**Number Exploration**

**Objective**

In this assignment, you will explore and document various methods associated with the Python list data structure. You will provide explanations for each method, include examples of their usage, and specify the return type of each method.

**Instructions**

* **Research and List**: Identify and list the common methods available for Python lists. For each method, provide the following:
* **Description**: A brief explanation of what the method does.
* **Syntax**: How the method is used, including its parameters.
* **Return Type**: Specify what type of value the method returns (e.g., None, a New List, a Boolean, etc.).

**Methods to Cover**

Ensure your document includes, but is not limited to, the following methods:

* append()
* extend()
* insert()
* remove()
* pop()
* clear()
* index()
* count()
* sort()
* reverse()
* copy()

**Create the Document**

Use Google Docs or Microsoft Word to create your document.

**Assignment # 5**: Python LIST Data Structure

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| **Method** | **Description** | |
| append() | append() method is used ***to add an item to the end of a list***. This method ***modifies the original list by adding the specified element to its end***.  **list**: The list to which the item will be appended.  **item**: The element to be added to the list. This can be of any data type (e.g., integer, string, another list, etc.)   * It modifies the original list, it does not create a new list. * If you append a list or another collection, the entire collection is added as a single element at the end of the list, rather than each element of the collection being added individually. For the latter behavior, consider using extend() instead.   This method is widely used for dynamically building lists, such as during loops or when processing data iteratively. | |
| **Syntax** | **Return Type** | **Examples** |
| list.append(item) | list | numbers = [1, 2, 3] # define list integers  numbers.append(4) # append item  print(numbers) # print list  print(type(numbers))  fruits = ["apple", "banana", "cherry"] # define list string  fruits.append("dates")  print(fruits)  print(type(fruits))  letters = ['a', 'b', 'c']  letters.append(['d', 'e']) # append list  print(letters)  print(type(letters))  person = [{"name": "Ali", "age": 30}] # dictionary in list  person.append({"name": "Aziz", "age": 25}) # append dictionary  print(person)  print(type(person)) |

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| **Method** | **Description** | |
| extend() | extend() method is used ***to add all the elements of an iterable*** (e.g., list, tuple, string, etc.) ***to the end of the list***. This method ***modifies the original list by appending each element of the iterable*** to the list.  **list**: The list to which the elements of the iterable will be added.  **iterable**: Any iterable (e.g., list, tuple, string) whose elements will be added to the list.   * extend() method is different from append(). While append() adds its argument as a single element to the end of the list, extend() adds each element of the iterable to the list. * extend() method is useful when you need to concatenate another iterable to the end of the list. * This method is more efficient than using a loop to iterate over the iterable and append each element individually, especially for large datasets.   By using extend(), you can effectively combine lists, tuples, strings, or other iterable types into a single list. | |
| **Syntax** | **Return Type** | **Examples** |
| list.extend(iterable) | list | numbers = [1, 2, 3]  more\_numbers = [4, 5, 6]  numbers.extend(more\_numbers)  print(numbers)  print(type(numbers))  fruits = ["apple", "banana"]  more\_fruits = ("cherry", "dates")  fruits.extend(more\_fruits)  print(fruits)  print(type(fruits))  letters = ['a', 'b', 'c']  letters.extend('123') # extend list with string  print(letters)  print(type(letters))  numbers = [1, 2, 3]  more\_numbers = {4, 5, 6} # define set  numbers.extend(more\_numbers)  print(numbers)  print(type(numbers)) |

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| **Method** | **Description** | |
| insert() | insert() method is used to insert an element at a specified position in a list. Unlike append() and extend(), which add elements to the end of the list, insert() allows you to place an element at any position within the list.  **list**: The list into which the element will be inserted.  **index**: The position in the list where the element should be inserted.  The index is zero-based, meaning the first position is 0.  **element**: The element to be inserted into the list.   * If the specified index is greater than the number of elements in the list, the element will be inserted at the end of the list. * If the index is negative, it counts from the end of the list.   e.g. an index of -1 would insert the element before the last element.   * The insert() method is useful when you need to maintain the order of elements in a list but need to add elements at specific positions.   By using the insert() method, you can precisely control where elements are added to your list, making it a powerful tool for managing ordered data. | |
| **Syntax** | **Return Type** | **Examples** |
| list.insert  (index, element) | list | numbers = [2, 3, 4]  numbers.insert(0, 1) # inserting an element at 0 index  print(numbers)  print(type(numbers))  fruits = ["apple", "banana", "cherry"]  fruits.insert(1, "dates") # insert an element in middle of List  print(fruits)  print(type(fruits))  letters = ['a', 'b', 'c']  print(len(letters))  letters.insert(len(letters), 'd') # insert an element at the end of List  print(letters)  print(type(letters))  numbers = [1, 2, 3]  numbers.insert(2, [4, 5]) # insert list into list  print(numbers)  print(type(numbers)) |

Write down explanation or description for remove method for Python List, include syntax, return type and examples of its usage

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| **Method** | **Description** | |
| remove() |  | |
| **Syntax** | **Return Type** | **Examples** |
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| **Method** | **Description** | |
| pop() |  | |
| **Syntax** | **Return Type** | **Examples** |
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| **Method** | **Description** | |
| clear() |  | |
| **Syntax** | **Return Type** | **Examples** |
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| **Method** | **Description** | |
| index() |  | |
| **Syntax** | **Return Type** | **Examples** |
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| **Method** | **Description** | |
| count() |  | |
| **Syntax** | **Return Type** | **Examples** |
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| **Method** | **Description** | |
| sort() |  | |
| **Syntax** | **Return Type** | **Examples** |
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| **Method** | **Description** | |
| reverse() |  | |
| **Syntax** | **Return Type** | **Examples** |
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| **Method** | **Description** | |
| copy() |  | |
| **Syntax** | **Return Type** | **Examples** |
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