String

- String In Python is a sequence of characters
- The string type in Python is represented using a str class
- Python strings are "immutable" which means they cannot be changed after they are created

functions:

count(), find(), upper(), isdigit(), format() etc.

Slicing Strings

[start : end : step]

s[-1]

s[1:4]

s[2:8:2]

s[9:2:-1]

s[2:]

s[:4]

s[::-1]

Collections in Python

There are four collection data types in Python:

- **List**
- **Tuple**
- **Set**
- **Dictionary**

List

Lists are used to store multiple items in a single variable.

List items are changeable, and allow duplicate values.

List items can be of any data type (it can contain different data types)

Accessing items of a List

The items in a list can be accessed through indexing and slicing.

Indexing:

ls[2]

ls[-2]

Slicing: (by [start : end : step])

ls[2:8:2]

Create List:

ls = [1,2,3]

ls=[10]*3

ls=list(range(2,20,2))

Add items:

append(), insert(), ls[3:3] =[10,20]

Remove items:

remove(), pop(), del, ls[2:4]=[]

Clear List:

```
ls.clear()
```

Copy list:

```
ls2 = ls1.copy()
ls2 = list(ls1)
```

Convert:

```
str.split(",") - string to list
",".join(list) - list to string
```

Tuple

Tuples are used to store multiple items in a single variable.

A tuple is a unchangeable collection, allow duplicate values.

Tuple items can be of any data type (it can contain different data types)

Accessing items of a Tuple

The items in a tuple can be accessed through indexing or slicing, like lists

Create Tuple:

(), (1,2,3), (10,)

Tuples VS Lists:

1. Tuples are **faster** than lists.
2. Tuples make the code **safe** from any accidental modification.
3. Tuples can be used as dictionary keys if it contains immutable values like strings, numbers or another tuple.

We will use Tuple mainly in functions.

Set

Sets are used to store multiple items in a single variable.

Set is an unchangeable collection - (set items are unchangeable, but you can add\remove items)

and **do not allow duplicate** values

Set items can be of any data type (it can contain different data types)

Accessing items of a Set

The items in a set can be accessed through indexing and slicing like lists.

functions sets:

- &
- |
- -
- ^

Dictionary

Dictionaries are used to store data values in **key:value** pairs.

A dictionary is a collection which is changeable and do not allow duplicates.

keys: immutable data types, usually numbers or string

values: can be any arbitrary Python object

Create Dictionary:

```
d={}
d=dict({})
```

Get value by key:

```
d[key]
d.get("key")
```

Functions:

keys(), values(), items(), update(), clear()

Summary

- List - a changeable collection. Allows duplicate members.
- Tuple - an unchangeable collection. Allows duplicate members.
- Set - an unchangeable collection*. No duplicate members.
- Dictionary - a changeable collection. No duplicate members.

Which data structure to use?

We will check what we need in terms of:

- **Efficiency** (do we want it to save space for future changes)
- **Safety** (can the structure be changed)
- **Duplicates** (do we want to allow duplicates or not)

Python Flow Control

Conditionals

- if statement
- if...else statement
- if...elif...else statement
- Nested if...else statement

pass - avoid getting an error if we have an if statement with no content.

Loops

- While loop
- For loop

break: stop the loop

continue: skips to the next iteration

else: run when the loop is finished

(condition no longer is true in while loop)

Range

Represents a sequence of integers

range(stop)

range(start, stop)

range(start, stop, step)