Mutable and Immutable Objects

When a program is run, data objects in the program are stored in the computer's memory for processing. While some of these objects can be modified at that memory location, other data objects can't be modified once they are stored in the memory. *The property of whether or not data objects can be modified in the same memory location where they are stored is called* **mutability**.

We can check the mutability of an object by checking its memory location before and after it is modified. If the memory location remains the same when the data object is modified, it means it is mutable.

To check the memory location of where a data object is stored, we use the function, id(). Consider the following example (you can try this yourself in IDLE):

>>> a=[5, 10, 15]	Assigning values to the list a.
>>> id(a)	Using the function id() to get the memory location of a.
1906292064	The ID of the memory location where a is stored.
>>> a[1]=20	Replacing the second item in the list,10 with a new item, 20.
>>> print(a)	Using the print() function to verify the new value of a.
[5, 20, 15]	Verified that the value of a has changed.
>>> id(a)	Using the function id() to get the memory location of a.
1906292064	The ID of the memory location where a is stored.

Notice that the memory location has not changed as the ID remains (1906292064) remains the same before and after the variable is modified. This indicates that the list is **mutable**, i.e., it can be modified at the same memory location where it is stored. Now, let us check if a tuple is mutable in Python.

```
>>> b=(5, 10, 15)
```

Assigning values to the tuple b.

```
>>> b[1]=20
```

Replacing the second item in the list, 10 with a new item, 20.

```
Traceback (most recent call last):

  File "<pyshell#1>", line 1, in <module>

    b[1]=20

TypeError: 'tuple' object does not support item assignment
```

Error explaining that a tuple does not support a modification in the items – i.e, it is **immutable.**

You can verify the mutability of each of the data types in IDLE.

Immutable: numeric, string, and tuple

Mutable: list, dictionary