

Exercise 4

Array:

- Arrays are a systematic arrangement of similar objects, normally into rows and columns. In Python however there is greater flexibility on what data types can be listed together.
- They are arranged and accessed according to the pre-set numeric index.
- The index range in Python is 0 to n-1, as it is for most programming languages. However, there are several that begin the index at 1 and go to n e.g. R.

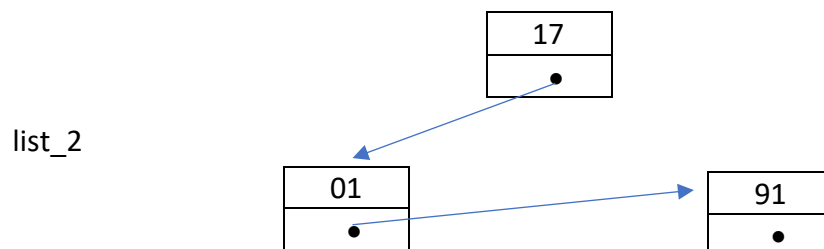
list_1

0	1	2	3	4	5	6	7	8	9
10	20	30	40	50	60	70	80	90	'HUNDRED'

- To find an element in list_1 we could either look through the entire list, which would take longer on larger projects, or if we knew the index number we could use that to go directly to that element. E.g. `list_1[5] == 60`

Linked List:

- Linked lists are linear collections of data elements, called nodes. Each node points to the next node in the list using pointers.
- This means they can be edited more flexibly but they can take longer to iterate through as you have to go through the list linearly.



- If you wanted to find the element == 91 in this linked list you would have to pass through the elements 17 and 01 before reaching it. Not a problem here but for lists of thousands of elements the process becomes quite slow.

Dictionaries:

- Dictionaries are based on key - value pairs which means that, rather than a number index as with arrays the values are assigned with a number, name, symbol or some other representation that then identifies that value. This representation is the key and can make looking up the value easier.
- A good example is that of an actual dictionary - list_3:
- If we had a word we wanted to find the meaning of like 'python' we would look up the meaning in a list of meanings. If this information was stored in an array, however, we would

need to know the exact number of the meaning of 'python' in the list of all English word meanings and as it is in the middle of an enormous list this is impractical. If we used a linked list we would have to go from element to element waiting to find it. With a dictionary however, we can assign the value of the meaning of 'python' with the key value 'python'. Meaning we can simply look that key up directly to find the meaning of 'python' = 'Very large snake / very hard programming language'.