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Lecture 13 Assignment

```
1 #include <stdio.h>
2 #include <math.h>
3
4 // Declare outer structure line
5 struct line
6 {
7     // Declare inner structure point
8     struct point
9     {
10         // Declare inner structure point variables
11         float x;
12         float y;
13     } point1, point2;
14     // Declare outer structure line variables
15     float *midpoint;
16     float slope;
17     float distance;
18     float intercept;
19 };
20
21 // Declare the functions
22 float solveSlope(struct line line1);
23 float *solveMidpoint(struct line line1);
24 float solveDistance(struct line line1);
25 float getSlopeInterceptForm(struct line line1);
26
27 int main(void)
28 {
29     struct line line1;
30     // Prompt the user to enter the coordinates of the first point
31     printf("Enter x and y for point 1: ");
32     scanf("%f%f", &line1.point1.x, &line1.point1.y);
33     // Prompt the user to enter the coordinates of the second point
34     printf("Enter x and y for point 2: ");
35     scanf("%f%f", &line1.point2.x, &line1.point2.y);
36     // Display the slope of the line
37     printf("Slope: %f\n", solveSlope(line1));
38     // Display the midpoint of the line
39     printf("Midpoint: (%f, %f)\n", solveMidpoint(line1)[0], solveMidpoint(line1)[1]);
40     // Display the distance between the two points of the line
41     printf("Distance between two points: %f\n", solveDistance(line1));
42     // Display the slope-intercept form of the line
43     printf("Slope-intercept form: y = %fx + (%f)\n", solveSlope(line1), getSlopeInterceptForm(line1));
44     // End the program
45     return 0;
46 }
47
48 float solveSlope(struct line line1)
49 {
50     // Solve for the slope of the line
51     line1.slope = (line1.point2.y - line1.point1.y) / (line1.point2.x - line1.point1.x);
52     return line1.slope;
53 }
54
55 float *solveMidpoint(struct line line1)
56 {
57     // Solve for the midpoint of the line
58     line1.midpoint[0] = (line1.point1.x + line1.point2.x) / 2;
59     line1.midpoint[1] = (line1.point1.y + line1.point2.y) / 2;
60     return line1.midpoint;
61 }
62
63 float solveDistance(struct line line1)
64 {
65     // Solve for the distance between the two points of the line
66     line1.distance = sqrt(pow(line1.point1.x - line1.point2.x, 2) + pow(line1.point1.y - line1.point2.y, 2));
67     return line1.distance;
68 }
69
70 float getSlopeInterceptForm(struct line line1)
71 {
72     // Solve for the slope-intercept form of the line
73     line1.intercept = line1.point1.y - (solveSlope(line1) * line1.point1.x);
74     return line1.intercept;
75 }
76
```

GitHub: <https://github.com/chstrkn/CMSC21/tree/main/Lecture13/Assignments>