PYTHON FOR COMPUTATIONAL PROBLEM SOLVING

The function: reduce

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reduce() Function

Introduction

The reduce() is a function that applies a given function to the elements of an iterable, reducing them to a single value. This function is defined in **"functools"** module.

Syntax

functools.reduce(function, iterable[, initializer])

- The **function argument** is a function that takes two arguments and returns a single value. The first argument is the accumulated value, and the second argument is the current value from the iterable.
- The **iterable** argument is the sequence of values to be reduced.
- The optional initializer argument is used to provide an initial value. If no initializer is specified, the first element of the iterable is used as the initial value.

reduce() Function

Working of reduce function:

•At first step, first two elements of the sequence are picked and the result is obtained.

•The same function is applied to the previously attained result and the number just succeeding the second element and the result is again stored.

•This process continues till no more elements are left in the container.

•There will be n – 1 calls if no initializer is specified.(n is the number of elements in the input iterable)

•The final result is returned as a single value.

Examples

Example 1.To find the factorial of a number using reduce() function

```
import functools
n = 5
print("The factorial is ",functools.reduce(int.__mul__ , range(1, n + 1)))
```
Output:
The factorial is 120

Example 2. To find the sum of first 10 numbers using reduce() function
```
import functools
print(functools.reduce(int.__add__, range(10)))
```
output
The sum of first 10 numbers is 55

Examples

Example 3.To find the product of numbers with 100 as the initial value.

```python
def product(x, y):
        print("product : ", x, y)
        return x * y
print("The product with 100 as initial value
is",functools.reduce(product, [11, 22, 33, 44], 100))
```
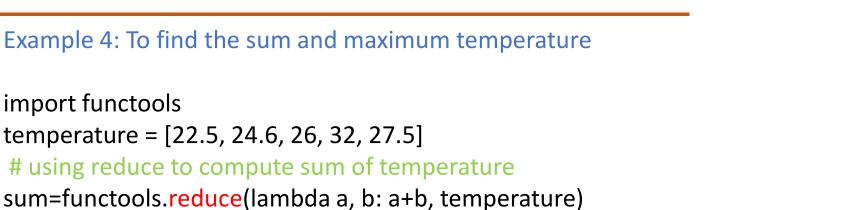
Output:

product : 100 11

product : 1100 22

product : 24200 33

product : 798600 44

The product with 100 as initial value is 35138400

Examples

Example 4: To find the sum and maximum temperature

```python
import functools
temperature = [22.5, 24.6, 26, 32, 27.5]
 # using reduce to compute sum of temperature
sum=functools.reduce(lambda a, b: a+b, temperature)
print("The average temperature is ", sum/5)
 # using reduce to compute maximum temperature in the list
print("The maximum temperature is : ", end="")
print(functools.reduce(lambda a, b: a if a > b else b,
temperature))
```

Output:
 The average temperature is 26.52
The maximum temperature is : 32

THANK YOU

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