Eclipse, Kliezl P. Exercise 2.1 – 1

Q: For each of the following algorithms, indicate (i) a natural size metric for its inputs, (ii) its basic operation, and (iii) whether the basic operation count can be different for inputs of the same size:

a. computing the sum of numbers *n*

b. computing *n*!

c. finding the largest element in a list of numbers *n*

d. Euclid's algorithm

e. sieve of Eratosthenes

f. pen-and-pencil algorithm for multiplying two n-digit decimal integers

A:

Computing the sum of numbers *n*

(i) n
(ii) Addition of two numbers
(iii) No

Computing *n*!

(i) Size of n
(ii) Multiplication of two numbers
(iii) No

Finding the largest element in a list of numbers *n*

(i) n
(ii) Comparison of two numbers
(iii) No

Euclid's Algorithm

(i) Size of larger number of two input numbers, or size of smaller number of two input numbers, or sum of sizes of two numbers
(ii) Modulo Division
(iii) Yes

Sieve of Eratosthenes

(i) Size of n
(ii) Elimination of a number from remaining numbers to be prime
(iii) No

Pen-and-pencil Algorithm for multiplying two n-digit decimal integers

(i) n
(ii) Multiplication of two input digits
(iii) No