

Solutions - Practical Lesson 1

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1 Exercise 1.1

Solution:

- What is a built-in function that Python uses to iterate over a number sequence ?
`range()` generates a list of numbers, which is used to iterate over for loops.

```
for i in range(5):  
    print(i)
```

The `range()` function accompanies two sets of parameters.

```
range([start], stop[, step])
```

where

- start: It is the starting no. of the sequence.
- stop: It specifies the upper limit of the sequence.
- step: It is the incrementing factor for generating the sequence.

Points to note: only integer arguments are allowed. Parameters can be positive or negative. The `range()` function in Python starts from the zeroth index.

- What is a string in Python ?

A string in Python is a sequence of alpha-numeric characters. They are immutable objects. It means that they don't allow modification once they get assigned a value. Python provides several methods, such as `join()`, `replace()` or `split()` to alter strings. But none of these change the original object.

- What does the continue do in Python ?

The `continue` is a jump statement in Python which moves the control to execute the next iteration in a loop leaving all the remaining instructions in the block unexecuted. The `continue` statement is applicable for both the `while` and `for` loops.

- When should you use the break in Python ?

Python provides a `break` statement to exit from a loop. Whenever the `break` hits in the code, the control of the program immediately exits from the body of the loop. The `break` statement in a nested loop causes the control to exit from the inner iterative block.

- What is a dictionary in Python programming ?

A dictionary is a data structure known as an associative array in Python which stores a collection of objects. The collection is a set of keys having a single associated value. We can call it a hash, a map, or a hashmap as it gets called in other programming languages.

- What is the use of the dictionary in Python ?

A dictionary has a group of objects (the keys) map to another group of objects (the values). A Python dictionary represents a mapping of unique Keys to Values. They are mutable and hence will not change. The values associated with the keys can be of any Python types.

- How do you create a dictionary in Python ?

Let's take the example of building site statistics. For this, we first need to break up the key-value pairs using a colon(`:`). The keys should be of an immutable type, i.e., so we'll use the data-types which don't allow changes at runtime. We'll choose from an `int`, `string`, or `tuple`. However, we can take values of any kind. For distinguishing the data pairs, we can use a comma(`,`) and keep the whole stuff inside curly braces(`{...}`).

```
>>> site_stats = {'site': 'tecbeamers.com', 'traffic': 10000, "type": "organic"}
>>> type(site_stats)
<class 'dict'>
>>> print(site_stats)
{'type': 'organic', 'site': 'tecbeamers.com', 'traffic': 10000}
```

- How do you read from a dictionary in Python ?

To fetch data from a dictionary, we can directly access using the keys. We can enclose a key using brackets `[...]` after mentioning the variable name corresponding to the dictionary.

```
>>> site_stats = {'site': 'tecbeamers.com', 'traffic': 10000, "type": "organic"}
>>> print(site_stats["traffic"])
```

We can even call the get method to fetch the values from a dict. It also let us set a default value. If the key is missing, then the KeyError would occur.

```
>>> site_stats = {'site': 'tecbeamers.com', 'traffic': 10000, "type": "organic"}
>>> print(site_stats.get('site'))
tecbeamers.com
```

- How do you traverse through a dictionary object in Python?

We can use the for and in loop for traversing the dictionary object.

```
>>> site_stats = {'site': 'tecbeamers.com', 'traffic': 10000, "type": "organic"}
>>> for k, v in site_stats.items():
    print("The key is: %s" % k)
    print("The value is: %s" % v)
    print("+++++")
The key is: type
The value is: organic
+++++
The key is: site
The value is: tecbeamers.com
+++++
The key is: traffic
The value is: 10000
+++++
```

- How do you add elements to a dictionary in Python ?

We can add elements by modifying the dictionary with a fresh key and then set the value to it.

```
>>> # Setup a blank dictionary
>>> site_stats = {}
>>> site_stats['site'] = 'google.com'
>>> site_stats['traffic'] = 10000000000
>>> site_stats['type'] = 'Referral'
>>> print(site_stats)
{'type': 'Referral', 'site': 'google.com', 'traffic': 10000000000}
```

We can even join two dictionaries to get a bigger dictionary with the help of the `update()` method.

```
>>> site_stats['site'] = 'google.co.in'
>>> print(site_stats)
{'site': 'google.co.in'}
>>> site_stats_new = {'traffic': 1000000, "type": "social media"}
>>> site_stats.update(site_stats_new)
>>> print(site_stats)
{'type': 'social media', 'site': 'google.co.in', 'traffic': 1000000}
```

- How do you delete elements of a dictionary in Python ?

We can delete a key in a dictionary by using the `del` method.

```
>>> site_stats = {'site': 'tecbeamers.com', 'traffic': 10000, "type": "organic"}
>>> del site_stats["type"]
>>> print(site_stats)
{'site': 'google.co.in', 'traffic': 1000000}
```

Another method, we can use is the `pop` function. It accepts the key as the parameter. Also, a second parameter, we can pass a default value if the key doesn't exist.

```
>>> site_stats = {'site': 'tecbeamers.com', 'traffic': 10000, "type": "organic"}
>>> print(site_stats.pop("type", None))
organic
>>> print(site_stats)
{'site': 'tecbeamers.com', 'traffic': 10000}
```

- How do you check the presence of a key in a Dictionary?

We can use Python's `in` operator to test the presence of a key inside a dict object.

```
>>> site_stats = {'site': 'tecbeamers.com', 'traffic': 10000, "type": "organic"}
>>> 'site' in site_stats
True
>>> 'traffic' in site_stats
True
>>> "type" in site_stats
True
```

- What is the syntax for list comprehension in Python?

The signature for the list comprehension is as follows:

```
[ expression(var) for var in iterable ]
```

For example, the below code will return all the numbers from 10 to 20 and store them in a list.

```
>>> alist = [var for var in range(10, 20)]
>>> print(alist)
```

- What is the syntax for dictionary comprehension in Python ?

A dictionary has the same syntax as was for the list comprehension but the difference is that it uses curly braces:

```
{ aKey, itsValue for aKey in iterable }
```

For example, the below code will return all the numbers 10 to 20 as the keys and will store the respective squares of those numbers as the values.

```
>>> adict = {var:var**2 for var in range(10, 20)}
>>> print(adict)
```

- How do you write a conditional expression in Python ?

We can utilize the following single statement as a conditional expression. `default_statement if condition`

```
>>> no_of_days = 366
>>> is_leap_year = "Yes" if no_of_days == 366 else "No"
>>> print(is_leap_year)
Yes
```

- Which python function will you use to convert a number to a string?

For converting a number into a string, you can use the built-in function `str()`. If you want an octal or hexadecimal representation, use the inbuilt function `oct()` or `hex()`.