CSSIE 450: Programming Assignment #1
Real Time Event Driven Programming

Assigning Date: October 1, 2001
Due Time: October 10, 2001 at 5:00pm

Objective
In this programming assignment we will practice event driven programming with real time update as we have learned in the lectures. Based on the given user interface specification, we will allow user to play a simple game of bouncing a circle.

Approach
Please refer to the simple_mp1Solution program linked to the course web-page. You have to implement a similar program. The followings are the user interface specifications. Events defined on the mouse:

<table>
<thead>
<tr>
<th>Button/Action</th>
<th>What should happen:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left/Down</td>
<td>Define the center of the circle</td>
</tr>
<tr>
<td>Left/Down-Move</td>
<td>Drags out a circle such that the circle just touches the current mouse position.</td>
</tr>
<tr>
<td>Left/Up</td>
<td>Done defining the circle.</td>
</tr>
<tr>
<td>Mid/Down</td>
<td>Nothing</td>
</tr>
<tr>
<td>Mid/Down-Move</td>
<td>Nothing</td>
</tr>
<tr>
<td>Mid/Up</td>
<td>Clear the game window. This is different from Reset because the state of the game is not altered (refer to the following: speed, points to approximate circle should not be changed).</td>
</tr>
<tr>
<td>Right/Down</td>
<td>Nothing</td>
</tr>
<tr>
<td>Right/Down-Move</td>
<td>If circle is not defined, do nothing. If circle is defined, right movement increases the circle radius, left movement decreases circle radius. You must ensure that the change is continuous.</td>
</tr>
<tr>
<td>Right/Up</td>
<td>Nothing</td>
</tr>
</tbody>
</table>

Immediately after a circle is defined, it would start moving either horizontally or vertically. Motion of circle is prohibited before it is completely defined (before Left Mouse Button is up). However, once a circle is completely defined, unless game is paused or speed is set to zero (refer to the followings), the motion can never stop. Your application must support the followings:

- **Motion** – At any point your user must be able to, with a click of a button, change the motion direction of the circle. You must support at least up/down/left/right directions.
- **Bounce** – When the center of your circle is about to move off the window, you must change the motion direction to bounce the circle back into the window. After a circle is defined it must be at least partially visible at all times.
- **Speed** – You must provide a slider to allow your user to control the speed of the moving circle.
- **Circle Approximation** – Your circle should be approximated with discrete points. The actual number of points used to approximate your circle must be under user control.
- **Reset** – You must provide reset functionality such that your user can reset the state of the game.
- **Pause** – Your user must be able to halt the game and re-start it at anytime.
- **Message Output** – Your application must echo all user’s actions.
- **Quit** – You must allow user to quit your application.

The above interaction must be supported via a friendly graphical user interface. Proper function support without friendly user interface will only earn you half the credit. Initially, your program should start up with a blank window. Your program must also keep track of the state of the display window and be able to redraw the content when necessary.
Credit Distribution

Here is how the credits are distributed in this assignment:

1. Proper support for mouse events 25%
   a. Middle button (clear screen) 5%
   b. Right mouse button (scaling) 20%

2. Proper circle behavior 25%
   a. No motion until completely defined 5%
   b. Proper bouncing behavior 10%
   c. Circle always visible 10%

3. Proper user interaction support 35%
   a. Circle motion under user control 10%
   b. Proper speed control support 10%
   c. Proper circle approximation points support 5%
   d. Proper Pause/Reset of game support 5%
   e. Proper Quit/Echoing support 5%

4. Others 15%
   a. General program efficiency/style 10%
   b. Correct/usable zip submission 5%

This programming assignment will count 5% towards your final grade for this class.