Fundamental Computer Programming- C++ Lab(I)

Lab 8: Intersection of a Line and a Line Segment

Week 8, Fall 2020

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Problem Description

Given line L and a line segment S, determine whether L and S intersect or not. If they intersect, find out the coordinates of the intersection. The floating part of the coordinates should have 8 digits, rounded to the nearest least significant digit.

Input Format

The first line gives the number of test cases, then followed by the data for each test case. Each test case takes a line which contains in sequence the coordinates of two points on L and the coordinates of the two end points of S. The coordinates of a vertex are specified by two integers. The first integer is X coordinate and the second integer is Y coordinate. Integers are representable in 32 bits and separated by whitespaces.

Output Format

The output for a test case takes a line. If L and S intersect, the line first contains a "yes" and then followed by two numbers, showing the coordinates of the intersection if the line and the line segment intersect at only one point. In case the line and the line segment intersect at more than one point, the output line should print "The line segment is on the line." If there is no intersection, the output line for this case contains only a "no". The last line should print out the name of your classmate who give you 10 test cases.

Test cases

You are required to design your test cases. You should have 20 test cases. You should design the first 10 test cases and the other 10 test cases should come from your classmate. For your 10 test cases, five test cases each should have an intersection and the other five should not.

Example

Sample Input	Sample Output
16	
1 1 2 2 1 1 1 0	yes 1 1
1 1 2 2 2 2 3 3	The line segment is on the line.
1 1 2 2 3 3 4 5	yes 3 3
1 1 2 2 3 4 4 5	no
1 1 2 2 1 0 -1 -1	yes -1 -1
1 1 1 2 -10 3 10 3	yes 1 3
-10 3 10 3 1 1 1 2	no
1 1 2 2 2 0 1 -1	no
12 30 -25 8 67 99 -54 70	no
12 30 -25 67 99 -54 -60 8	yes 94.0825 -52.0825
12 30 -25 8 67 99 -54 -60	yes 16.5489 32.7048
1 1 1 3 2 2 2 3	no
1 1 3 1 2 2 3 2	no
0 1 0 5 0 2 0 3	The line segment is on the line.
1 0 5 0 2 0 3 0	The line segment is on the line.
-100 100 100 -100 -99 99 101 -101	The line segment is on the line.