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Basics of Programming through Python

Built-in Functions

Introduction to Programming

COMP102

Term 3 2022-2023

Built-in Functions

There are two kinds of functions in Python.

- Built-in functions that are provided as part of Python - print(), input(), type(), float(), int() , eval(),... without using def keyword *because it is already declared in Python*

- Functions that we define ourselves and then use ,by using def keyword (see topic 6)

we treat the built-function names as “new-reserved word (i.e., we avoid them as variable names)

Built-in functions

- Python provides a number of important built-in functions that we can use without needing to provide the function definition.
- The creators of Python wrote a set of functions to solve common problems and included them in Python for us to use

Built-in functions

Built-in functions that we will see

- String functions:
  - max function
  - min function
  - len function
- Type Conversion function int(),float()
- Random numbers random(), randint()
- Round numbers round()

Built-in functions

String Functions

maximun

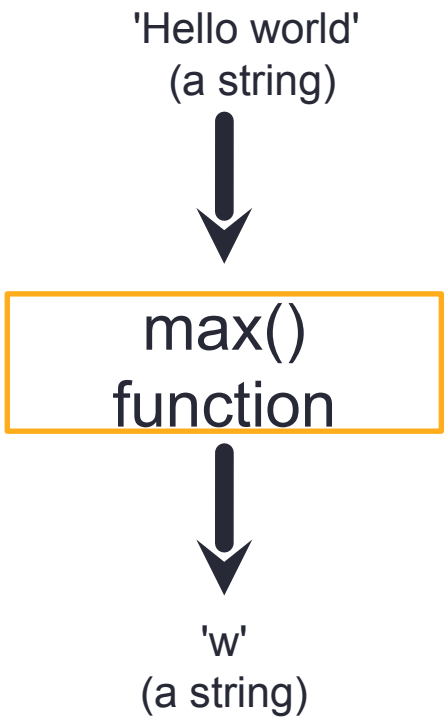
The max function tells us the "largest character" in the string (which turns out to be the letter "w")

```
big = max('Hello world')

print(big)
```

OR

```
print(max('Hello world'))
```



String functions

- String function
  - The largest or smallest characters are identified by the ASCII codes of each character.
  - Click ***here*** to see the complete list of ASCII codes.

Built-in functions

String Functions

minimum

The min function shows us the smallest character (which turns out to be a space).

```
small = min('Hello world')

print(small)
#print(min('Hello world'))
```

```
#print(min('good'))
```

'Hello world'
(a string)

min()
function

' '
(a string)

'd'
(a string)

Built-in functions

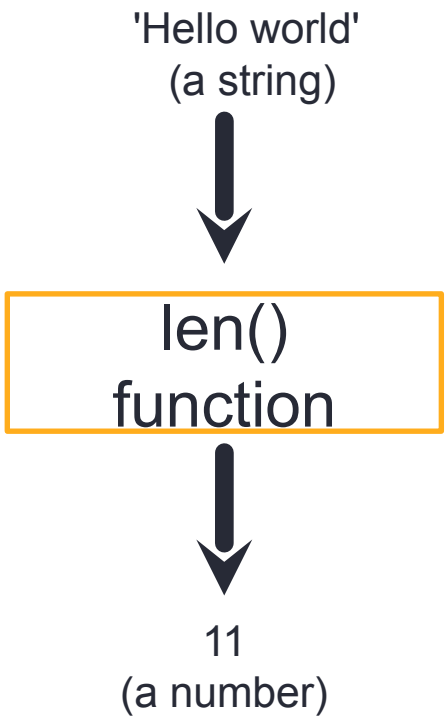
String Functions

length

Another very common built-in function is the **len** function.
tells us how many items are in its argument.
If the argument to **len** is a **string,** it returns the number of characters in the string.

```
len('Hello world')
#print (len('Hello world'))
```

Note : start counting string from 0 as index , any character (letters- numbers- special character- space),,, return integer number as a result



Try out

Run programs below on your system and see what results you get

Program 1

```
a = “Computer
applications!“

print(len(a))
```

22

Program 2

```
a = “Computer
applications!“
Small= min(a)
print(small)
```

‘ ‘

Program 3

```
a = “Computer
applications!“
Big= max(a)
print(Big)
```

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Built-in functions

Type Conversions

- Python provides built-in functions that convert values from one type to another
- When you put an integer and floating point in an expression, the integer is implicitly converted to a float
- You can control this with the built-in functions int() and float()

Built-in functions

Type Conversions

The int function takes any value and converts it to an integer, if it can, or complains otherwise:

Example 1:

```
>>> int('32')        gives        32
>>> int('Hello')     gives        ValueError: invalid literal for int()
with base 10: 'Hello'
```

Built-in functions

Type Conversions

The function float converts integers and strings to floating-point numbers:

Example 1:

```
>>> float(32)        gives        32.0
>>> int(3.14)        gives        3
int(4.8)==4
```

Try out

Run the program below on your system and see what results you get

```
#convert from int to float:
x = float(1)

#convert from float to int:
y = int(2.8)

print(x)
print(y)
```

```
print(float(1))
print(int(2.8))
```

1.0

2

Built-in functions

Random function

- The random module provides functions that generate pseudorandom numbers (which we will simply call “random”).

- The function random returns a random float between 0.0 and 1.0 (including 0.0 but not 1.0). Each time you call random, you get the next number in a long series. To see a sample, run this loop

```python
import random

print(random.random())
```

```
0.478837933130574
```

This program produces a random number between 0.0 and up to but not including 1.0

Note : when you Run this program more than one time you will get different random number

Example

Try out

- Run the program on your system and see what numbers you get. Run the program more than once and see what numbers you get.

Built-in functions

Random function

- The random function is only one of many functions that handle random numbers.
- The function randint takes the parameters low and high, and returns an integer between low and high (including both).

```
import random

                        low   high
print(random.randint(3, 9))

#returns a number between 3 and 9 (both included)
```

```
6
```

you can Run this program more than 1 time so you will get different integer number between low, and high including both

Example

Built-in functions

Round function

The round() function rounds off to the given number of digits and returns the floating point number, if no number of digits is provided for round off , it rounds off the number to the nearest integer.

Built-in functions

Round function

Syntax:
round(number, number of digits

round() parameters:

..1) number - number to be rounded .
.2) number of digits (Optional) - number of digits up to which the given number is to be rounded.

If the second parameter is **missing**, then round() function **returns**:
..a) if only an integer is given , as 15 , then it will round off to 15.
..b) if a decimal number is given , then it will round off to the **ceil** integer after that if decimal value has >=5 , and it will round off to the **floor** integer if decimal is <5.

```
print(round(1.5))
```

```
# for integers
print(round(15))

# for floating point
print(round(51.6))


print(round(51.5))

print(round(51.4))

print(round(52.5))
```

output

```
15

52


52
51
```

```
# when the (ndigit+1)th digit is =5
print(round(2.621, 2))

# when the (ndigit+1)th digit is >=5
print(round(2.676, 2))

# when the (ndigit+1)th digit is <5
print(round(2.673, 1))
```

output

```
2.62

2.68

 2. 7
```

Let’s review some built-in functions

max Function

Gives the largest character in the string

String fun

min function

Gives the smallest character in the string

String fun

len function

Gives how many items are in its argument

String fun

int function

takes any value and converts it to an integer

Type conversion fun

float function

converts integers and strings to floating-point numbers:

Type conversion fun

random function

returns a random float between 0.0 and 1.0

Random fun

Let’s review some built-in functions

randint() Function

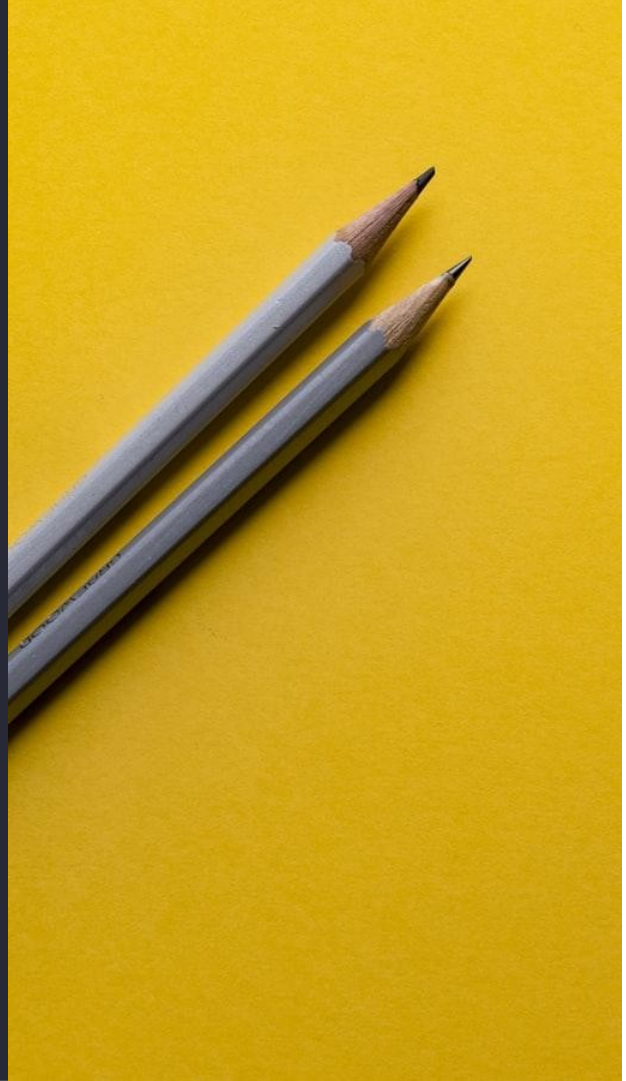
returns an integer between low and high (including

Random fun

round() function

rounds off to the given number of digits

Math fun



Thanks!