Assignment 4 – Part 2 (Shapes Option)
Structures & Functions
COSC 051

For this assignment you are requested to refactor the software you wrote for assignment 4. You will use a structure to encapsulate all relevant data items that represent a shape (line and circle). The structure you create may contain other structures. As an example the circle may contain a point (the x and y that represents the center of circle), a radius and a symbol used to draw the circle.

**EXAMPLE (not inclusive)**

```cpp
struct Point {
    int x;
    int y;
};

struct Circle{
    Point center;
    int radius;
    char symbol;
};
```

The creation of a structure for your shape items will allow you to manipulate several shapes in the same program.

The second part of the assignment requires you to write functions to operate on the shape objects. ALL operations on shapes must happened by calling one of your functions. You will have to pass a Shape item (Circle, Line) variable to your function. Examples include the following functions (you have to write functions for each shape type):

```cpp
// True, if success, false if radius is off screen
bool setCircleRadius(Circle & b, int r) ;

// Sets the center of a circle. True if success, false if x or y is off screen
bool setCircleCenter(Circle & b, int x, int y) ;

// Move circle to x, y. True if success, false if x,y is off screen
bool moveCircle(Circle & b, int x, int y) ;

// Draws circle
void drawCircle(Circle & b) ;

//Returns the current center of Circle , which is a Point structure.
Point returnCircleCenter(Circle b); 

//Returns the current radius of Circle , which is an integer.
int returnCircleRadius(Circle b); 
```
void setCircleSymbol(Circle & b, char sym);

void clearCircle(Circle & b);

To receive any points your program must use a structure for your shapes (line and circle) and implement all functions for each shape. Write a program using your structure and functions. Note once a shape has been drawn, it remains visible (part of the 2D array representing the screen) until it is removed with a call to the clearCircle() or clearLine() function.

Program due date is Thursday, November 17, 2011 at 11:59 pm. Extension to the program due date will not be granted for this assignment. Please plan appropriately.

This graded assignment is worth 100 points and will be counted as part of your programming grade for the course.

The product that you submit must be your own work. Collaboration is allowed as specified within the syllabus for this course. For this assignment, you are not required to submit an acknowledgement statement.

**OPTIONAL EXTRA CREDIT (15 POINTS)**

Write function that will draw an animated line rotating about its mid-point. The line will continually rotate until the user presses a key. The function prototype for this function is:

// Draw and animate line around its mid point.
void lineDrawAndRotate(Line & b);