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Deep learning (Task 5)

What is introducing sets?

A Set in Python programming is an unordered collection data type that is iterable, mutable and has no duplicate elements.

Set are represented by { } (values enclosed in curly braces)

The major **Advantage** of using a set, as opposed to a list, is that it has a highly optimized method for checking whether a specific element is contained in the set. This is based on a data structure known as a hash table. Since sets are unordered, we cannot access items using indexes as we do in lists.

Example

```
# a set cannot have duplicate values
myset = {"Geeks", "for", "Geeks"}
print(myset)

# values of a set cannot be changed
myset[1] = "Hello"
print(myset)
```

Error Generate:

The first code explains that the set cannot have a duplicate value. Every item in it is a unique value.

The second code generates an error because we cannot assign or change a value once the set is created. We can only add or delete items in the set.

{'Geeks', 'for'}

TypeError: 'set' object does not support item assignment

In some cases it will not generate error but not duplicate data exist represent just single element.

Heterogeneous Element with Python Set

Python sets can store heterogeneous elements in it, i.e., a set can store a mixture of string, integer, boolean, etc datatypes.

Python Frozen Sets

Frozen sets in Python are immutable objects that only support methods and operators that produce a result without affecting the frozen set or sets to which they are applied. It can be done with frozenset() method in Python.

While elements of a set can be modified at any time, elements of the frozen set remain the same after creation.

If no parameters are passed, it returns an empty frozenset.

Different sets functions

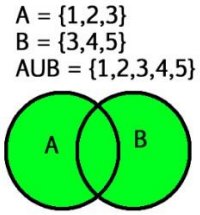
1. Add() : used “add” for add element
2. Union() : used symbol “|” or union for union 2 sets
3. Intersection():used symbol “&” or intersection for intersection 2 sets
4. Difference():used symbol “-” for difference 2 sets
5. Clear() : to clear the sets

Union

Python set Union() Method returns a new set which contains all the items from the original set.
Union of two given sets is the set which contains all the elements of both the sets. The union of two given sets A and B is a set which consists of all the elements of A and all the elements of B such that no element is repeated.

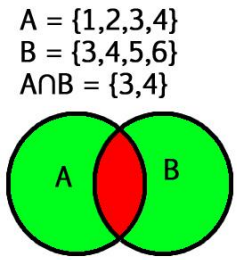
*The symbol for denoting union of sets is **‘U’***

Python set Union() Method Syntax:
Syntax: *set1.union(set2, set3, set4….)*



Intersection

Python set intersection() method returns a new set with an element that is common to all set
The intersection of two given sets is the largest set, which contains all the elements that are common to both sets. The intersection of two given sets A and B is a set which consists of all the elements which are common to both A and B.



Python Set intersection() Method Syntax:

Syntax: *set1.intersection(set2, set3, set4….)*

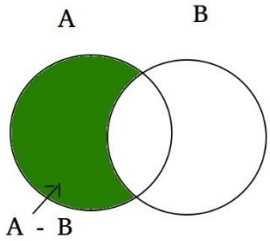
Parameters:

- *any number of sets can be passed*

Return: *Returns a set which has the intersection of all sets(set1, set2, set3…) with set1. It returns a copy of set1 only if no parameter is passed.*

Difference

The difference between the two sets in Python is equal to the difference between the number of elements in two sets. The function difference() returns a set that is the difference between two sets. Let's try to find out what will be the difference between two sets A and B. Then (set A – set B) will be the elements present in set A but not in B and (set B – set A) will be the elements present in set B but not in set A.



Example:

set A = {10, 20, 30, 40, 80}

set B = {100, 30, 80, 40, 60}

set A - set B = {10, 20}

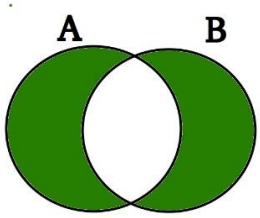
set B - set A = {100, 60}

Explanation: A - B is equal to the elements present in A but not in B

B - A is equal to the elements present in B but not in A

Symmetric Difference

Python Set symmetric_difference() Method is used to get the **elements present in either of the two sets, but not common to both the sets**. Let's look at the Venn diagram of the symmetric_difference between two sets.



Symmetric Difference is marked in Green If there are a set_A and set_B, then the symmetric difference between them will be equal to the union of set_A and set_B without the intersection between the two. It is the opposite of intersection.

Python set symmetric_difference() Method Syntax

Syntax: *set_A.symmetric_difference(set_B)*

Parameter: *Takes a single parameter that has to be a set*

Finding symmetric with this symbol "^"

Making data unique with sets

The set is the unordered collection of unique elements

Using set() property of Python, we can easily check for the unique values. Insert the values of the list in a set. Set only stores a value once even if it is inserted more than once. After inserting all the values in the set by list_set=set(list), convert this set to a list to print it.

Enumerate function ()

When dealing with iterators, we also get need to keep a count of iterations. Python eases the programmers' task by providing a built-in function enumerate() for this task. Enumerate() method adds a counter to an iterable and returns it in a form of enumerating object. This enumerated object can then be used directly for loops or converted into a list of tuples using the list() function.

Syntax:

enumerate(iterable, start=0)

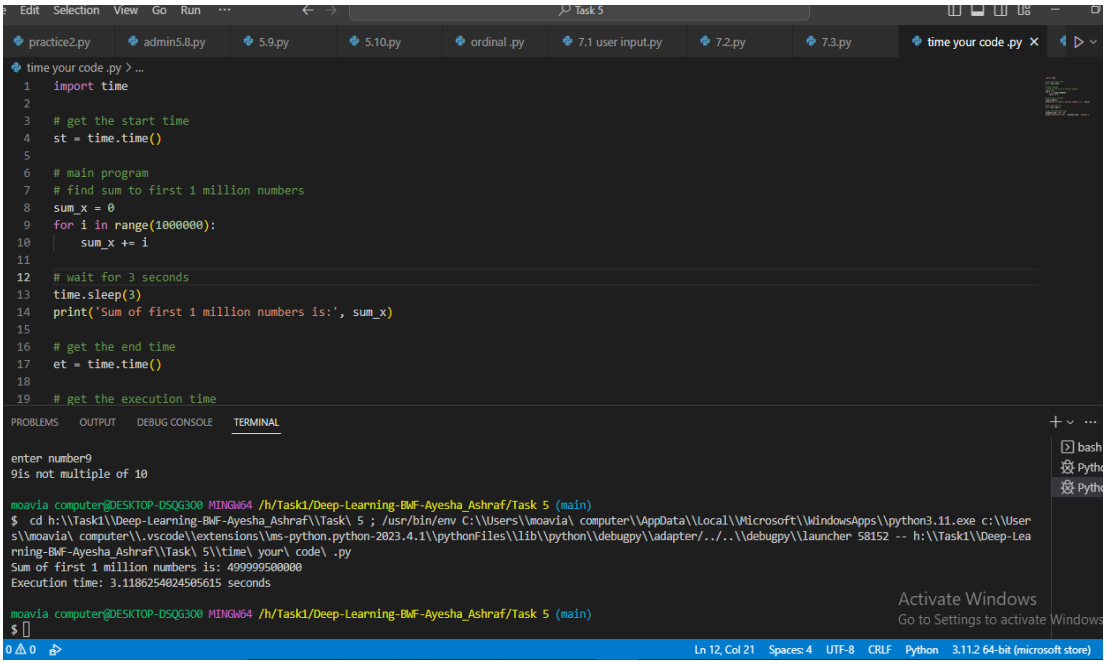
Parameters:

- **Iterable:** any object that supports iteration
- **Start:** the index value from which the counter is to be started, by default it is 0

Time your code

We will use the following four ways to measure the execution time in Python: –

- time.time() function: measure the the total time elapsed to execute the script in seconds.
- time.process_time(): measure the CPU execution time of a code
- timeit module: measure the execution time of a small piece of a code including the single line of code as well as multiple lines of code
- DateTime module: measure the execution time in the hours-minutes-seconds format.



admin5.8.py > ...

```python
import time

# get the start time
st = time.time()

users=['Ali','farhan','amna','admin']
for user in users:
    if user=='admin':
        print('would like to see the status report')
    else:
        print("Hi" +user+ "thanks for login")
# get the end time
et = time.time()

# get the execution time
elapsed_time = et - st
print('Execution time:', elapsed_time, 'seconds')
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
moavia computer@DESKTOP-DSQG3O0 MINGW64 /h/Task1/Deep-Learning-BWF-Ayesha_Ashraf/Task 5 (main)
$  cd h:\\Task1\\Deep-Learning-BWF-Ayesha_Ashraf\\Task\ 5 ; /usr/bin/env C:\\Users\\moavia\ computer\\AppData\\Local\\Microsoft\\WindowsApps\\python3.11.exe c:\\Users\\moavia\ computer\\.vscode\\extensions\\ms-python.python-2023.4.1\\pythonFiles\\lib\\python\\debugpy\\adapter/../..\\debugpy\\launcher 58182 -- h:\\Task1\\Deep-Learning-BWF-Ayesha_Ashraf\\Task\ 5\\admin5.8.py
HiAlithanks for login
Hifarhanthanks for login
Hiamnathanks for login
would like to see the status report
Execution time: 0.001995563507080078 seconds

moavia computer@DESKTOP-DSQG3O0 MINGW64 /h/Task1/Deep-Learning-BWF-Ayesha_Ashraf/Task 5 (main)
$
```