P3.24

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September 26, 2011

1 Specification

Exercise P3.24. Write a program that draws a square with corner points (0, 0) and (1, 1). Prompt the user for a mouse click. If the user clicked inside the square, then show a message Congratulations. Otherwise, show a message You missed.

2 Design

Assume that the points forming the square have dimensions:

and that the user's point is in variable p. Display the message to the user someplace outside the square. For example at some point (2,2).

3 Implementation

"p3_24.cpp" 1≡

```
⟨ Include Files 3c ⟩
int ccc_win_main()//authors entry point that calls name
{
⟨ Draw a Square 2a ⟩
⟨ Get the point where the user clicked 2b ⟩
⟨ Determine if that point is in the square 3a ⟩
return 0;
}
◇
```

The authors graphics library includes a `Point` class and a `Line` class which allow points and lines to be drawn on the screen. A `Point` has an `x-` and a

`y-coordinate`. For example, `Point(1,3)` is a `Point` with `x-coordinate` 1 and `y-coordinate` 3. Two points can be joined by a line, represented by a `Line` object that is contructed from two `Point` objects, it's start point and end points.

```
Point p(1, 3);
Point q(4, 7);
Line s(p, q);
```

Both the `Point` and `Line` class implement the member function `move(x, y)` which changes position of an object, moving the entire object by the `x` and `y` units specified.

```
s.move(1, 0)
```

This moves the line `s` 1 unit in the x direction (to the right). cwin is a window object used to display graphic objects such as `Line` and `Point` to the screen.

```
cwin << s;
```

⟨ *Draw a Square* 2a ⟩ ≡

```
//draw a 1x1 unit square
Point top_left(0, 1);
Point top_right(1, 1);
Point bottom_left(0, 0);

Line horizontal(top_left, top_right);
Line vertical(top_left, bottom_left);

cwin << horizontal << vertical;

horizontal.move(0, -1);
vertical.move(1, 0);

cwin << horizontal << vertical;
```

◇

Fragment referenced in 1.

In the author's library, there is a function named `get_mouse` that returns the point where the left-button of the mouse was clicked. Invoke it using the `cwin` object. Store the point in variable `p`

⟨ *Get the point where the user clicked* 2b ⟩ ≡

```
Point p = cwin.get_mouse("Try to click inside the square.");
```

◇

Fragment referenced in 1.

There is a member function namedverb—get$_x$()|*and*`get_y()`*toretrievethecoordinatesfromapointobject.*(*e.g.*`p`)

⟨ *Determine if that point is in the square* 3a ⟩ ≡

```
//assign x and y coordinates to double variable
double x = p.get_x();
double y = p.get_y();
//determine if the user clciked inside the square
if(x <= 1 && x >= 0 && y <=1 && y >= 0)
{
 cwin << p << Message(p, "Congratulations, You did it!");
}
else
{
 cwin << p << Message(p, "Sorry, You missed!");
}
```

◇

Fragment referenced in 1.

"p3_24.bat" 3b≡

```
g++ -mwindows -I C:\C++_Programs\bigc2_sourcecode\cccfiles -o p3_24 p3_24.cpp ^
C:\C++_Programs\bigc2_sourcecode\cccfiles\ccc_msw.cpp ^
C:\C++_Programs\bigc2_sourcecode\cccfiles\ccc_shap.cpp ^
-lgdi32
```

◇

Theses are the include files for this program

⟨ *Include Files* 3c ⟩ ≡

```
#include "ccc_win.h"
```

◇

Fragment referenced in 1.

4 Test