Data Structure Assigment

1 - Tuples

1- ordered collection of elements

2- enclose in () round brackets

3- different types of elements can be used

4- Once elements are stored you cannot change them(immutable)

```
In [1]:   tup = (2, "Muhammad Faizan Ahmed", 2.7, False, 78)
          tup
```

```
Out[1]:  (2, 'Muhammad Faizan Ahmed', 2.7, False, 78)
```

```
In [2]:   # Checking type
          type(tup)
```

```
Out[2]:  tuple
```

Indexing in Tuple

```
In [3]:   tup[1]
```

```
Out[3]:  'Muhammad Faizan Ahmed'
```

```
In [4]:   tup[3]
```

```
Out[4]:  False
```

```
In [5]:   tup[1:3]      # Last element is exclusive
```

```
Out[5]:  ('Muhammad Faizan Ahmed', 2.7)
```

```
In [6]:   tup[1::2]
```

```
Out[6]:  ('Muhammad Faizan Ahmed', False)
```

```
In [7]:   # Length of elements in tuple
          len(tup)
```

```
Out[7]:  5
```

```
In [8]:   tup2 = ("Python", 3.5, 9, True)
```

```
tup2
```

Out[8]: ('Python', 3.5, 9, True)

In [9]:
```python
# Adding two tuples(Concatenation) - adds the elements of second tuple after the first
tup3 = tup + tup2
tup3
```

Out[9]: (2, 'Muhammad Faizan Ahmed', 2.7, False, 78, 'Python', 3.5, 9, True)

In [10]:
```python
# Concatenation + repeat
tup4 = tup*2 + tup2
tup4
```

Out[10]:
```
(2,
 'Muhammad Faizan Ahmed',
 2.7,
 False,
 78,
 2,
 'Muhammad Faizan Ahmed',
 2.7,
 False,
 78,
 'Python',
 3.5,
 9,
 True)
```

In [11]:
```python
tup1 = (20,69,73,88,94)
tup1
```

Out[11]: (20, 69, 73, 88, 94)

In [12]:
```python
# Minimum
min(tup1)
```

Out[12]: 20

In [13]:
```python
# Maximum
max(tup1)
```

Out[13]: 94

In [14]:
```python
# Repeat
tup1 = tup1*2
tup1
```

Out[14]: (20, 69, 73, 88, 94, 20, 69, 73, 88, 94)

2 - List

1- ordered collection of elements

2- enclosed in [] square brackets

3- Mutable, we can change the values in the list

```
In [15]:   list1 = [2, "Muhammad Faiazn Ahmed", True, 3.3]
           list1
```

```
Out[15]:   [2, 'Muhammad Faiazn Ahmed', True, 3.3]
```

```
In [16]:   # Checking Type
           type(list1)
```

```
Out[16]:   list
```

```
In [17]:   # Length of list
           len(list1)
```

```
Out[17]:   4
```

Indexing of List

```
In [18]:   list1[2]
```

```
Out[18]:   True
```

```
In [19]:   list1[2:4]
```

```
Out[19]:   [True, 3.3]
```

```
In [20]:   list1[1::2]
```

```
Out[20]:   ['Muhammad Faiazn Ahmed', 3.3]
```

```
In [21]:   list2 = ["ML Chilla", 23, 5.96, True, "Python Chilla"]
           list2
```

```
Out[21]:   ['ML Chilla', 23, 5.96, True, 'Python Chilla']
```

```
In [22]:   list1
```

```
Out[22]:   [2, 'Muhammad Faiazn Ahmed', True, 3.3]
```

```
In [23]:   # Concatenation
```

```
list1 + list2
```

Out[23]:
```
[2,
 'Muhammad Faiazn Ahmed',
 True,
 3.3,
 'ML Chilla',
 23,
 5.96,
 True,
 'Python Chilla']
```

In [24]:
```python
# Repeatation
list1*2
```

Out[24]: [2, 'Muhammad Faiazn Ahmed', True, 3.3, 2, 'Muhammad Faiazn Ahmed', True, 3.3]

List Operation

In [25]:
```python
# Reverse function

list1.reverse()
list1
```

Out[25]: [3.3, True, 'Muhammad Faiazn Ahmed', 2]

In [26]:
```python
# Append function - add the element in last location of the last

list1.append("Hello! Ammar Bhai")
list1
```

Out[26]: [3.3, True, 'Muhammad Faiazn Ahmed', 2, 'Hello! Ammar Bhai']

In [27]:
```python
# Clear function - clears the whole list

list1.clear()
list1
```

Out[27]: []

In [28]:
```python
list2
```

Out[28]: ['ML Chilla', 23, 5.96, True, 'Python Chilla']

In [29]:
```python
# Pop function - Removes the last element

list2.pop()
list2
```

Out[29]: ['ML Chilla', 23, 5.96, True]

Assignmnet Project - Count Function

In [30]:
```python
# Count function - counts the no. of element present in the list
list2.count("ML Chilla")
```

Out[30]: 1

In [31]:
```python
# Copy function - copies the same list in another variable

list3 = list2.copy()
list3
```

Out[31]: ['ML Chilla', 23, 5.96, True]

In [32]:
```python
 list2
```

Out[32]: ['ML Chilla', 23, 5.96, True]

In [33]:
```python
 list4 = ["Ammar Bhai", "Muhammad Faizan Ahmed", 5, 7.9, True]
 list4
```

Out[33]: ['Ammar Bhai', 'Muhammad Faizan Ahmed', 5, 7.9, True]

In [34]:
```python
# Extend function - add one list in another list at the end

list2.extend(list4)
list2
```

Out[34]:
```
['ML Chilla',
 23,
 5.96,
 True,
 'Ammar Bhai',
 'Muhammad Faizan Ahmed',
 5,
 7.9,
 True]
```

In [35]:
```python
list5 = [29, 19, 57, 45, 30, 100, 22]
list5
```

Out[35]: [29, 19, 57, 45, 30, 100, 22]

In [36]:
```python
# Sort function - sorts the elements of the list

list5.sort()
list5
```

Out[36]: [19, 22, 29, 30, 45, 57, 100]

In [37]:   list2

Out[37]:   ['ML Chilla',
             23,
             5.96,
             True,
             'Ammar Bhai',
             'Muhammad Faizan Ahmed',
             5,
             7.9,
             True]

In [38]:   # Index function - gives the index of any element present in the list
            list2.index("Ammar Bhai")

Out[38]:   4

In [39]:   # Insert function - inserts the elements at any particular index
            list2.insert(3,"Python Chilla")
            list2

Out[39]:   ['ML Chilla',
             23,
             5.96,
             'Python Chilla',
             True,
             'Ammar Bhai',
             'Muhammad Faizan Ahmed',
             5,
             7.9,
             True]

In [40]:   # Remove function - removes any particular element in the list
            list2.remove("Ammar Bhai")
            list2

Out[40]:   ['ML Chilla',
             23,
             5.96,
             'Python Chilla',
             True,
             'Muhammad Faizan Ahmed',
             5,
             7.9,
             True]

---

2 - Dictionaries

1- An unordered collection of elements

2- Key and Value

3- enclosed in {} curly brackets

4- Mutable - values can be changed

In [41]:   # Restaurant Menu

```
Menu_Prices = {"Biryani" : 100, "Alu Matar" : 80, "Roti" : 12, "Samosa" : 15, "Qourma"
Menu_Prices
```

Out[41]: {'Biryani': 100, 'Alu Matar': 80, 'Roti': 12, 'Samosa': 15, 'Qourma': 150}

In [42]:
```
# Checking Type
type(Menu_Prices)
```

Out[42]: dict

List Operation

In [43]:
```
# Keys function - Extracts Keys

Menu_Prices.keys()
```

Out[43]: dict_keys(['Biryani', 'Alu Matar', 'Roti', 'Samosa', 'Qourma'])

In [44]:
```
# Values function - Extracts Value

Menu_Prices.values()
```

Out[44]: dict_values([100, 80, 12, 15, 150])

In [45]:
```
# Items function - Extracts Items

Menu_Prices.items()
```

Out[45]: dict_items([('Biryani', 100), ('Alu Matar', 80), ('Roti', 12), ('Samosa', 15), ('Qourm
         a', 150)])

In [46]:
```
# Adding element in dictionary

Menu_Prices["Bhindi"] = 80
Menu_Prices
```

Out[46]: {'Biryani': 100,
          'Alu Matar': 80,
          'Roti': 12,
          'Samosa': 15,
          'Qourma': 150,
          'Bhindi': 80}

In [47]:
```
# Updating the values

Menu_Prices["Samosa"] = 20
Menu_Prices
```

Out[47]: {'Biryani': 100,
          'Alu Matar': 80,
          'Roti': 12,

```
                        'Samosa': 20,
                        'Qourma': 150,
                        'Bhindi': 80}
```

In [48]:
```
Menu2_Prices = {"Snacks" : 50, "Chocolate" : 20, "Biscuit" : 10}
Menu2_Prices
```

Out[48]:   {'Snacks': 50, 'Chocolate': 20, 'Biscuit': 10}

In [49]:
```
# Update function

Menu_Prices.update(Menu2_Prices)
Menu_Prices
```

Out[49]:   {'Biryani': 100,
             'Alu Matar': 80,
             'Roti': 12,
             'Samosa': 20,
             'Qourma': 150,
             'Bhindi': 80,
             'Snacks': 50,
             'Chocolate': 20,
             'Biscuit': 10}

In [50]:
```
# Clear function - clears the dictionary

Menu2_Prices.clear()
Menu2_Prices
```

Out[50]:   {}

In [51]:
```
# Get function - getting the value of given key

Menu_Prices.get("Biryani")
```

Out[51]:   100

In [52]:
```
# Copy function - copies all the elements from dictionary into another variable

New_Menu = Menu_Prices.copy()


New_Menu
```

Out[52]:   {'Biryani': 100,
             'Alu Matar': 80,
             'Roti': 12,
             'Samosa': 20,
             'Qourma': 150,
             'Bhindi': 80,
             'Snacks': 50,
             'Chocolate': 20,
             'Biscuit': 10}

In [53]:
```
# Popitem function - removes the last element from dictionary
```

```
      New_Menu.popitem()
      New_Menu
```

Out[53]:
```
{'Biryani': 100,
 'Alu Matar': 80,
 'Roti': 12,
 'Samosa': 20,
 'Qourma': 150,
 'Bhindi': 80,
 'Snacks': 50,
 'Chocolate': 20}
```

In [54]:
```
# Pop function - removes any particular element from dictionary

New_Menu.pop("Biryani")
New_Menu
```

Out[54]:
```
{'Alu Matar': 80,
 'Roti': 12,
 'Samosa': 20,
 'Qourma': 150,
 'Bhindi': 80,
 'Snacks': 50,
 'Chocolate': 20}
```

In [55]:
```
# fromkeys function - assigns each letter a specific value

New_Menu.fromkeys("Alu Matar", 10)
```

Out[55]:
```
{'A': 10, 'l': 10, 'u': 10, ' ': 10, 'M': 10, 'a': 10, 't': 10, 'r': 10}
```

In [56]:
```
# setdefault function - gets the value of any particular key

New_Menu.setdefault("Snacks")
```

Out[56]: 50

---

4 - Set

1- Unordered and Indexed

2- enclose in {} curly braces

3- No duplicates are allowed

In [57]:
```
set1 = {2, 89.4, "Muhammad Faizan Ahmed", False}
set1
```

Out[57]: {2, 89.4, False, 'Muhammad Faizan Ahmed'}

In [58]:
```
# Checking Type
```

```
type(set1)
```

Out[58]: set

In [59]:
```python
# Length of Set

len(set1)
```

Out[59]: 4

Set Operation

In [60]:
```python
# Adding elements in Set

set1.add("ML Chilla")
set1
```

Out[60]: {2, 89.4, False, 'ML Chilla', 'Muhammad Faizan Ahmed'}

In [61]:
```python
# Removing elements from Set

set1.remove(89.4)
set1
```

Out[61]: {2, False, 'ML Chilla', 'Muhammad Faizan Ahmed'}

In [62]:
```python
set1
```

Out[62]: {2, False, 'ML Chilla', 'Muhammad Faizan Ahmed'}

In [63]:
```python
# Copy function = copies the same set into another variable

set2 = set1.copy()
set2
```

Out[63]: {2, False, 'ML Chilla', 'Muhammad Faizan Ahmed'}

In [64]:
```python
# Clear function - clears the whole set

set1.clear()
set1
```

Out[64]: set()

In [65]:
```python
# Pop function - randomly removes the element from set

set2.pop()
set2
```

Out[65]: {2, 'ML Chilla', 'Muhammad Faizan Ahmed'}

In [66]:
```python
set1.add(5)
set1
```

Out[66]: {5}

In [67]:
```python
# Union function

set3 = {2,5,6,8}
set4 = {2,7,6,1,8,5,9}

set3.union(set4)
```

Out[67]: {1, 2, 5, 6, 7, 8, 9}

In [68]:
```python
# Intersection Function

set3.intersection(set4)
```

Out[68]: {2, 5, 6, 8}

In [69]:
```python
# Subset function - checks whether one set is subset of another set

set3.issubset(set4)
```

Out[69]: True

In [70]:
```python
# Superset function - checks whether one set is superset of another set

set4.issuperset(set3)
```

Out[70]: True

In [71]:
```python
# Difference function

set4.difference(set3)
```

Out[71]: {1, 7, 9}

In [72]:
```python
set4
```

Out[72]: {1, 2, 5, 6, 7, 8, 9}

In [73]:
```python
# Discard function

set4.discard(5)
set4
```

Out[73]: {1, 2, 6, 7, 8, 9}

In [74]:
```python
# Symmetric function

set4.symmetric_difference(set3)
```

Out[74]: {1, 5, 7, 9}

In [75]:
```python
# Isdisjoint function

set4.isdisjoint(set3)
```

Out[75]: False