String data type (OR) str class

What is string?

String is collection of characters and these characters can be alphabets, digits and special characters.
String is an immutable sequence of characters, after creating string changes cannot be done; It does not support mutable operations like append, insert, remove, pop,…
String is non numeric data type; we cannot perform arithmetic operations on string.

Example: name, address, product name, customer name, course name, user name, password,…

How to create string?

String is created in different ways.

1. String is created by representing characters within single quotes
2. String is created by representing characters within double quotes
3. String is created by representing characters within triple quotes (triple single quotes or triple double quotes)
4. String is created using str() function

Within single quotes we can represent single line string

```
>>> s1='python'
>>> s2='45'
>>> s3='python3.13'
>>> s4='python123$'
>>> print(s1,s2,s3,s4,type(s1),type(s2),type(s3),type(s4))
python 45 python3.13 python123$ <class 'str'> <class 'str'> <class 'str'>
<class 'str'>
```

within single quotes we can embed or insert double quotes

```
>>> s5='python is "easy" language'
>>> print(s5)
python is "easy" language
```

Within double quotes we can represent single line string

```
>>> str1="python"
>>> str2="1.5"
>>> str3="python3.13"
>>> str4="python123@gmail.com"
>>> print(str1,str2,str3,str4,type(str1),type(str2),type(str3),type(str4))
python 1.5 python3.13 python123@gmail.com <class 'str'> <class 'str'>
<class 'str'> <class 'str'>
>>>
```

Within double quotes we can insert single quotes or we can embed single quotes

```
>>> str5="python is 'simple' language"
>>> print(str5)
python is 'simple' language
```

```
>>> s1='''python is high level langauge
... python is oop langauge
... python is scripting language'''
>>> print(s1)
python is high level langauge
python is oop langauge
python is scripting language
>>> s2="""Python
... Jython
... Rpython
... IronPython"""
>>> print(s2)
Python
Jython
Rpython
IronPython
```

What is doc string in python and how to define doc string in python?

A docstring, short for documentation string, serves as an in-code documentation method in Python. It is a string literal that appears as the first statement in a module, class, function, or method definition. Docstrings are used to explain the purpose, arguments, and behavior of the code element they document. Unlike regular comments, docstrings are accessible at runtime through the __doc__ attribute and the built-in help() function.

Docstrings are written within triple quotes, which can be single (''') or double ("""). They support both single-line and multi-line formats.

test1.py

```
'''
ApplicationName: ATM
Author: NareshIT
Description:

'''
```

```
>>> import test191
>>> print(test191.__doc__)

ApplicationName: ATM
Author: NareshIT
Description:
>>> help(test191)
Help on module test191:

NAME
    test191

DESCRIPTION
    ApplicationName: ATM
    Author: NareshIT
    Description:

FILE
    d:\fspmar5pm\test191.py
```

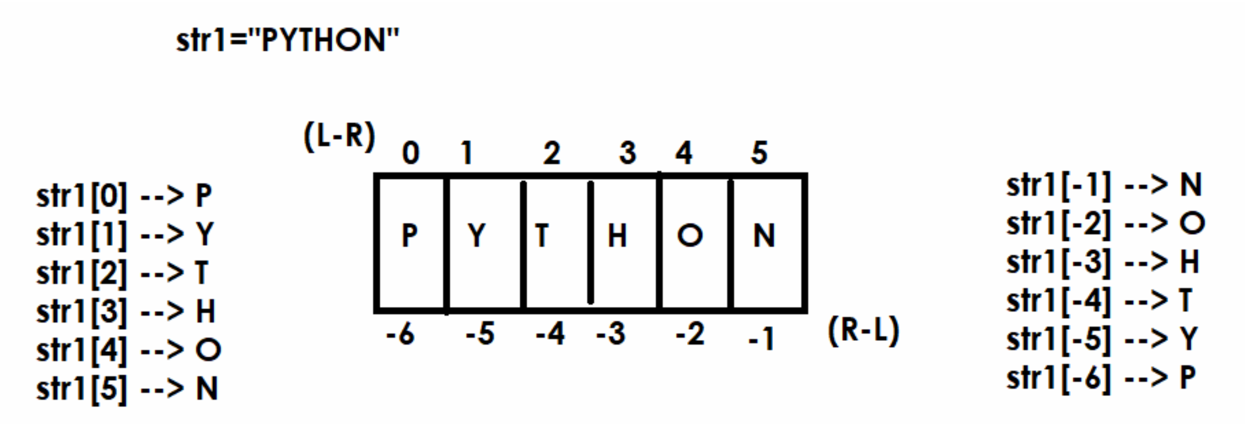
str() type or function

str type is used for representing string object
It is a type conversion function used for creating string object using other types.

Syntax1: str() : empty string
Syntax2: str(object) : convert object into string type

```
>>> s1=str()
>>> print(s1,type(s1))
 <class 'str'>
>>> print(len(s1))
0
>>> s2=str("python")
>>> print(s2,type(s2))
python <class 'str'>
>>> s3=str(23)
>>> print(s3,type(s3))
23 <class 'str'>
>>> s4=str(1.5)
>>> print(s4,type(s4))
1.5 <class 'str'>
>>> s5=str((10,20,30))
>>> print(s5,type(s5))
(10, 20, 30) <class 'str'>
>>> print(len(s5))
12
```

String is an immutable sequence and ordered collection, we can read content of string using index, slicing, for, iterator and enumerate.



```
str1[0] --> P
str1[1] --> Y
str1[2] --> T
str1[3] --> H
str1[4] --> O
str1[5] --> N
```

```
str1[-1] --> N
str1[-2] --> O
str1[-3] --> H
str1[-4] --> T
str1[-5] --> Y
str1[-6] --> P
```

Example of immutability:

```
>>> s1="PYTHON"
>>> s1[0]
'P'
>>> s1[0]='J'
```

```
Traceback (most recent call last):
  File "<pyshell#45>", line 1, in <module>
    s1[0]='J'
TypeError: 'str' object does not support item assignment
>>> del s1[0]
Traceback (most recent call last):
  File "<pyshell#46>", line 1, in <module>
    del s1[0]
TypeError: 'str' object doesn't support item deletion
>>> s1.append('X')
Traceback (most recent call last):
  File "<pyshell#47>", line 1, in <module>
    s1.append('X')
AttributeError: 'str' object has no attribute 'append'
```

Example:

```
#Python program to check whether the string is
# Symmetrical or Palindrome

str1=input("Enter any String ")

str2=str1[::-1]
if str1==str2:
    print("Palindrome")
else:
    print("Not Palindrom")

if len(str1)%2!=0:
    print("Not Symmetrical")
else:
    h1=str1[:len(str1)//2]
    h2=str1[len(str1)//2:]
    if h1==h2:
        print("Symmetrical")
    else:
        print("Not Symmetrical")
```

Output

```
Enter any String amaama
Palindrome
```

```
Symmetrical

Enter any String khokho
Not Palindrom
Symmetrical

Enter any String madam
Palindrome
Not Symmetrical
```

Example:

```
# Find Length of String in Python
# without using len function

str1=input("Enter any string ")
c=0

for ch in str1:
    c=c+1

print(f'length of string is {c}')
```

Output

```
Enter any string abc
length of string is 3

Enter any string python
length of string is 6
```

Example:

```
# Write a program to count alphabets, digits, special characters
# in given string

str1=input("Enter any string ")
ac,dc,sc=0,0,0

for ch in str1:
    if ch>='A' and ch<='Z' or ch>='a' and ch<='z':
        ac=ac+1
    elif ch>='0' and ch<='9':
        dc+=1
    else:
        sc+=1

print(f'Alphabet Count {ac}')
print(f'Digit Count {dc}')
print(f'Special Character Count {sc}')
```

Output

```
Enter any string ab12@$67cd
Alphabet Count 4
Digit Count 4
Special Character Count 2
```

Predefined methods or functions of str class or data type

The methods of str data type are immutable. These methods are does not do any changes within string, it returns changes in new string.