

Java Software Development Homework 6

- Write a program that can do some operations on big integers including addition, subtraction and comparison.
 - Big integer: an integer that is greater than 2^{31} -1 or less than -2^{31}
- Declare an interface IOperation with only one operation:
 - perform(num1: String, num2: String): String
- Create three classes that implement IOperation
 - Addition
 - The perform method takes two arguments and returns the sum of them.
 - Subtraction
 - The perform method takes two arguments and returns the difference of them.
 - Comparison
 - The perform method takes two arguments and returns -1, 0, or 1 if the first argument is less than, equal to, or greater than the second argument, respectively.

• For example, if you want to calculate 123 + 456:

```
// Calculate 123 + 456
IOperation operation = new Addition();
String result = operation.perform("123", "456");
```

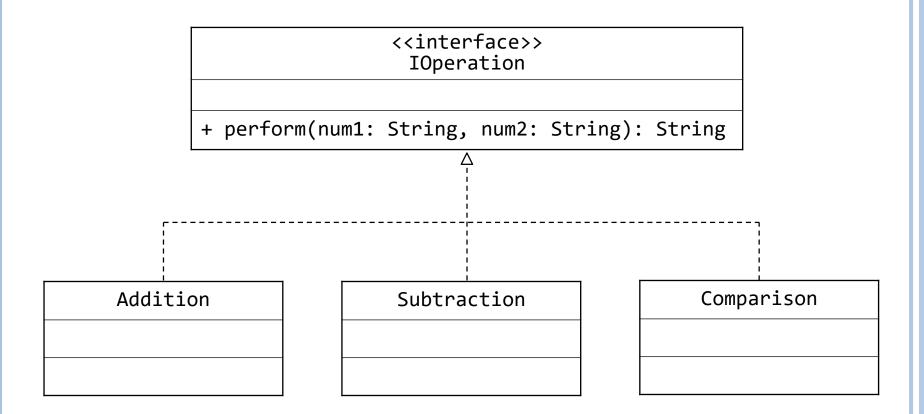
• If you want to calculate 123 - 456:

```
// Calculate 123 - 456
IOperation operation = new Subtraction();
String result = operation.perform("123", "456");
```

• If you want to determine whether 123 is larger than 456

```
// Determine whether 123 > 456
IOperation operation = new Comparison();
String result = operation.perform("123", "456");
```

- The input is an expression to be evaluated, which is given from keyboard.
- An expression is composed of the following elements:
 - Integers (May be greater than 2^{31} -1 or less than -2^{31})
 - Arithmetic operators: +, -
 - Logical operators: >, <, =
 - Whitespaces
- Each element in an expression is separate by whitespaces.
- Arithmetic and logical operators will not appear simultaneously.
- Note that the following expressions may be possible:
 - 123 + -456 (You should evaluate it to -333)
 - -123 -456 (You should evaluate it to 333)



Input	123 + 456
Output	579

Input	123 - 456
Output	-333

Input	123 > 456
Output	false

Input	123 < 456
Output	true

Input	123 = 456	
Output	false	

Input	99999 + 99999
Output	199998

Input	0 - 0 + 0 - 0 + 0 - 0
Output	0

Input	-123456789 + 987654321123456789
Output	987654321

Input	9876543210123456789876543210123456789 + 123
Output	9876543210123456789876543210123456912

Input	-135792468123456789876543210123456789 < -1357924680123456789876543210123456789
Output	false

Scoring Criteria

- Plagiarism is strictly forbidden.
- You MUST follow the class design illustrated in page 4.
- The following APIs are **NOT ALLOWED** in your program:
 - java.math.BigInteger
 - java.math.BigDecimal
- You will not get any points if you don't follow the requirements.

Submission

- Please archive your source code to STUDENT_ID.zip (download the example zip file from Moodle) and upload to Moodle before deadline.
- Your zip file should follow the following format.

```
STUDENT_ID.zip|- src|- META-INF|- MANIFEST.MF
```

- All the source files (*.java) are put in the src directory.
- The entry point (i.e. main class) of the program is specified in the MANIFEST.MF file.
- No late submission is accepted.

If you have any problem about this homework, please contact TA: selab@mail.csie.ncku.edu.tw