

Contents

1	Functions	2
1.1	gcd – gcd algorithm	2
1.1.1	gcd – the greatest common divisor	2
1.1.2	binarygcd – binary gcd algorithm	2
1.1.3	extgcd – extended gcd algorithm	2
1.1.4	lcm – the least common multiple	3
1.1.5	gcd_of_list – gcd of many integers	3
1.1.6	coprime – coprime check	3
1.1.7	pairwise_coprime – coprime check of many integers	3

Chapter 1

Functions

1.1 gcd – gcd algorithm

1.1.1 gcd – the greatest common divisor

gcd(a: *integer*, b: *integer*) → *integer*

Return the greatest common divisor of two integers **a** and **b**.

a, **b** must be int, long or **Integer**. Even if one of the arguments is negative, the result is non-negative.

1.1.2 binarygcd – binary gcd algorithm

binarygcd(a: *integer*, b: *integer*) → *integer*

Return the greatest common divisor of two integers **a** and **b** by binary gcd algorithm.

†This function is an alias of **binarygcd**

a, **b** must be int, long, or **Integer**.

1.1.3 extgcd – extended gcd algorithm

extgcd(a: *integer*, b: *integer*) → (*integer*, *integer*, *integer*)

Return the greatest common divisor d of two integers **a** and **b** and u , v such that $d = au + bv$.

a, b must be int, long, or **Integer**.
The returned value is a tuple (u, v, d).

1.1.4 lcm – the least common multiple

lcm(a: integer, b: integer) → integer

Return the least common multiple of two integers a and b.

†If both a and b are zero, then it raises an exception.

a, b must be int, long, or **Integer**.

1.1.5 gcd_of_list – gcd of many integers

gcd_of_list(integers: list) → list

Return gcd of multiple integers.

For given integers $[x_1, \dots, x_n]$, return a list $[d, [c_1, \dots, c_n]]$ such that $d = c_1x_1 + \dots + c_nx_n$, where d is the greatest common divisor of x_1, \dots, x_n .

integers is a list which elements are int or long
This function returns $[d, [c_1, \dots, c_n]]$, where d, c_i are an integer.

1.1.6 coprime – coprime check

coprime(a: integer, b: integer) → bool

Return True if a and b are coprime, False otherwise.

a, b are int, long, or **Integer**.

1.1.7 pairwise_coprime – coprime check of many integers

pairwise_coprime(integers: list) → bool

Return True if all integers in integers are pairwise coprime, False otherwise.

integers is a list which elements are int, long, or **Integer**.

Examples

```
>>> gcd.gcd(12, 18)
6
>>> gcd.gcd(12, -18)
6
>>> gcd.gcd(-12, -18)
6
>>> gcd.extgcd(12, -18)
(-1, -1, 6)
>>> gcd.extgcd(-12, -18)
(1, -1, 6)
>>> gcd.extgcd(0, -18)
(0, -1, 18)
>>> gcd.lcm(12, 18)
36
>>> gcd.lcm(12, -18)
-36
>>> gcd.gcd_of_list([60, 90, 210])
[30, [-1, 1, 0]]
```