Pyhton Data structures

There are 4 pthon data structures

- list
- sets
- tupels
- dictionary

1. List

In [ ]:
```
* Heterogenuos Datastructure
* 1 dimensional
* Allows Duplicate values
* Mutable - The entries are changeable at anytime
* slicable because list is indexable
```

In [4]:
```
scores = [] #empty list
```

In [9]:
```
scores
```

Out[9]:
```
[]
```

In [8]:
```
type(scores)
```

Out[8]:
```
list
```

In [11]:
```
scores = [780,45,98,214] #Homogenous values ie ony numerical values
scores
```

Out[11]:
```
[780, 45, 98, 214]
```

In [13]:
```
names = ["alex",548,"harry",78.54] #Heterogenous means it can take float int string
names
```

Out[13]:
```
['alex', 548, 'harry', 78.54]
```

In [15]:
```
names = ["alex",548,"harry",78.54,"alex","harry",78.54] #Allows duplicate values
names
```

Out[15]:
```
['alex', 548, 'harry', 78.54, 'alex', 'harry', 78.54]
```

In [18]:
```
names[0] ="Robby"  #mutable can change values any time
```

In [19]:
```
names
```

Out[19]:
```
['Robby', 548, 'harry', 78.54, 'alex', 'harry', 78.54]
```

In [20]:
```
names[2:]    #indexable
```

Out[20]:
```
['harry', 78.54, 'alex', 'harry', 78.54]
```

In [21]:
```
#names[0:5] #positive indexing
names[:-2]  #negative indexing
```

Out[21]:
```
['Robby', 548, 'harry', 78.54, 'alex']
```

In [23]:
```
names[-5:]
```

Out[23]:
```
['harry', 78.54, 'alex', 'harry', 78.54]
```

In [26]:
```
names.append("sandra")  # we can add values at anytime
```

In [27]:
```
names
```

Out[27]:
```
['Robby', 548, 'harry', 78.54, 'alex', 'harry', 78.54, 'sandra', 'sandra']
```

2. Sets

- 1 Dimensional datastructures
- Heterogeneous
- Duplicate values Not Allowed
- Not slicable because not indexable
- Mutable - because values can be changed anytime

In [30]:
```
empty_set= set() #empty set syntax
type(empty_set)
```

Out[30]:
```
set
```

In [31]:
```
temp={45,85,78,59}
```

In [32]:
```
temp
```

Out[32]:
```
{45, 59, 78, 85}
```

In [33]:
```
type(temp)
```

Out[33]:
```
set
```

In [36]:
```
temp={45,85,78,59,"Swapnil",45,85,78} # Heterogenous
# Duplicate values not allowed
```

In [37]:
```
temp
```

Out[37]:
```
{45, 59, 78, 85, 'Swapnil'}
```

In [40]:
```
temp[0] #not indexable
temp[0:2] # not slicable
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-40-2846fe74461c> in <module>
----> 1 temp[0] #not indexable
      2 temp[0:2] # not slicable

TypeError: 'set' object is not subscriptable
```

In [41]:
```
temp.add(5)
```

In [42]:
```
temp
```

Out[42]:
```
{45, 5, 59, 78, 85, 'Swapnil'}
```

3. Tuple

- 1 Dimentional datastructure
- Heterogenous
- Allows duplicate values
- Slicable as it is indexable
- Not mutable - values once got assigned to a tuple variable, it cannot be changed in future. We have to create a new tuple variable.

In [43]:
```
empty_tuple = ()
type(empty_tuple)
```

Out[43]:
```
tuple
```

In [46]:
```
time = (78,85,964,2.5,36.4,"alex",78,85,964,2.5,36.4,"harry") # Heterogenous
                                                              # Allows duplicate values
time
```

Out[46]:
```
(78, 85, 964, 2.5, 36.4, 'alex', 78, 85, 964, 2.5, 36.4, 'harry')
```

In [48]:
```
time[4]    # indexable
```

Out[48]:
```
36.4
```

In [49]:
```
time[4:9]  #slicable
```

Out[49]:
```
(36.4, 'alex', 78, 85, 964)
```

In [51]:
```
time[4]= (2.5)   # Not mutable
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-51-55640a2d9776> in <module>
----> 1 time[4]= (2.5)   # Not mutable

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

4. Dictionary(dict) - Key:Value pair

- 2 Dimentional Datastructure
- Heterogenous
- It can duplicate values but not recommended to have duplicate keys (duplicate keys not allowed)
- Not slicable, because not indexable

In [52]:
```
empty_dict = {}
type(empty_dict)
```

Out[52]:
```
dict
```

In [57]:
```
shopping_cart = {"Tomato":5,
                 "Oats": 1,
                 "Almonds": 0.5,
                 "Black Raisins":0.5,
                 "Oats":3}       # Duplicate keys not allowed
shopping_cart
```

Out[57]:
```
{'Tomato': 5, 'Oats': 3, 'Almonds': 0.5, 'Black Raisins': 0.5}
```

In [60]:
```
shopping_cart.keys()
```

Out[60]:
```
dict_keys(['Tomato', 'Oats', 'Almonds', 'Black Raisins'])
```

In [61]:
```
shopping_cart.values()
```

Out[61]:
```
dict_values([5, 3, 0.5, 0.5])
```

In [11]:
```
team_sequence = {"Names":['Dhoni','virat','sachin'],
                 "Age":[45,30,50],
                 "Position":['W-keeper','Batting','Batting']}
```

In [15]:
```
team_sequence
```

Out[15]:
```
{'Names': ['Dhoni', 'virat', 'sachin'],
 'Age': [45, 30, 50],
 'Position': ['W-keeper', 'Batting', 'Batting']}
```

In [16]:
```
# Two dimensional datastructure
import pandas as pd
pd.DataFrame(team_sequence)
```

Out[16]:

	Names	Age	Position
0	Dhoni	45	W-keeper
1	virat	30	Batting
2	sachin	50	Batting

In [ ]:
```

```