

CS 135

Exercise #7

Point value: 40

Date due: email source file (using mail utility) to your lab instructor by 11:59pm Fri, Oct 6

New Skills Practiced (Learning Goals)

- Problem solving and debugging.
- Use of selection structures (if statement).

Given the x and y coordinates of 2 different points, the slope of the line (unless it is vertical) defined by the points can be computed as shown below.

If $P_1 = (x_1, y_1)$ and $P_2 = (x_2, y_2)$ then $\text{slope} = (y_2 - y_1) / (x_2 - x_1)$

If the slope is

- equal to 0, then the line is horizontal
- positive, then the line is increasing
- negative, then the line is decreasing

If the slope is not defined (cannot be computed) the line is vertical.

If the 2 points are the same, they do not define a line.

Design and implement a complete C++ program that will

- display your name, lecture and lab section #s, and exercise #
- interactively prompt for and read 2 integers that represent the x and y coordinates of P_1
- interactively prompt for and read 2 integers that represent the x and y coordinates of P_2
- display (to the screen) the input values with appropriate labels and an appropriate message that indicates whether the points define a line
- if they define a line,
 - the line's slope (except for vertical lines)
 - what type of line (horizontal, vertical, increasing, or decreasing)
 - an increasing line has a positive slope
 - a decreasing line has a negative slope
- display slopes with 4 digits to the right of the decimal

When the program compiles and runs correctly on bobby.cs.unlv.edu, use the mail utility to email a copy of the program file to your lab instructor. Make sure the subject line of your email includes your name, lecture and lab section #s, and the exercise # if you wish to

receive full credit.

NOTES:

- Assume that the 4 input values will be integers (positive, negative, or zero).
- **Choose appropriate data sets to test your program.** The 3 samples shown below are NOT enough to verify that the program meets all requirements. (See [Generating Test Data](#) handout.)
- It is a good idea to send a carbon copy to yourself (-c option) of all emails sent to your lab or course instructor when using the mail utility.
- A comment with your name, lecture section#, lab section#, and exercise# should be at the start of your program file.

Sample terminal session:

```
[lee@bobby keys]$ g++ exercise07.cpp
[lee@bobby keys]$ ./a.out
Lee Misch  Lec#10__  Lab#10__  Exercise #7
Please enter the x and y coordinates for point 1: -2 7
Please enter the x and y coordinates for point 2: 3 -5
Point 1: (-2,7)
Point 2: (3,-5)
Slope = -2.4000
The line defined is decreasing.
[lee@bobby keys]$ ./a.out
Lee Misch  Lec#10__  Lab#10__  Exercise #7
Please enter the x and y coordinates for point 1: 4 5
Please enter the x and y coordinates for point 2: 4 3
Point 1: (4,5)
Point 2: (4,3)
The line defined is vertical.
[lee@bobby keys]$ ./a.out
Lee Misch  Lec#10__  Lab#10__  Exercise #7
Please enter the x and y coordinates for point 1: -1 3
Please enter the x and y coordinates for point 2: -1 3
Point 1: (-1,3)
Point 2: (-1,3)
Point 1 and 2 are the same. No line defined.
```

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