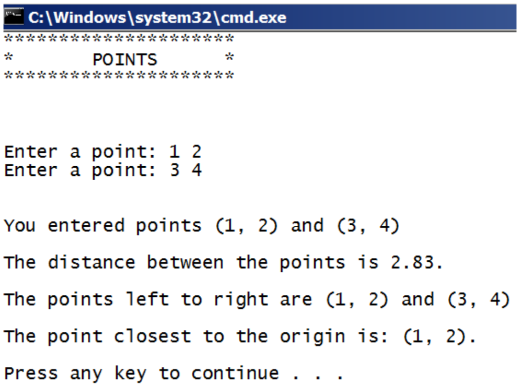
CS 150 Lab 11
More Functions

The main objective of today's lab is to continue writing functions understanding passed by value versus passed by reference.

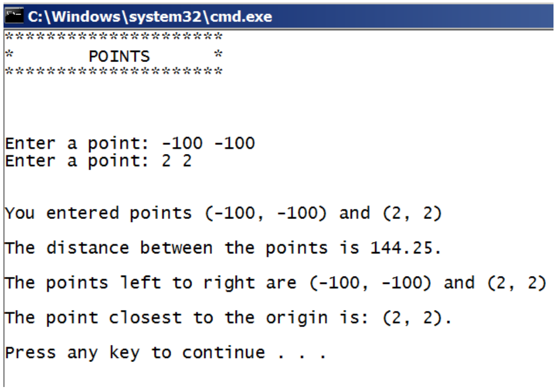
- Be sure your output looks exactly like the specified output.
- Submit the completed project to CS150-01 Lab by Friday at 5pm.
- Follow the coding standards and add comments to your code!
- Your projects are to be created in **PUNetIDLabs**

Write a complete C++ program in a project **11_1_Points** that will process a set of points (x, y). X and Y are always integers.

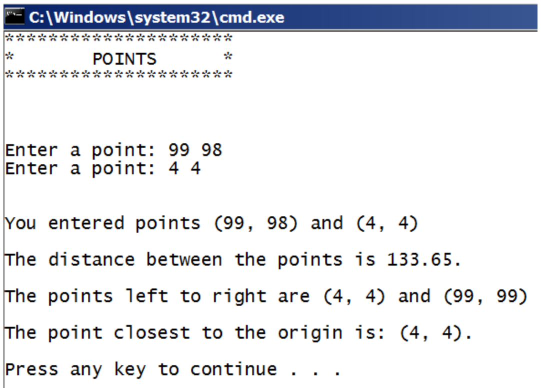
Some complete sample runs of the program are below:



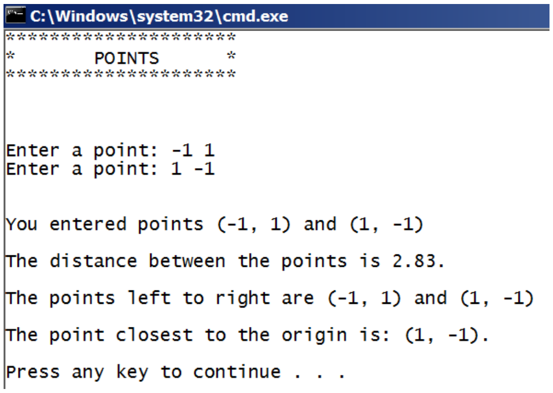
```
*********************
*       POINTS      *
*********************



Enter a point: 1 2
Enter a point: 3 4


You entered points (1, 2) and (3, 4)

The distance between the points is 2.83.

The points left to right are (1, 2) and (3, 4)

The point closest to the origin is: (1, 2).

Press any key to continue . . .
```



```
*********************
*       POINTS      *
*********************



Enter a point: -100 -100
Enter a point: 2 2


You entered points (-100, -100) and (2, 2)

The distance between the points is 144.25.

The points left to right are (-100, -100) and (2, 2)

The point closest to the origin is: (2, 2).

Press any key to continue . . .
```



```
*********************
*       POINTS      *
*********************



Enter a point: 99 98
Enter a point: 4 4


You entered points (99, 98) and (4, 4)

The distance between the points is 133.65.

The points left to right are (4, 4) and (99, 99)

The point closest to the origin is: (4, 4).

Press any key to continue . . .
```



```
*********************
*       POINTS      *
*********************



Enter a point: -1 1
Enter a point: 1 -1


You entered points (-1, 1) and (1, -1)

The distance between the points is 2.83.

The points left to right are (-1, 1) and (1, -1)

The point closest to the origin is: (1, -1).

Press any key to continue . . .
```

A documented program **11_1_PointsClean** is in the CS150 Public folder on grace. Create a new project and then copy this code into your main.cpp.

To complete this project, you will need to write each of the following four function definitions:

```
Prompt the user for a point (x,y). Read the point from the user
void getPoint (int &x, int &y);

Display the point to the screen in format (x, y)
void displayPoint (int x, int y);

Calculate the distance between the points. Return the distance
double getDistance (int x1, int y1, int x2, int y2);

Order the points from left to right using the x values.
The left most point ends up in x1, y1, the rightmost point
ends up in x2, y2
void orderLeftToRight (int &x1, int &y1, int &x2, int &y2);

Determine which of two points is closer to (0, 0). Return that point via
closestX, closestY
void findClosestToOrigin (int x1, int y1, int x2, int y2,
       int &closestX, int &closestY);
```

in addition to **adding code in main** that will implement the logic of the program.

You may need to look up the functions **double sqrt(double)** and **double pow(double, double)** for **getDistance()**

http://www.cplusplus.com/reference/cmath/pow/
http://www.cplusplus.com/reference/cmath/sqrt/

Make certain that you completely write and test each function before moving onto the next function and BEFORE implementing any of the logic in main!

Show the instructor or TA your solution

1) Your program is to compile without any errors or warnings.

2) The entire program is to be documented and each function is to be documented including main.

Once your project is complete, place your solution into the CS150-01 Drop folder on grace. Your solution is to have ALL previous projects completely working and correct.

Optional Challenge: Your CHOICE:

Work on Craps.

OR

Based on the placement of the two points, draw the general direction of the line. For example, each of the sets of points below should draw the given simple representation:

(1, 1) (10,10)

```
   *
  *
 *
*
```

(1, 10) (10, 1)

```
*
 *
  *
   *
```

(2, 3) (2, 10)

```
*
*
*
*
```

(1, 10) (5, 10)

```
****
```