Computer Science 155
Spring 1998
Homework 0 Lite
Due Sunday, January 25, before midnight

This is a fun and very easy assignment to familiarize you with the SGI workstations. Since it is an easy assignment, the normal extension policy does not apply.

1. Login to any of the SGI's. (All of these machines are served by a single file server, so you are not tied to any single machine. These machines run a version of Unix called "Irix". There are three types of SGI's in the lab: Most of the machines are Indigo 2 XZ's. These machines have impressive graphics capabilities, but are not the fastest machines in the lab. The two SGI's on the back wall, Eakins and Wayland, are SGI Indigo 2 "Extremes". Their graphics engines are substantially faster than that of the XZ's. Finally, Escher is an SGI 02. For many applications, its graphics engine is even faster than that of the Extremes. There are some applications for which the 02 is the slowest machine in the lab. We'll see why later.)

   Customize your desktop by selecting the **Desktop** option in the Desk menu and then the **Customize** suboption. Play around here for awhile. You can select your desktop background, screen saver, etc. Notice that within the **Windows** subsuboption, you can choose whether you would like the configuration you have set up to be saved continuously or explicitly. Continuous saving means that if you clutter up your desktop with all sorts of windows and then logout, all those windows will be there when you login again. Explicit saving allows you to put your favorite features on the desktop (clocks, performance meters, etc.) and then explicitly save them so that they will be there each time you login, but any additional windows you opened during a particular session will not be saved unless you push the **Set Home Session** button to explicitly save your changes.

2. Play around with the SGI graphics demo programs. You'll find them by using the **Find** option in the Desk menu and then selecting **Graphics Demos** from there. Atlantis is my personal favorite.

3. This course culminates in a major term project. In the directory "/cs/cs155" there are three subdirectories containing sample projects from this course in 1995, 1996, and 1997. Each sample project is in its own directory and contains a brief README file with instructions. Check these out.

4. Notice that in the **Help** menu are all sorts of books on-line. Among these is the OpenGL Programming Guide (very readable), the OpenGL Reference Manual (less readable but a useful reference), and many and other useful sources. There are convenient search features for these on-line books. Play around here too.

5. Login to "Monet". This is the only machine with a camera connected to it (the lens cover of the camera slides open). Find the **capture** utility (it's in the MediaTools Icon Catalog or you can run it right from the shell). **Capture** allows you to digitize data via the camera, video input, microphone, or the display screen itself. The icon on the bottom left selects which of the three input media to use. Notice that the camera lens can be focused right on the camera. Take a picture of yourself. It will be stored in a file called "capture.rgb".

6. Next, scan in an image using the flatbed scanner in the corner of the room. You do not need to be logged in to Symons to do this. All the SGI's have access to the scanner. To scan in the image, type "gscan" at the prompt. Select the "HPScanJet, target scanned on SGI option". Adjust the number of pixels per inch so that you don't end up saving zillions of pixels. Scan the image and save it to a file that ends with the suffix ".rgb". (Such as "spam.rgb"). "rgb" is an SGI image format that we'll be using a lot.

7. Now find the **imgworks** media tool and play around with your two images. You can enhance it, crop it, and apply a variety of filters and transformations to the image. Alternatively, you can use the popular **xv** tool which is also installed on the SGI's.

   After you're done tweaking your images using imgworks or xv, convert the images into the "gif" format (gif uses a compression algorithm, resulting in a more compact representation of the image). You can store the images as gifs from within imgworks or xv. Alternatively, you can use the **togif** converter to convert rgb images to gif images (see the man pages for details). Finally, move one of your gif pictures to ".icons/login.icon". This will make your picture appear on the login screen. (The image might not appear on the login screen on a particular workstation until after you've logged into it once.)

8. Using **imgworks** or **xv**, crop or enlarge any image you like so that it is a square of size 128×128 pixels. The graders and I will take a look at these images and you're invited (but by no means required) to make it as creative as you like. Now go into the directory "/cs/cs155". This is a read-only directory where I will post pieces of code that will be of use to you. In the "scanconvert" directory I have placed 2 programs (**display.cc** and **rgb2txt.c**) and a header file (**dimensions.h**) that you should copy into your own directory. Notice that one of these is a straight C program and the other is a C++ program. Read the documentation at the top of each of the files. The **rgb2txt** program converts an rgb file (such as the one you just made) into a corresponding text file that you can read and manipulate. The **display** program displays such a text file in color on the screen. Notice that you must adjust the dimensions of the input image in **dimensions.h** and compile **display.cc** afterwards. Notice also that **display.cc** does not use command line arguments. Therefore, to use it, you will need to use Unix's redirection facility (as in "display < myfile.txt"). *Surgeon General's Warning: These programs are crude and do little or no error checking.* You are welcome and encouraged to jazz them up! You will also notice that in the **data** subdirectory I have placed three text files converted from rgb files. The number after the name indicates the height and

width of the image. You'll need to recompile **display.cc** with the correct dimensions in **dimensions.h** to display these.

You may use either the gnu compilers (gcc and g++) or SGI's "optimized" compilers (cc and CC). Theoretically, SGI's compilers should produce better and faster object code. Compile the programs as described in the first line of each of the two files. Finally, display your converted rgb text file using **display**. (Don't be alarmed if the window is initially blank - it may take several seconds for the image to pop up. The performance bottleneck here is due to the time required to transfer the very large text file over the network.)

9. We have created a special directory for you to leave your completed homework assignments. The directory is "/coursework/graphics/jshmoe" where your login name should be substituted for "jshmoe". This is not your home directory, but merely a homework submission directory. Please use this directory only for your submitted homeworks. The account is readable and writable by you and is readable by the professor and the course assistants.

10. Place a copy of the text version of the image (that you converted using **rgb2txt**) in a file called "hw0.txt" in your homework submission directory.

11. To logout you must select the **Log Out** option in the **Desktop** menu or click the left mouse button outside of a window and select the logout option. **You will then be asked if you really want to logout. Make sure to click on "yes".**