Points in 2D

Submission deadline:	**2022-11-07 11:59:59**
Late submission with malus:	**2022-12-31 23:59:59** (Late submission malus: 100.0000 %)
Evaluation:	**5.5000**
Max. assessment:	**5.0000** (Without bonus points)
Submissions:	1 / 20 Free retries + 10 Penalized retries (-10 % penalty each retry)
Advices:	0 / 2 Advices for free + 2 Advices with a penalty (-10 % penalty each advice)

Program is given coordinates of three points in a 2D plane. The program reads the coordinates and decides whether these points share a common line, or not. Your task is to develop such a program in C/C++.

The program is given coordinates of three points in the standard input. Each coordinate has the form X Y, where X and Y are decimal numbers.

The program analyzes the position of the points and prints out one of the three possible results:

- two or all three input points are identical,
- the input points are distinct and do not share a common line, or
- the input points are distinct and do share a common line. The middle point is printed in this case.

The exact format of the output is described in sample runs below.

The program must check whether input data are well-formated, or not. If the input contains ill-formatted data (not integers), the program must detect it, display error message and terminate. The error message is to be displayed on the standard output. The format of the error message is shown in the sample runs below.

Example runs of the program:

```
Point A:
1 2
Point B:
3 4
Point C:
5 6
There exists a line connecting all three points.
Point B is in the middle.
```

```
Point A:
0.1 0.2
Point B:
0.3 0.4
Point C:
0.5 0.6
There exists a line connecting all three points.
Point B is in the middle.
```

```
Point A:
10 10
Point B:
0 10
Point C:
10 0
```

```
No line connects all points.
```

```
Point A:
0 1
Point B:
0 3
Point C:
0 2
There exists a line connecting all three points.
Point C is in the middle.
```

```
Point A:
1 0
Point B:
2 0
Point C:
-3 0
There exists a line connecting all three points.
Point A is in the middle.
```

```
Point A:
1 1
Point B:
2 2
Point C:
1 1
Some points are identical.
```

```
Point A:
10 20
Point B:
5 xyz
Invalid input.
```

Advice:

- The sample runs above list both the output of your program (boldface font) and user input (regular font). The bold/regular formatting is included here, in the problem statement page, to increase readability of the listing. Your program must output the text without any additional markup.
- Do not forget the newline (\n) after the last output line.
- Try to use as few conditions as possible. Use vector algebra to solve the problem.

Sample data: Download

Submit: Choose File Submit

☐ **Reference**

1	**2022-10-22 14:57:55**	**Download**
Submission status:	Evaluated	
Evaluation:	5.5000	

- **Evaluator: computer**
  - Program compiled

- Test 'Basic test with example inputs': success
  - result: 100.00 %, required: 100.00 %
  - Max. run time: 0.005 s (limit: 1.000 s)
  - Total run time: 0.034 s
  - Mandatory test success, evaluation: 100.00 %
- Test 'Borderline test': success
  - result: 100.00 %, required: 50.00 %
  - Max. run time: 0.005 s (limit: 1.000 s)
  - Total run time: 0.244 s
  - Optional test success, evaluation: 100.00 %
- Test 'Invalid input test': success
  - result: 100.00 %, required: 50.00 %
  - Max. run time: 0.005 s (limit: 1.000 s)
  - Total run time: 0.057 s
  - Optional test success, evaluation: 100.00 %
- Test 'Random test': success
  - result: 100.00 %, required: 50.00 %
  - Max. run time: 0.005 s (limit: 1.000 s)
  - Total run time: 0.101 s
  - Optional test success, evaluation: 100.00 %
- Overall ratio: 100.00 % (= 1.00 * 1.00 * 1.00 * 1.00)

- Total percent: 100.00 %
- Early submission bonus: 0.50
- Total points: 1.00 * (5.00 + 0.50) = 5.50

		Total	Average	Maximum	Function name
SW metrics:	Functions:	**6**	--	--	--
	Lines of code:	**106**	**17.67 ± 13.40**	**45**	`middle`
	Cyclomatic complexity:	**28**	**4.67 ± 4.15**	**13**	`middle`