Welcome to the CoGrammar

Lists, Sets and Tuples

The session will start shortly...

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

Cyber Security 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**

Cyber Security Session Housekeeping cont.

- For all **non-academic questions**, please submit a query: **www.hyperiondev.com/support**
- We would love your **feedback** on lectures: **Feedback on Lectures**
- Find all the lecture **content** in you **Lecture Backpack** on GitHub.

Safeguarding & Welfare

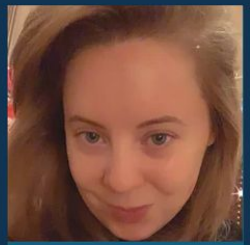
We are committed to all our students and staff feeling safe and happy; we want to make sure there is always someone you can turn to if you are worried about anything.

If you are feeling upset or unsafe, are worried about a friend, student or family member, or you feel like something isn't right, speak to our safeguarding team:

Ian Wyles
Designated Safeguarding Lead

Simone Botes

Rafiq Manan



Charlotte Witcher

Nurhaan Snyman

Ronald Munodawafa

Tevin Pitts

Scan to report a safeguarding concern

or email the Designated Safeguarding Lead:
Ian Wyles
safeguarding@hyperiondev.com

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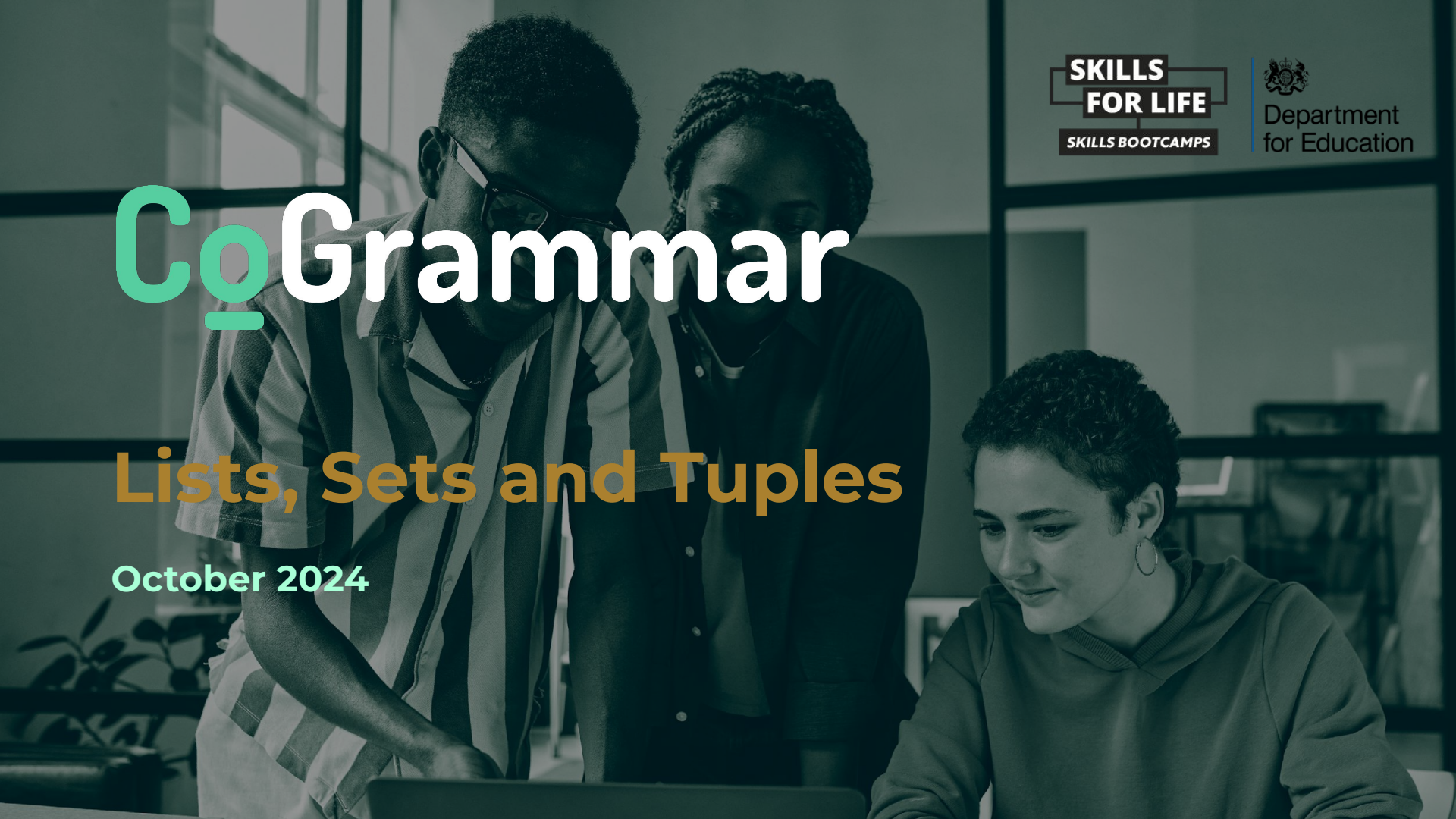


Lists, Sets and Tuples

October 2024

Learning Objectives & Outcomes

- Define **lists**, **sets**, and **tuples** in Python.
- Identify the differences between these data structures and when to use each one.
- Perform basic operations like adding, removing, and accessing elements in **lists**, **sets**, and **tuples**.
- Understand the immutability of tuples and how it affects data manipulation.

Polls

Please have a look at the poll notification and select an option.

Which of the following is mutable in Python?

A. List
B. Tuple
C. Set

Polls

Please have a look at the poll notification and select an option.

Which data structure allows duplicate elements in Python?

A. List
B. Set
C. Tuple
D. Both A and C

Python Collections

- Collections are ways to group multiple elements together.
- They help in managing large amounts of data efficiently
- Three main types of collections:
  - Lists
  - Sets
  - Tuples

Lists

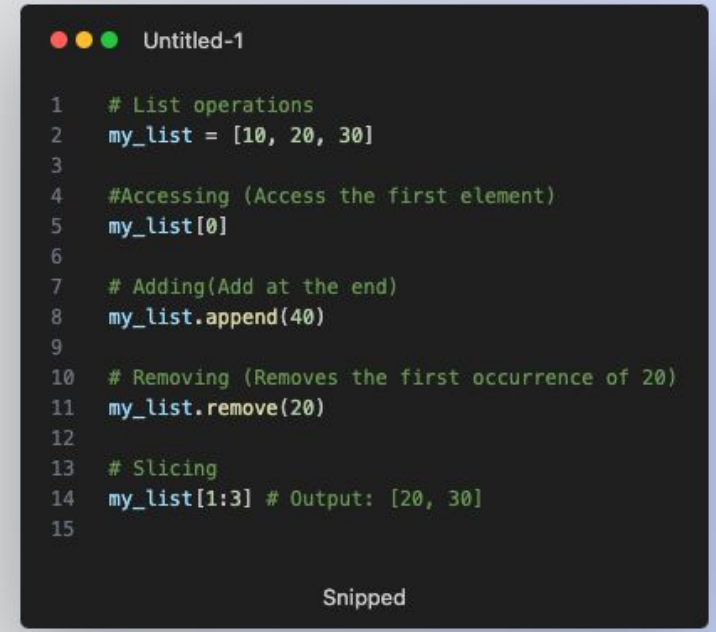
- Lists are ordered, mutable collections that allow duplicate elements. (Dynamic arrays)

- Key Features:
  - Ordered: Elements maintain the order in which they were added.
  - Mutable: Elements can be changed.
  - Supports duplicate items: Supports duplicate items.

Lists Operations

- Common List operations:
  - Accessing elements
  - Adding elements
  - Removing elements
  - Slicing

Lists


Untitled-1
1 # List operations
2 my_list = [10, 20, 30]
3
4 #Accessing (Access the first element)
5 my_list[0]
6
7 # Adding(Add at the end)
8 my_list.append(40)
9
10 # Removing (Removes the first occurrence of 20)
11 my_list.remove(20)
12
13 # Slicing
14 my_list[1:3] # Output: [20, 30]
15
Snipped

Sets

- Sets are unordered collections that only allow unique elements
- Sets are like mathematical sets (no duplicates)
- Key features:
  - Unordered: No indexing or ordering of elements
  - Mutable: You can add or remove elements
  - Cannot contain duplicate items

Sets Operations

- Common Set Operations
  - Adding elements
  - Removing elements
  - Union: Combines two sets
  - Intersection: Common elements in sets

Sets

Untitled-1

```python
# Sets Operations
my_set = { 1, 2, 3 }

my_set2 = {4, 5, 6}

# Adding elements
my_set.add(4)

# Removing elements
my_set.remove(2)

# Union: Combines two sets
my_set.union(my_set2)

# Intersection: Outputs the common elements in sets
my_set.intersection(my_set2)
```

Snipped

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Tuples

- Tuples are ordered, immutable collections that allow duplicate elements.
- Once created, tuples cannot be changed
- Key features:
    - Ordered
    - Immutable
    - Supports duplicate items

Tuples Operations

- Common Tuple Operations:
    - Accessing Elements
    - Slicing
    - Unpacking: Assigns tuple elements to variables

Tuples

Untitled-1

```python
# Tuples
my_tuple = ( 1, 2, 3 )

# Accessing elements
my_tuple[0]

# Slicing
my_tuple[1:3] # Output: (2, 3)

# Unpacking
a, b, c = my_tuple # Output: a=1, b=2, c=3
```

Snipped

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When to use each?

- Lists: Use when you need an ordered collection that can change over time and may contain duplicates
- Sets: Use when you need a collection of unique elements and don’t care about order
- Tuples: Use when you need an ordered, unchangeable collection, such as coordinates or fixed data.

Summary

- Lists are for ordered, mutable collections with duplicates.
- Sets are for unique, unordered collections.
- Tuples are for ordered, immutable collections.
- Each collection type serves different purposes, depending on the task.

Polls

What will be the result of the following code?

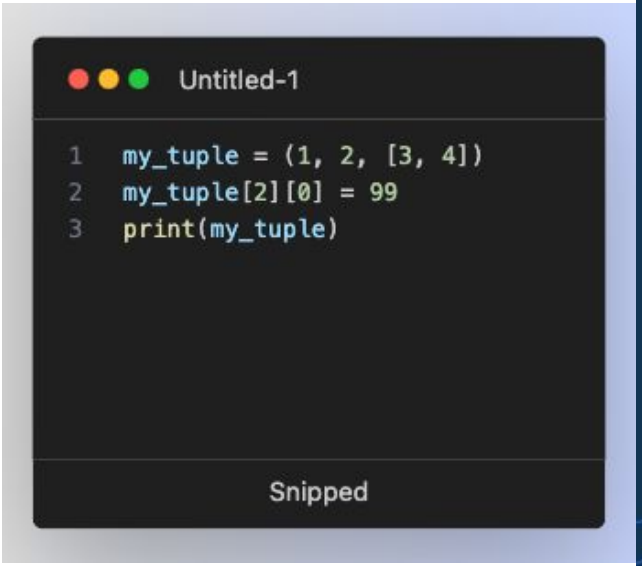
A. { 1. 2. 3. [4, 5] }
B. TypeError
C. { 1, 2, 3, 4, 5 }
D. [1, 2, 3, [4, 5]]

Polls

Please have a look at the poll notification and select an option.

What will be the output of this code?

A. (1, 2, [99, 4])
B. TypeError: 'tuple' object does not support item assignment
C. (1, 2, 99, 4)
D. (1, 2, [3, 4])



Questions and Answers

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Thank you for attending

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