

Input 1: PDF test case

4

u 4 3 9 8

r 13 2 3 5

so 3 5 5 10

nice 5 10 13 2

Output 1:

so nice

9.0 8.0 3.0 5.0 4.0 3.0 13.0 2.0

so nice u

8.0 7.0 3.0 5.0 4.0 3.0 13.0 2.0

so u nice

3.0 5.0 4.0 3.0 13.0 2.0

r u nice

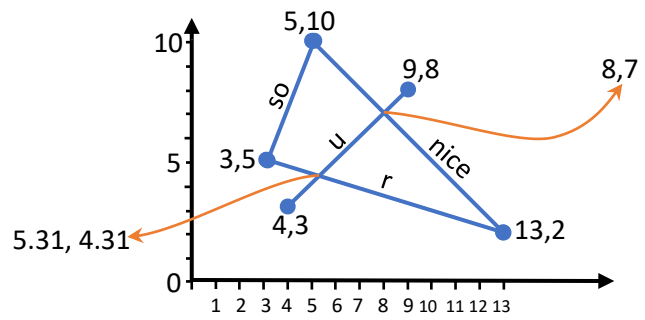
5.3 4.3 4.0 3.0 13.0 2.0

u r nice

4.0 3.0 13.0 2.0

r nice

13.0 2.0



Input 2: check basic insertion/deletion of shared end-points

4

d 12 8 13 2

b 13 2 3 5

a 3 5 5 10

c 5 10 12 8

Output 2:

a c

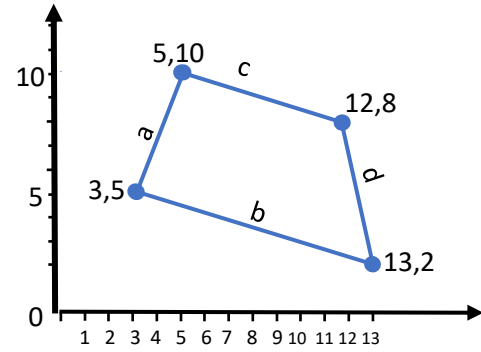
12.0 8.0 3.0 5.0 13.0 2.0

a d

3.0 5.0 13.0 2.0

b d

13.0 2.0



Input 3: checking no intersection or single intersection after removing a shared bottom-bottom point

6

b 2 6 11 3

a 5 10 8 5

c 8 5 10 9

d 15 12 14 7

e 7 2 13 11

f 12 8 14 7

Output 3:

d

13.0 11.0 5.0 10.0 10.0 9.0 12.0 8.0 14.0 7.0 2.0 6.0 8.0 5.0 11.0 3.0 7.0 2.0

e d

5.0 10.0 10.0 9.0 12.0 8.0 14.0 7.0 2.0 6.0 8.0 5.0 11.0 3.0 7.0 2.0

a e d

10.0 9.0 12.0 8.0 14.0 7.0 2.0 6.0 8.0 5.0 11.0 3.0 7.0 2.0

a c e d

12.0 8.0 14.0 7.0 2.0 6.0 8.0 5.0 11.0 3.0 7.0 2.0

a c e f d

14.0 7.0 2.0 6.0 8.0 5.0 11.0 3.0 7.0 2.0

a c e

2.0 6.0 8.0 5.0 11.0 3.0 7.0 2.0

b a c e

8.0 5.0 11.0 3.0 7.0 2.0

b e

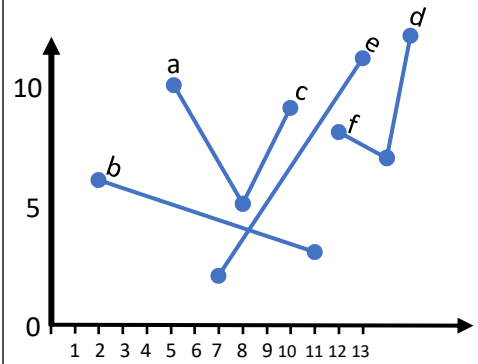
8.3 3.9 11.0 3.0 7.0 2.0

e b

11.0 3.0 7.0 2.0

e

7.0 2.0



Input 4: checking no intersection or double intersection after processing a shared top-bottom point

6

b 8 1 6 8

a 6 8 4 12

c 11 4 3 9

d 14 6 15 10

e 13 11 7 2

f 14 6 16 5

Output 4:

a

13.0 11.0 15.0 10.0 3.0 9.0 6.0 8.0 14.0 6.0 16.0 5.0 11.0 4.0 7.0 2.0 8.0 1.0

a e

15.0 10.0 3.0 9.0 6.0 8.0 14.0 6.0 16.0 5.0 11.0 4.0 7.0 2.0 8.0 1.0

a e d

3.0 9.0 6.0 8.0 14.0 6.0 16.0 5.0 11.0 4.0 7.0 2.0 8.0 1.0

c a e d

6.0 8.0 14.0 6.0 16.0 5.0 11.0 4.0 7.0 2.0 8.0 1.0

c b e d

6.3 6.9 14.0 6.0 16.0 5.0 11.0 4.0 7.5 2.8 7.0 2.0 8.0 1.0

b c e d

14.0 6.0 9.1 5.2 16.0 5.0 11.0 4.0 7.5 2.8 7.0 2.0 8.0 1.0

b c e f

9.1 5.2 16.0 5.0 11.0 4.0 7.5 2.8 7.0 2.0 8.0 1.0

b e c f

16.0 5.0 11.0 4.0 7.5 2.8 7.0 2.0 8.0 1.0

b e c

11.0 4.0 7.5 2.8 7.0 2.0 8.0 1.0

b e

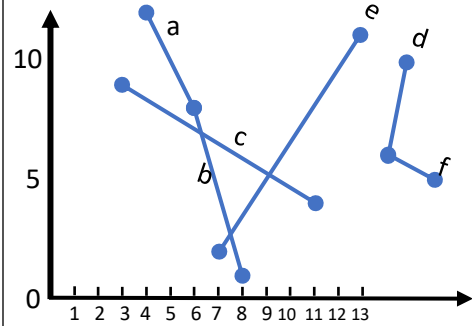
7.5 2.8 7.0 2.0 8.0 1.0

e b

7.0 2.0 8.0 1.0

b

8.0 1.0



Input 5: checking no intersection or double intersection
after processing a shared top-top endpoint

6

a 1 1 6 12

b 0 3 5 4

c 9 0 6 12

d 14 7 13 10

e 5 4 11 2

f 10 5 13 10

Output 5:

a c

13.0 10.0 14.0 7.0 10.0 5.0 5.0 4.0 0.0 3.0 11.0 2.0 1.0 1.0 9.0 0.0

a c d f

14.0 7.0 10.0 5.0 5.0 4.0 0.0 3.0 11.0 2.0 1.0 1.0 9.0 0.0

a c f

10.0 5.0 5.0 4.0 0.0 3.0 11.0 2.0 1.0 1.0 9.0 0.0

a c

5.0 4.0 0.0 3.0 11.0 2.0 1.0 1.0 9.0 0.0

a b e c

2.1 3.4 0.0 3.0 8.3 2.9 11.0 2.0 1.0 1.0 9.0 0.0

b a e c

0.0 3.0 8.3 2.9 11.0 2.0 1.0 1.0 9.0 0.0

a e c

8.3 2.9 11.0 2.0 1.0 1.0 9.0 0.0

a c e

11.0 2.0 1.0 1.0 9.0 0.0

a c

1.0 1.0 9.0 0.0

c

9.0 0.0

