CS19101 Programming and Data Structures
Variable, Assignment, and Elementary Computation

General instruction to be followed strictly

1. Do not use any global variable unless you are explicitly instructed so.
2. Use proper indentation in your code and comment.
3. Name your file as `<roll_no>_<assignment_no>`. For example, if your roll number is 14CS10001 and you are submitting assignment 3, then name your file as `14CS10001_3.c` or `14CS10001_3.cpp` as applicable.
4. Write your name, roll number, and assignment number at the beginning of your program.
5. Make your program as efficient as possible.

Write a C program to perform the following tasks.

1. Let $P = (x_1, y_1)$ and $Q = (x_2, y_2)$ be two points in the two-dimensional plane. Assume that the straight line join P and Q does not pass through the origin. These coordinates should be floating-point numbers.
2. Print the equation of the straight line joining P and Q in $aX + bY + c = 0$ format. You are not required to ensure that the gcd of a, b, and c is 1. Any valid equation is acceptable.
3. Print the distance of the straight line from the origin.
4. Print the mirror-image of the origin with respect to the straight line joining P and Q.
5. Take $R = (x_3, y_3)$ a point as input from the user. Print if R lies on the straight-line joining P and Q.
6. Print the mirror-image of R with respect to the straight line joining P and Q.

You may require math library functions. For that, you use the following code in the beginning of your code.

```
#include<math.h>
```

To compile your code, you the following command in terminal.

```
gcc ./program.c  -lm
```

To compare a floating point variable, say x, with a floating point constant, say 2, use the following code

```
‘‘if (x== 2.0f)’’ or ‘‘if (x > 2.0f)’’ etc.
```

Sample Output

```
palash@palash-ThinkPad-X1-Yoga-3rd:~$ ./a.out  ./a.out
Write x1: 3.4
Write y1: -2.6
Write x2: -5.2
Write y2: -19
Equation of the line joinig the two points is 16.400000X+(-8.600000)Y+(-78.120003)=0
The distance of the line from the origin is 4.218576
Mirror image of the origin with respect to the line is (7.472110,-3.918302)
Write x3: 32
Write y3: -9.2
The point (32.000000,-9.200000) does not lie on the straight line
Mirror image of (32.000000,-9.200000) with respect to the line is (-18.292313,17.172802)
palash@palash-ThinkPad-X1-Yoga-3rd:~$
```

Policy on Plagiarism

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