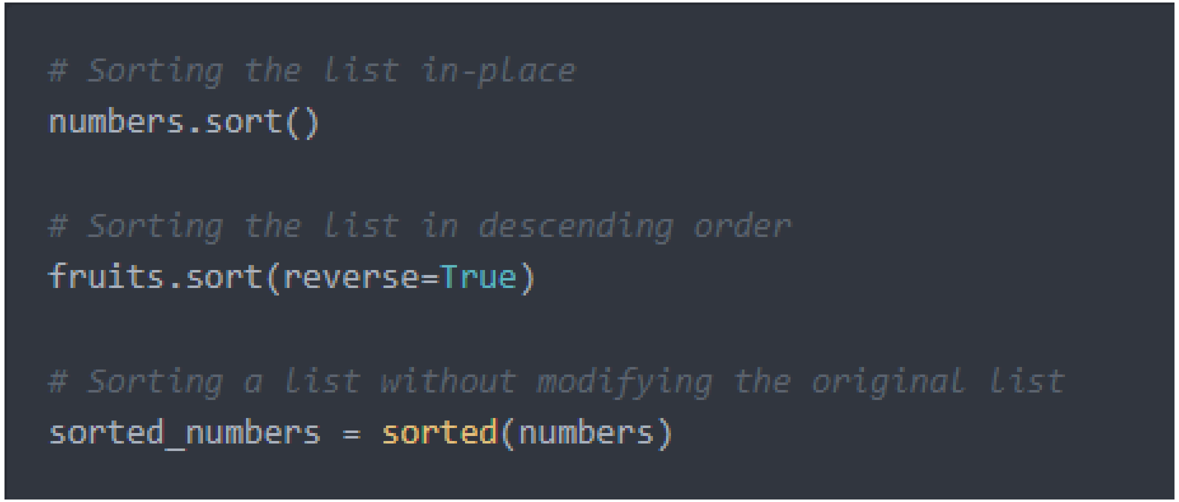
Adding & Removing Items



```python
# Adding a single item
fruits.append("grape")

# Adding multiple items
fruits.extend(["pineapple", "mango"])

# Removing an item by value
fruits.remove("banana")

# Removing an item by index and returning it
removed_item = fruits.pop(2)
```

Lists Examples

Sorting Lists



```
# Sorting the list in-place
numbers.sort()

# Sorting the list in descending order
fruits.sort(reverse=True)

# Sorting a list without modifying the original list
sorted_numbers = sorted(numbers)
```

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Dictionaries in Python

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Agenda

- ❖ **Distinguish** between the **functionality** of a **Lists** and **Dictionaries**.

- ❖ Expand on key **operations** relevant to Dictionaries.

- ❖ Apply the above knowledge to improve **data management** in programs

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Dictionaries

- In Python, **dictionaries** function akin to the dictionaries we commonly used in English class, such as those from Oxford.
- Python **dictionaries** are **similar** to a **list;** however, each item has two parts, a ***key*** and a ***value***.
- To draw a parallel, consider an English dictionary where the ***key*** represents a ***word***, and the associated ***value*** is its ***definition***.

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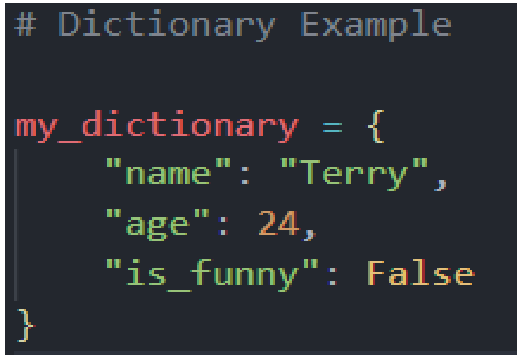
Dictionary Example

❖ Dictionaries are enclosed in **curly brackets**; **key value pairs** are separated by **colon** and **each pair** is **separated by a comma.**



```python
# Dictionary Example

my_dictionary = {
    "name": "Terry",
    "age": 24,
    "is_funny": False
}
```

❖ On the **left** is the **key**, on the **right** is the **value.**

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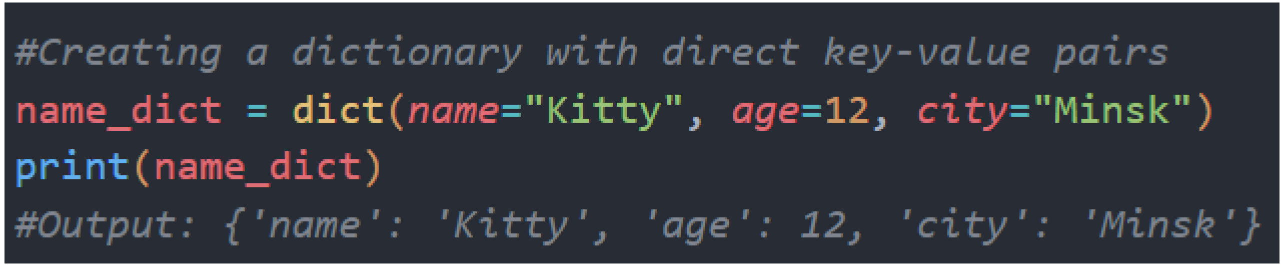
Dict() Functions

- The **dict()** function in Python is a versatile way to create dictionaries.
- Create dictionaries through *assigning values to keys* by passing in **keys** and **values** separated by an **= sign**.



```
#Creating a dictionary with direct key-value pairs
name_dict = dict(name="Kitty", age=12, city="Minsk")
print(name_dict)
#Output: {'name': 'Kitty', 'age': 12, 'city': 'Minsk'}
```

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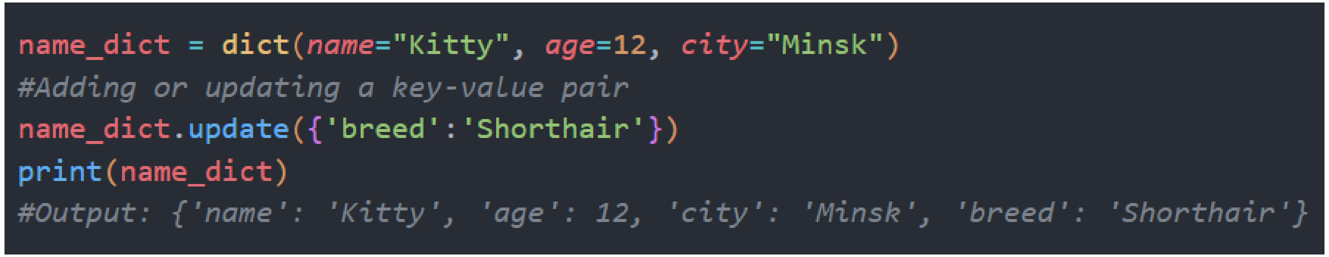
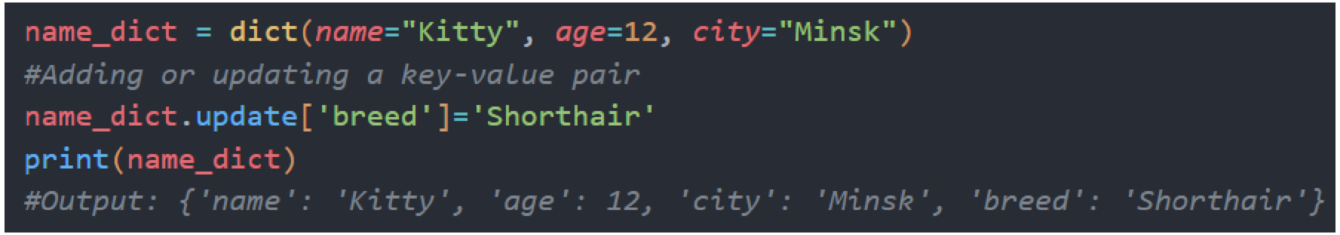
Dictionary Update()

❖ To append or add elements to a dictionary in Python, you can use the **update()** method or simply use the **square bracket notation**.



```
name_dict = dict(name="Kitty", age=12, city="Minsk")
#Adding or updating a key-value pair
name_dict.update({'breed':'Shorthair'})
print(name_dict)
#Output: {'name': 'Kitty', 'age': 12, 'city': 'Minsk', 'breed': 'Shorthair'}
```



```
name_dict = dict(name="Kitty", age=12, city="Minsk")
#Adding or updating a key-value pair
name_dict.update['breed']='Shorthair'
print(name_dict)
#Output: {'name': 'Kitty', 'age': 12, 'city': 'Minsk', 'breed': 'Shorthair'}
```

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Dictionaries cont.

Key Dictionary functions

❖ **Key-Value Pairs**	*items(), keys(), values()*
❖ **Fetching**	*get()*
❖ **Updating**	*update()*
❖ **Deleting**	*pop(), popitem()*

Summary

Lists

- ❖ **Lists** in Python offer a powerful mechanism for organizing and manipulating data in a structured manner.

Indexing

- ❖ We can access elements in our list with **indexing** and can use **slicing** to grab multiple values

Dictionaries

- ❖ **Dictionaries** in Python are mutable collections of **key-value pairs**, allowing efficient **storage** and **retrieval** of data.
- ❖ They provide a mapping between **unique keys** and their **associated values**.

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Let’s take a break

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Questions and Answers

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Thank you for attending

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