

Homework 1

Due Monday, August 31, 2009 at 11:59pm

This short homework assignment will help you get set up with the necessary infrastructure and software we will be using in this class. You will be doing a fairly simple drawing program, which I estimate should not take you more than a few hours to complete

1. Getting your development environment set up

In this class, we will be using a Windows-based development environment. To complete this assignment you should set up your machine with Visual Studio if you do not already have it. You can download Visual Studio Express from Microsoft, buy Visual Studio from the bookstore, or download Visual Studio through the MSDN university program. For those who don't have a Windows-based machine, get yourself an account on the machines in 210.

2. Getting Familiar with Visual Studio

If you have never worked with Visual Studio, this exercise is an excuse to get your hands dirty for the first time. Create a new project and write a "Hello World" program. Run it and test that the text shows up on the screen. Learn how to use the debugger so that you can step through the code. Make sure that you are comfortable with some of the following things in C:

- Creating data structures (linked lists, etc)
- Accessing arrays of data
- Pointers, referencing, etc

The Microsoft MSDN website is a good place to start learning about Visual Studio. Google around and see what you find.

3. SimpleDraw Program

Okay, now we get to the interesting part of this assignment. You will be creating a simple drawing program that allows the user to draw onto a canvas using the mouse. Your program should do the following:

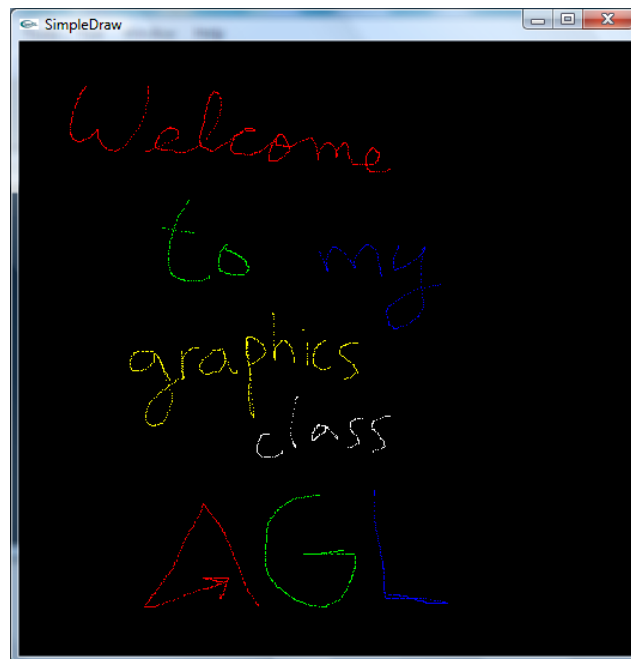
- Start drawing when the user presses the left button down, stop drawing when the user releases the button
- Allow the user to select 10 colors by using the 0-9 number keys.
- Hitting the space bar should clear the screen with black.

That's it! In order to handle the mouse and keyboard inputs and drawing to the window we will be using GLUT. To get you started, I have provided you with a program template you can use. Download HW1_Template.zip from the course website.

Here are a few hints on how to approach this assignment:

1. The first thing you will have to do is create some sort of framebuffer data structure that stores all the pixels of the screen. When the user is coloring at a pixel you should update the framebuffer color at that pixel with the correct value. Remember that you will need to store color as RGB.
2. To dump the framebuffer to the screen, you will need to use an OpenGL command that dumps the data in your framebuffer to the graphics card. Read the section on "Reading, Writing and Copying Pixel Data" in Ch.8 of the Redbook.
3. Don't worry if there are "holes" in your lines as you make traces with the mouse. This is caused because the GLUT callbacks are not happening fast enough to catch your mouse at every pixel in between.

Here is a sample screen shot from one of my master pieces using my program:



Extra credit:

For those of you who finish this quickly (it took me less than 15 mins to complete this assignment):

1. Allow for the user to save the artwork to a bitmap file of any format (jpg, bmp, etc). Hint, you can use the CImage class provided by Microsoft.

2. Add some cool features to your drawing program to make it more sophisticated (e.g. novel kinds of paintbrushes, the capability of loading an image and editing it, etc).

Submission instructions

We are still working out the submission process. I will post something on the class website with instructions when we get a working solution, and if not we will use email like we have done in the past. Remember, you have 1 week to finish this assignment.