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PYTHON FOR COMPUTATIONAL PROBLEM SOLVING

The function: reduce

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reduce() Function

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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

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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

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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

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

```
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

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Example 4: To find the sum and maximum temperature

```
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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