Lab 5. Operator Overloading

For this problem, you need to know how to implement operator overloading of a class. You must implement the eight operators, and two constructor as follows: • vector + vector: addition of two vectors.

■ Ex:

(3, 7, 5) + (-2, 6, 1) = (1, 13, 6)

• vector – vector: subtraction of two vectors.

■ Ex:

(6, -5, 7) – (3, 3, -5) = (3, -8, 12)

• vector * vector: dot two vectors.

■ Ex:

(1, 2, 3) * (1, 2, 3) => 14

• vector / vector: cross two vectors.

■ Ex:

(1, 2, 3) / (4, 5, 6) = (-3, 6, -3)

• -(vector): negate the vector.

■ Ex:

-(1, 2, 3) = (-1, -2, -3)

• vector1 > vector2: compare the length of two vectors from original point, if the length of vector1 is larger than that of vector2, then print true, else print false. ■ Ex:

(1, 2, 3) > (1, 0, 1) => true

(1, 0, 1) > (1, 2, 3) => false

• ofstream << vector (print): print the vector in a specific format.

■ Ex:

If vector = (5, 6, 7), cout << vector will print "(5, 6, 7)".

• ifstream >> vector (read): read the vector from .txt file in a specific format. ■ Ex:

Input is "num1 num2 num3", which is a 3-dimension vector and the type of number is float, file >> vector will read the input and store the elements sequentially.

1.2 3.4 5.6 => (1.2, 3.4, 5.6)

You must use **operator overloading** to implement.
You must use template to do this lab.
Do not use std::vector.

Input Format

Please implement the file I/O part.
You MUST read the input data from the input.txt.

The first line shows the number of test cases.

Only negate operator has two lines:
The first line contains an operator.
The second line is the operand, which is a 3-dimension vector

Other operators have three lines:
The first line contains an operator.
The second and third line are the operands, which are two 3-dimension vectors

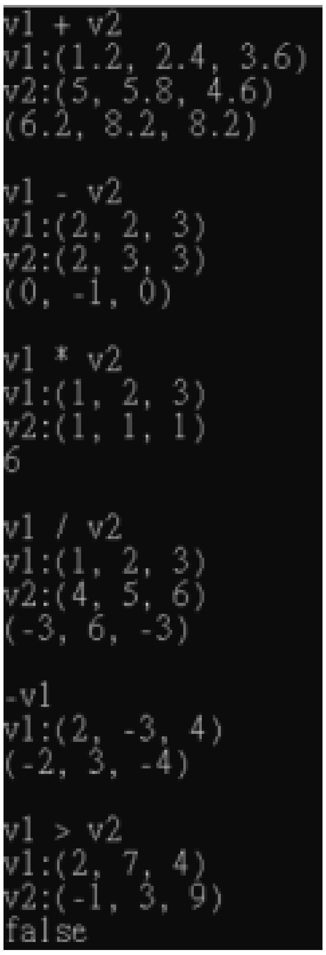
Output Format

You must output the result after doing each calculation.

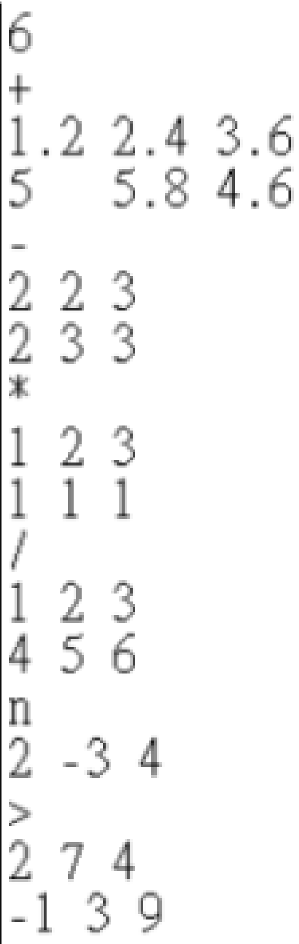
See more detail from Sample output.

Sample Input & Output.

Input: Output:



```
v1 + v2
v1:(1.2, 2.4, 3.6)
v2:(5, 5.8, 4.6)
(6.2, 8.2, 8.2)

v1 - v2
v1:(2, 2, 3)
v2:(2, 3, 3)
(0, -1, 0)

v1 * v2
v1:(1, 2, 3)
v2:(1, 1, 1)
6

v1 / v2
v1:(1, 2, 3)
v2:(4, 5, 6)
(-3, 6, -3)

-v1
v1:(2, -3, 4)
(-2, 3, -4)

v1 > v2
v1:(2, 7, 4)
v2:(-1, 3, 9)
false
```



```
6
+
1.2 2.4 3.6
5   5.8 4.6
-
2 2 3
2 3 3
*
1 2 3
1 1 1
/
1 2 3
4 5 6
n
2 -3 4
>
2 7 4
-1 3 9
```