

Open a file and print the content:

```
f = open("demofile.txt", "r")  
print(f.read())
```

## Definition and Usage

The `open()` function opens a file, and returns it as a file object.

Read more about file handling in our chapters about [File Handling](#).

## Syntax

```
open(file, mode)
```

## Parameter Values

Parameter	Description
<i>file</i>	The path and name of the file
<i>mode</i>	A string, define which mode you want to open the file in:  <div><p>"r" - Read - Default value. Opens a file for reading, error if the file does not exist</p><p>"a" - Append - Opens a file for appending, creates the file if it does not exist</p><p>"w" - Write - Opens a file for writing, creates the file if it does not exist</p><p>"x" - Create - Creates the specified file, returns an error if the file exist</p></div> <p>In addition you can specify if the file should be handled as binary or text mode</p> <div><p>"t" - Text - Default value. Text mode</p><p>"b" - Binary - Binary mode (e.g. images)</p></div>

## **RUNNING A .PY SCRIPT FILE USING JUPYTER NOTEBOOK IN PYTHON**

```
In [6]: %run C:/NKNPYTHCODES-03SEP2021/script02.py
```

```
Enter the number: 234
Input Number by the user = 234
Orignum = 0
Input Number by the user = 0
Reversed Number = 432
```

**C:/NKNPYTHCODES-03SEP2021/script02.py**

**#Normal Logic to reverse a given number in python**

```
orignum = int(input("Enter the number: "))
```

```
n1 = orignum
```

```
revnum = 0
```

```
sum = 0
```

```
print("Input Number by the user = ", orignum)
```

```
while(orignum>0):
```

```
    mod1 = orignum % 10
```

```
    revnum = (revnum * 10) + mod1
```

```
    orignum = (orignum // 10)
```

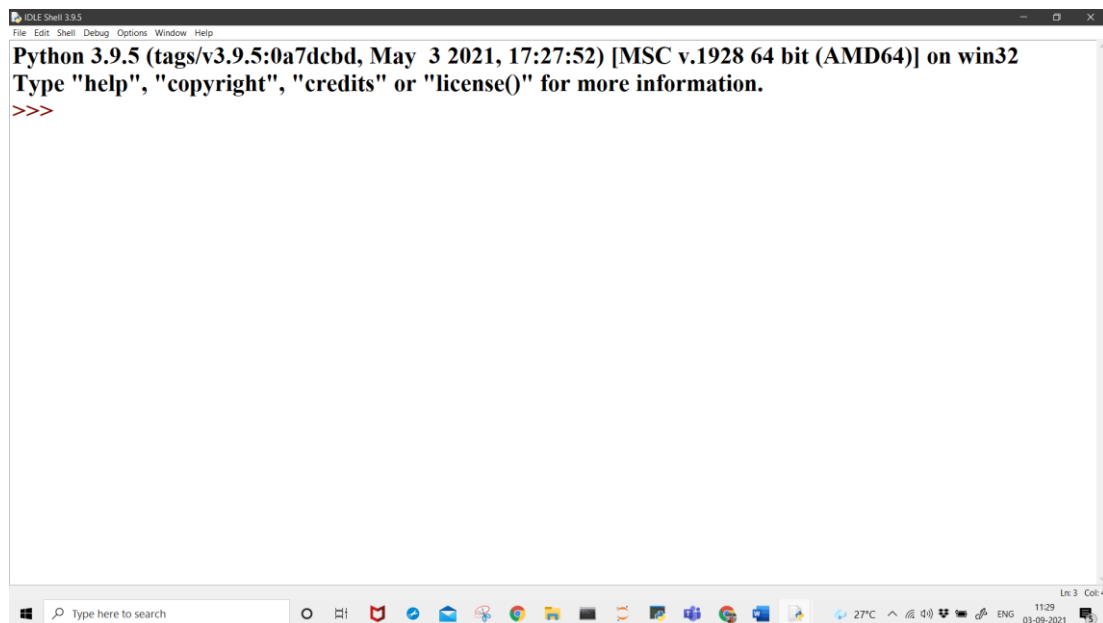
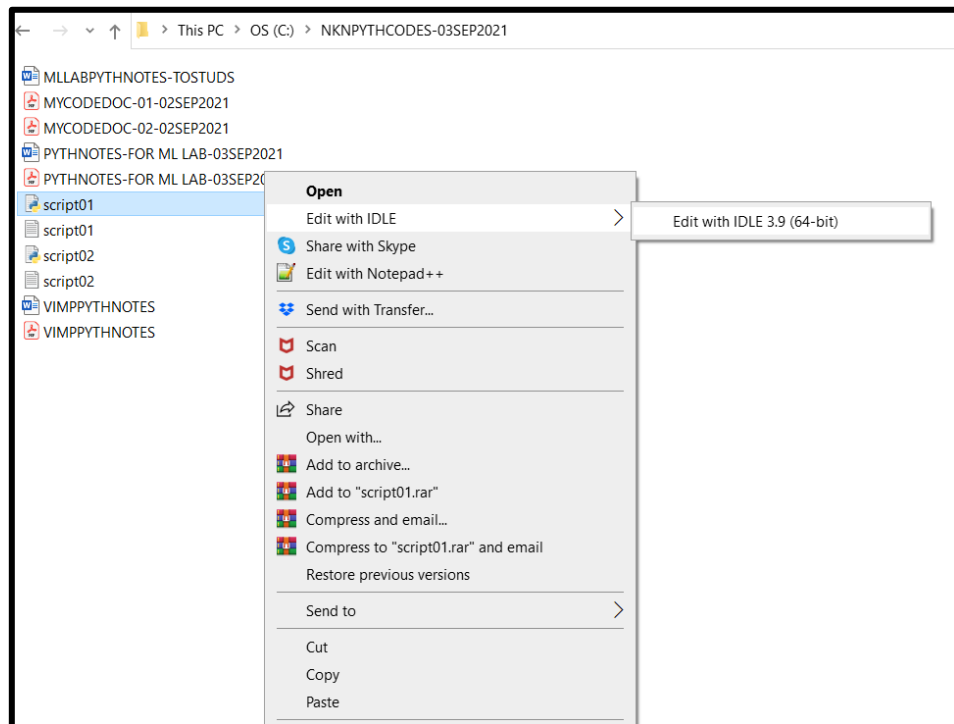
```
print("Orignum = ", orignum)
```

```
print("Input Number by the user = ", orignum)
```

```
print("Reversed Number = ", revnum)
```

```
*****
```

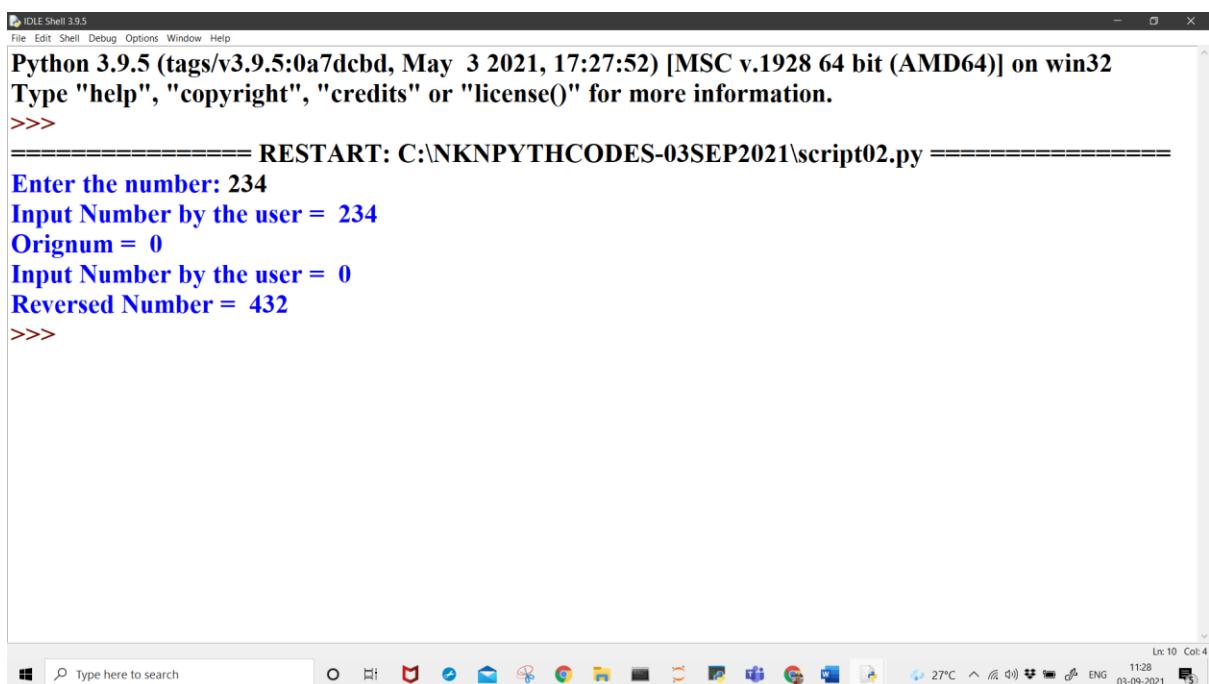
## RUNNING A .PY SCRIPT FILE USING IDLE IN PYTHON



## #Normal Logic to reverse a given number in python

```
orignum = int(input("Enter the number: "))
n1 = orignum
revnum = 0
sum = 0
print("Input Number by the user = ", orignum)
while(orignum>0):
    mod1 = orignum % 10
    revnum = (revnum * 10) + mod1
    orignum = (orignum // 10)

print("Orignum = ", orignum)
print("Input Number by the user = ", orignum)
print("Reversed Number = ", revnum)
```



The screenshot shows a Python IDE Shell window titled "IDLE Shell 3.9.5". The window displays the output of a Python script. The first line shows the Python version and system information: "Python 3.9.5 (tags/v3.9.5:0a7dcdb, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32". The second line shows the command prompt prompt ">>>". The third line shows the command "RESTART: C:\NKNPYTHCODES-03SEP2021\script02.py". The fourth line shows the input "Enter the number: 234". The fifth line shows the output "Input Number by the user = 234". The sixth line shows the output "Orignum = 0". The seventh line shows the output "Input Number by the user = 0". The eighth line shows the output "Reversed Number = 432". The ninth line shows the command prompt prompt ">>>". The window has a menu bar with "File", "Edit", "Shell", "Debug", "Options", "Window", and "Help". The status bar at the bottom shows "Ln: 10 Col: 4", "27°C", "11:28", "03-09-2021", and "ENG".

```
Python 3.9.5 (tags/v3.9.5:0a7dcdb, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\NKNPYTHCODES-03SEP2021\script02.py =====
Enter the number: 234
Input Number by the user = 234
Orignum = 0
Input Number by the user = 0
Reversed Number = 432
>>>
```











```
a = "Hello"  
print(a)
```

```
a = """Lorem ipsum dolor sit amet,  
consectetur adipiscing elit,  
sed do eiusmod tempor incididunt  
ut labore et dolore magna aliqua."""  
print(a)
```

```
a = '''Lorem ipsum dolor sit amet,  
consectetur adipiscing elit,  
sed do eiusmod tempor incididunt  
ut labore et dolore magna aliqua.'''  
print(a)
```

```
a = "Hello, World!"  
print(a[1])
```

```
for x in "banana":  
    print(x)
```

```
a = "Hello, World!"  
print(len(a))
```

```
txt = "The best things in life are free!"  
print("free" in txt)
```

```
txt = "The best things in life are free!"  
if "free" in txt:  
    print("Yes, 'free' is present.")
```

```
txt = "The best things in life are free!"  
print("expensive" not in txt)
```

```
txt = "The best things in life are free!"  
if "expensive" not in txt:  
    print("No, 'expensive' is NOT present.")
```

```
b = "Hello, World!"  
print(b[2:5])
```

```
b = "Hello, World!"  
print(b[:5])
```

```
b = "Hello, World!"  
print(b[2:])
```

## Negative Indexing

```
b = "Hello, World!"  
print(b[-5:-2])
```

```
a = "Hello, World!"  
print(a.upper())
```

```
a = "Hello, World!"  
print(a.lower())
```

```
a = " Hello, World! "  
print(a.strip()) # returns "Hello, World!"
```

```
a = "Hello, World!"  
print(a.replace("H", "J"))
```

```
a = "Hello, World!"  
print(a.split(", ")) # returns ['Hello', ' World!']
```

```
a = "Hello"  
b = "World"  
c = a + b  
print(c)
```

```
a = "Hello"
b = "World"
c = a + " " + b
print(c)
```

```
age = 36
txt = "My name is John, I am " + age
print(txt)
```

```
age = 36
txt = "My name is John, and I am {}"
print(txt.format(age))
```

```
quantity = 3
itemno = 567
price = 49.95
myorder = "I want {} pieces of item {} for {} dollars."
print(myorder.format(quantity, itemno, price))
```

Output:

```
I want 3 pieces of item 567 for 49.95 dollars.
```

```
quantity = 3
itemno = 567
price = 49.95
myorder = "I want to pay {2} dollars for {0} pieces of item {1}."
print(myorder.format(quantity, itemno, price))
```

Output:

```
I want to pay 49.95 dollars for 3 pieces of item 567
```

# Escape Characters

Other escape characters used in Python:

Code	Result
\'	Single Quote
\\	Backslash
\n	New Line
\r	Carriage Return
\t	Tab
\b	Backspace
\f	Form Feed
\ooo	Octal value
\xhh	Hex value

**center()** Returns a centered string

**count()** Returns the number of times a specified value occurs in a string

**endswith()** Returns true if the string ends with the specified value

**expandtabs()** Sets the tab size of the string

**find()** Searches the string for a specified value and returns the position of where it was found

**format()** Formats specified values in a string

<u>index()</u>	Searches the string for a specified value and returns the position of where it was found
<u>isalnum()</u>	Returns True if all characters in the string are alphanumeric
<u>isalpha()</u>	Returns True if all characters in the string are in the alphabet
<u>isdecimal()</u>	Returns True if all characters in the string are decimals
<u>isdigit()</u>	Returns True if all characters in the string are digits
<u>isidentifier()</u>	Returns True if the string is an identifier
<u>islower()</u>	Returns True if all characters in the string are lower case
<u>isnumeric()</u>	Returns True if all characters in the string are numeric
<u>isprintable()</u>	Returns True if all characters in the string are printable
<u>isspace()</u>	Returns True if all characters in the string are whitespaces
<u>isupper()</u>	Returns True if all characters in the string are upper case
<u>join()</u>	Joins the elements of an iterable to the end of the string
<u>ljust()</u>	Returns a left justified version of the string
<u>lower()</u>	Converts a string into lower case
<u>lstrip()</u>	Returns a left trim version of the string
<u>maketrans()</u>	Returns a translation table to be used in translations
<u>partition()</u>	Returns a tuple where the string is parted into three parts
<u>replace()</u>	Returns a string where a specified value is replaced with a specified value
<u>rfind()</u>	Searches the string for a specified value and returns the last position of where it was found
<u>rindex()</u>	Searches the string for a specified value and returns the last position of where it was found
<u>rjust()</u>	Returns a right justified version of the string
<u>rpartition()</u>	Returns a tuple where the string is parted into three parts
<u>rsplit()</u>	Splits the string at the specified separator, and returns a list
<u>rstrip()</u>	Returns a right trim version of the string
<u>split()</u>	Splits the string at the specified separator, and returns a list
<u>splitlines()</u>	Splits the string at line breaks and returns a list
<u>startswith()</u>	Returns true if the string starts with the specified value

<code>strip()</code>	Returns a trimmed version of the string
<code>swapcase()</code>	Swaps cases, lower case becomes upper case and vice versa
<code>title()</code>	Converts the first character of each word to upper case
<code>translate()</code>	Returns a translated string
<code>upper()</code>	Converts a string into upper case
<code>zfill()</code>	Fills the string with a specified number of 0 values at the beginning

# Python Lists

```
mylist = ["apple", "banana", "cherry"]
```

## List

Lists are used to store multiple items in a single variable.

Lists are one of 4 built-in data types in Python used to store collections of data, the other 3 are [Tuple](#), [Set](#), and [Dictionary](#), all with different qualities and usage.

Lists are created using square brackets:

### Example

Create a List:

```
thislist = ["apple", "banana", "cherry"]  
print(thislist)
```

```
thislist = ["apple", "banana", "cherry"]  
print(len(thislist))
```

List items can be of any data type:

```
list1 = ["apple", "banana", "cherry"]  
list2 = [1, 5, 7, 9, 3]  
list3 = [True, False, False]
```

```
list1 = ["abc", 34, True, 40, "male"]
```

## type()

From Python's perspective, lists are defined as objects with the data type 'list':

```
<class 'list'>
```

```
mylist = ["apple", "banana", "cherry"]  
print(type(mylist))
```

# The list() Constructor

It is also possible to use the `list()` constructor when creating a new list.

# note the double round-brackets

```
thislist = list(("apple", "banana", "cherry"))  
print(thislist)
```

## Python Collections (Arrays)

There are four collection data types in the Python programming language:

- **List** is a collection which is ordered and changeable. Allows duplicate members.
- **Tuple** is a collection which is ordered and unchangeable. Allows duplicate members.
- **Set** is a collection which is unordered and unindexed. No duplicate members.
- **Dictionary** is a collection which is ordered\* and changeable. No duplicate members.

\*As of Python version 3.7, dictionaries are *ordered*. In Python 3.6 and earlier, dictionaries are *unordered*.

When choosing a collection type, it is useful to understand the properties of that type. Choosing the right type for a particular data set could mean retention of meaning, and, it could mean an increase in efficiency or security.

List items are indexed and you can access them by referring to the index number:

**Note:** The first item has index 0.

## Negative Indexing

Negative indexing means start from the end

`-1` refers to the last item, `-2` refers to the second last item etc.

```
thislist = ["apple", "banana", "cherry"]  
print(thislist[-1])
```

## Range of Indexes

You can specify a range of indexes by specifying where to start and where to end the range.

When specifying a range, the return value will be a new list with the specified items.



```
thislist =  
["apple", "banana", "cherry", "orange", "kiwi", "melon", "mango"]  
print(thislist[2:5])
```

**Note:** The search will start at index 2 (included) and end at index 5 (not included).

```
thislist =  
["apple", "banana", "cherry", "orange", "kiwi", "melon", "mango"]  
print(thislist[2:])
```

Specify negative indexes if you want to start the search from the end of the list:

This example returns the items from "orange" (-4) to, but NOT including "mango" (-1):

```
thislist =  
["apple", "banana", "cherry", "orange", "kiwi", "melon", "mango"]  
print(thislist[-4:-1])
```

```
thislist = ["apple", "banana", "cherry"]  
if "apple" in thislist:  
    print("Yes, 'apple' is in the fruits list")
```

```
thislist = ["apple", "banana", "cherry"]  
thislist[1] = "blackcurrant"  
print(thislist)
```

```
thislist = ["apple", "banana", "cherry", "orange", "kiwi", "mango"]  
thislist[1:3] = ["blackcurrant", "watermelon"]  
print(thislist)
```

```
thislist = ["apple", "banana", "cherry"]  
thislist[1:2] = ["blackcurrant", "watermelon"]  
print(thislist)
```

```
thislist = ["apple", "banana", "cherry"]  
thislist.insert(2, "watermelon")  
print(thislist)
```

```
thislist = ["apple", "banana", "cherry"]
thislist.append("orange")
print(thislist)
```

To insert a list item at a specified index, use the `insert()` method.

The `insert()` method inserts an item at the specified index:

```
thislist = ["apple", "banana", "cherry"]
thislist.insert(1, "orange")
print(thislist)
```

To append elements from *another list* to the current list, use the `extend()` method.

```
thislist = ["apple", "banana", "cherry"]
tropical = ["mango", "pineapple", "papaya"]
thislist.extend(tropical)
print(thislist)
```

The `extend()` method does not have to append *lists*, you can add any iterable object (tuples, sets, dictionaries etc.).

```
thislist = ["apple", "banana", "cherry"]
thistuple = ("kiwi", "orange")
thislist.extend(thistuple)
print(thislist)
```

```
thislist = ["apple", "banana", "cherry"]
thislist.remove("banana")
print(thislist)
```

The `pop()` method removes the specified index.

```
thislist = ["apple", "banana", "cherry"]
thislist.pop(1)
print(thislist)
```

If you do not specify the index, the `pop()` method removes the last item.

```
thislist = ["apple", "banana", "cherry"]
thislist.pop()
print(thislist)
```

The `del` keyword also removes the specified index:

```
thislist = ["apple", "banana", "cherry"]
del thislist[0]
print(thislist)
```

The `del` keyword can also delete the list completely.

```
thislist = ["apple", "banana", "cherry"]
del thislist
```

The `clear()` method empties the list.

The list still remains, but it has no content.

```
thislist = ["apple", "banana", "cherry"]
thislist.clear()
print(thislist)
```

You can loop through the list items by using a `for` loop:

```
thislist = ["apple", "banana", "cherry"]
for x in thislist:
    print(x)
```

You can also loop through the list items by referring to their index number.

Use the `range()` and `len()` functions to create a suitable iterable.

**Print all items by referring to their index number:**

```
thislist = ["apple", "banana", "cherry"]
for i in range(len(thislist)):
    print(thislist[i])
```

## Using a While Loop

You can loop through the list items by using a `while` loop.

Use the `len()` function to determine the length of the list, then start at 0 and loop your way through the list items by referring to their indexes.

Remember to increase the index by 1 after each iteration.

```
thislist = ["apple", "banana", "cherry"]
i = 0
while i < len(thislist):
    print(thislist[i])
    i = i + 1
```

List Comprehension offers the shortest syntax for looping through lists:

```
thislist = ["apple", "banana", "cherry"]
[print(x) for x in thislist]
```

## List Comprehension

List comprehension offers a shorter syntax when you want to create a new list based on the values of an existing list.

Example:

Based on a list of fruits, you want a new list, containing only the fruits with the letter "a" in the name.

Without list comprehension you will have to write a `for` statement with a conditional test inside:

```
fruits = ["apple", "banana", "cherry", "kiwi", "mango"]
newlist = []

for x in fruits:
    if "a" in x:
        newlist.append(x)

print(newlist)
```

With list comprehension you can do all that with only one line of code:

```
fruits = ["apple", "banana", "cherry", "kiwi", "mango"]

newlist = [x for x in fruits if "a" in x]

print(newlist)
```

# The Syntax

```
newlist = [expression for item in iterable if condition == True]
```

The return value is a new list, leaving the old list unchanged.

---

## Condition

The *condition* is like a filter that only accepts the items that evaluate to `True`.

## Example

Only accept items that are not "apple":

```
newlist = [x for x in fruits if x != "apple"]
```

The condition `if x != "apple"` will return `True` for all elements other than "apple", making the new list contain all fruits except "apple".

The *condition* is optional and can be omitted:

```
fruits = ["apple", "banana", "cherry", "kiwi", "mango"]  
newlist = [x for x in fruits]  
print(newlist)
```

**Note:** Python does not have built-in support for Arrays, but [Python Lists](#) can be used instead.

## Arrays

**Note:** This page shows you how to use LISTS as ARRAYS, however, to work with arrays in Python you will have to import a library, like the [NumPy library](#).

Arrays are used to store multiple values in one single variable:

```
cars = ["Ford", "Volvo", "BMW"]
```

## Access the Elements of an Array

You refer to an array element by referring to the *index number*.

### Example

Get the value of the first array item:

```
x = cars[0]
```

[Try it Yourself »](#)

### Example

Modify the value of the first array item:

```
cars[0] = "Toyota"
```

```
x = len(cars)
```

# Looping Array Elements

You can use the `for in` loop to loop through all the elements of an array.

```
for x in cars:  
    print(x)
```

# Adding Array Elements

You can use the `append()` method to add an element to an array.

## Example

Add one more element to the `cars` array:

```
cars.append("Honda")
```

# Removing Array Elements

You can use the `pop()` method to remove an element from the array.

```
cars.pop(1)
```

You can also use the `remove()` method to remove an element from the array.

[https://www.w3schools.com/python/python\\_arrays.asp](https://www.w3schools.com/python/python_arrays.asp)

**Note:** The list's `remove()` method only removes the first occurrence of the specified value.

```
cars.remove("Volvo")
```

# User Input

Python allows for user input.

That means we are able to ask the user for input.

The method is a bit different in Python 3.6 than Python 2.7.

Python 3.6 uses the `input()` method.

Python 2.7 uses the `raw_input()` method.

```
username = input("Enter username:")  
print("Username is: " + username)
```

```
username = raw_input("Enter username:")  
print("Username is: " + username)
```

To make sure a string will display as expected, we can format the result with the `format()` method.

---

## String format()

The `format()` method allows you to format selected parts of a string.

Sometimes there are parts of a text that you do not control, maybe they come from a database, or user input?

To control such values, add placeholders (curly brackets `{}`) in the text, and run the values through the `format()` method:

**Add a placeholder where you want to display the price:**

```
price = 49  
txt = "The price is {} dollars"  
print(txt.format(price))
```

**Format the price to be displayed as a number with two decimals:**

```
txt = "The price is {:.2f} dollars"
```

If you want to use more values, just add more values to the `format()` method:

```
print(txt.format(price, itemno, count))
```

**And add more placeholders:**



```
quantity = 3  
itemno = 567  
price = 49  
myorder = "I want {} pieces of item number {} for {:.2f} dollars."  
print(myorder.format(quantity, itemno, price))
```





# Array Methods

Python has a set of built-in methods that you can use on lists/arrays.

Method	Description
<u>append()</u>	Adds an element at the end of the list
<u>clear()</u>	Removes all the elements from the list
<u>copy()</u>	Returns a copy of the list
<u>count()</u>	Returns the number of elements with the specified value
<u>extend()</u>	Add the elements of a list (or any iterable), to the end of the current list
<u>index()</u>	Returns the index of the first element with the specified value
<u>insert()</u>	Adds an element at the specified position
<u>pop()</u>	Removes the element at the specified position
<u>remove()</u>	Removes the first item with the specified value
<u>reverse()</u>	Reverses the order of the list
<u>sort()</u>	Sorts the list

```
#Normal Logic to reverse a given number.  
orignum = int(input("Enter the number: "))  
n1 = orignum  
revnum = 0  
sum = 0  
print("Input Number by the user = ", orignum)  
while(orignum>0):  
    mod1 = orignum % 10  
    revnum = (revnum * 10) + mod1  
    orignum = (orignum // 10)  
print("Orignum = ", orignum)  
print("Input Number by the user = ", orignum)  
print("Reversed Number = ", revnum)
```