P12 (E2 Group)

The Greatest Common Divisor (GCD) of two non-zero integers a and b, denoted as GCD(a,b), Is the largest positive integer that divides both a and b. For example, GCD(8,12) = 4 and GCD(18,30) = 6. You are given a NxN grid, where each cell [i,j] at i-th row and j-th column in the grid contains GCD(i,j). Find the total number of prime numbers in this grid (note that 1 is not a prime number).

	1	2	3	4	5
1	1	1	1	1	1
2	1	②	1	②	1
3	1	1	③	1	1
4	1	②	1	4	1
5	1	1	1	1	⑤

Example: A 5 x 5 grid can be filled in with GCD values as shown in the figure. Out of the 25 GCD values in the grid, the circled 5 are prime numbers.

Develop a Python program that computes the number of primes among the GCD values in the grid for a given N value as described above. The input to the program will be a file containing a sequence of different N values, each in a separate line. The number of primes that would appear in the grid for each N is to be output on a separate line to the screen and to a file named "Output.txt".

Special requirement: You must define at least 2 functions and use them in your code

Format:

Input: input_file (Each line of the input file contains the value of N for a grid)

Output: Display on screen and write to the output file named "Output txt' the number of primes in a grid corresponding to each N, on separate lines.

Case 1

input: test_data1.txt
Contents: 10
100

Output: Output.txt and on screen
Contents: 30
2791

Case 2

input: test_data2.txt
Contents: 30
67
215

Output: Output.txt and on screen
Contents: 250
1229
12441