

COSC 2P91 – Assignment 4 (Mini-Project 2) – Part 00000100

Due: April 16th at 5pm

This last part simply finalizes the requirements for the last assignment, including submission.

Requirements:

- The basic gradient image generation required from Part One
 - It doesn't matter whether this is a single menu option from a larger program, or by itself
 - It may or may not be threaded, at your discretion
 - It only ever needs to generate the same image, but it must be able to save to an arbitrary file name
 - The file format is `.ppm`
 - The basic interface must be in Python; the actual image generation must be in C
 - Write a bash script called `demoA` to invoke your program to generate a file called `partA.ppm`
- The silhouette generation required from Part Two
 - Again, it may be part of a larger program, or an independent one
 - It must be threaded
 - It must allow for a 'scene' file, in a format of your choosing
 - The scene file may be identified via command-line argument, or simply asking the user
 - It must allow for an arbitrary number of spheres, with arbitrary positions and sizes
 - It doesn't matter what colour scheme you use for the silhouette image
 - Write a bash script called `demoB` to invoke your program to generate a file called `partB.ppm`
- The actual ray tracer from Part Three
 - It must allow for different lighting:
 - ambient
 - diffuse
 - specular
 - It must allow an arbitrary number of shapes, materials, and lights
 - Lights also have positions
 - Materials and lights need to have at least a red, green, blue
 - It's up to you whether you want to define more complicated properties than that
 - You must have **one** of reflection, refraction, or shadows
 - Seriously, just go with shadows. All three options are worth the same amount
 - Write four bash scripts:
 - `demoC1` to only show off ambient
 - `demoC2` to only show off diffuse
 - `demoC3` to only show off specular
 - `demoC4` to demonstrate the other feature you implemented (which may also include whichever of the other parts you wish)
 - Each demo script will create `partC1.ppm`, `partC2.ppm`, etc.
 - If you did the bonus, also include `demoBonus` to create `bonus.ppm`
- All of your Python code must be both commented *and* documented
 - If you write a class, include a *docstring* for that class
 - If you write a function, include a *docstring* for that function
 - If you write a module, include a *docstring* for that module – basically, write one for each file
- Your C code must be reasonably commented
- C functions that are *only* to be used internally should be static
- Use header files where appropriate

- Ensure that the marker can easily recompile if necessary. That is, **one** of the following:
 - Include a Makefile, with a single (default) target of 'all'
 - or just write a `compile` script like I did in some of the examples
- Write a *very* simple document explaining the format of your scene files
 - It might only be five lines; this is fine
 - Make sure it's towards the front of your submission, especially if it's particularly short

Marks Distribution:

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|--------------------------------|----|
| • Part A: | |
| ◦ Image generation | 5 |
| ◦ Total: | 5 |
| • Part B: | |
| ◦ Loading/reading a scene file | 2 |
| ◦ Threading | 2 |
| ◦ Sphere intersection | 2 |
| ◦ Style/Discretionary | 2 |
| ◦ Total: | 8 |
| • Part C: | |
| ◦ Ray casting | 2 |
| ◦ Ambient | 2 |
| ◦ Diffuse | 2 |
| ◦ Specular | 2 |
| ◦ Additional Option | 2 |
| ◦ Materials | 2 |
| ◦ Style/Discretionary | 2 |
| ◦ Total: | 14 |
| • Additional: | |
| ◦ Interface(s) | 5 |
| ◦ Commenting and Documentation | 4 |
| ◦ Scene Specification | 1 |
| ◦ Compilation script/make | 1 |
| ◦ Demos | 2 |
| ◦ Total:..... | 13 |
| • Bonus..... | 2 |

Note: the scripts aren't worth very much, but the marker is under no obligation to put any extra work into getting it to run, so... it could end up being worth the entire assignment's grade if you omit them. Up to you.

Submission:

Print out a sample execution for each part, even if it's trivial, as well as a sample of the image generated from each (it's fine to group all of your images onto a single page, so long as you label them).

Print out all of your source code.

Staple everything together, along with a departmental cover page, and deposit it into the dropbox.

Upload all files to sandcastle, in whatever directory structure you feel appropriate, so long as the compilation and demo scripts can all be run from the top level. Submit via `submit2p91` and enter this as assignment #4.