NTUST OOP Midterm Problem Design

Subject: Large Integer Operation

Author: 陳昕璇 (HSIN-HSUAN CHEN)

Main	testing	concept:	Array
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Basics	Functions						
■ C++ BASICS	☐ SEPARATE COMPILATION AND NAMESPACES						
■ FLOW OF CONTROL	□ STREAMS AND FILE I/O						
□ FUNCTION BASICS	□ RECURSION						
□ PARAMETERS AND OVERLOADING	□ INHERITANCE						
■ ARRAYS	□ POLYMORPHISM AND VIRTUAL FUNCTIONS						
□ STRUCTURES AND CLASSES	□ TEMPLATES						
□ CONSTRUCTORS AND OTHER TOOLS	□ LINKED DATA STRUCTURES						
□ OPERATOR OVERLOADING, FRIENDS,AND	□ EXCEPTION HANDLING						
REFERENCES	□ STANDARD TEMPLATE LIBRARY						
□ STRINGS	□ PATTERNS AND UML						
□ POINTERS AND DYNAMIC ARRAYS							

Description:

Large number computation refers to the process of performing calculations on numbers that are beyond the typical range of numerical values. Common examples include high precision calculation, large integer computation, and large floating-point number computation. In computer science and mathematics, integers and floating-point numbers are typically used to represent numbers. However, due to the precision and range limitations in storing and processing numbers in computers, large number computation techniques are required when dealing with very large numbers.

For example, in certain mathematical problems, very large integers may need to be calculated, such as integers with more than 200 digits, while computers can usually only handle integers up to a few thousand digits. Therefore, large number computation techniques are used to perform high-precision calculations. These techniques utilize special data structures and algorithms to process extremely large data, avoiding loss of numerical precision or range limitations.

In C++, we can store big numbers by using data structures such as arrays, vectors, or strings. Then, we can implement operators for addition, subtraction, multiplication, division, modulo, as well as functions for comparison, input, and output.

Input:

Each test case may contain multiple inputs and outputs. The input consists of two numbers, please perform addition, subtraction, and multiplication. The input of this problem are both integers.

a

b

Output:

Please output the sum, difference, and product. The output of this problem are both integers.

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s (sum = a + b)

d (difference = a - b)

p (product = a * b)
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Sample Input / Output:

Sample Input	Sample Output					
684206820568913977247	10619238846691285528584585223458623400306290541106111					
831143321345972981675	54172359					
861223241672511715	30648975646869940163720376429682960593272266833587219					
377717064100214575610	0851071					
627379024516367048953	25843659150263249330782396981924657349634822401192259					
192887369481660644	36981330637462900500277342800487797416546743623805397					
209254614061933954256	7746474444460					
057024948583393185297	31850922812386790851211404989716678637059538712349836					
691182484895398233	3617270					
109254614061933954256	99999999999999999999999999999999999999					
057024948583393185297	179196					
695941013468219037	22862032100015531960919852030141400331719662067383470					
	77676798731703126402437985423380162851932886463278142					
	0435386761621					

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- $\hfill \square$ Medium, Multiple programming grammars and structures are required.
- Hard, Need to use multiple program structures or more complex data types.

Expected solving time:

90 minutes

Other notes: