

## CS 404: Problem Set 3

### Directions for Submission

E-mail your answers to me at [ajp9@cornell.edu](mailto:ajp9@cornell.edu). The subject of your message should be “CS404 PS3,” and the body of the message should contain your answers. Some mailers can format messages using HTML or RTF. Please turn this feature off and send your message using plain text. If for some reason you cannot send your message as text, you may attach your answers as a text file.

### Essential Knowledge—Please give a brief answer (1-2 sentences) for each

1. True or False. If you don't register your code with the Library of Congress (and pay the \$35 fee), someone may legally copy your code without your permission. Answer “true” or “false” and give a short explanation.
2. You just invented a revolutionary algorithm to compute the optimal route a traveling salesman (or political candidate) should take between cities, allowing him/her to visit all  $n$  cities using the least amount of gasoline<sup>1</sup>. To keep Microsoft from stealing your idea, what should you do?
3. You're given a version of LAPACK that has been compiled and stored in a Windows dynamically-linked library (DLL). What two things must you do to call routines in this library?

### More OpenGL

4. Download RAD1Dgl2.tar from the course website (near the problem sets). This is an extension of the RAD1D version with OpenGL calls

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<sup>1</sup>Don't laugh. This is a real problem known as the traveling salesman problem (for obvious reasons). Presently, no one has developed a polynomial time algorithm (an algorithm that takes  $n^p$  steps, where  $p$  doesn't depend on  $n$ ) to solve this problem. The interesting aspect of the traveling salesman problem is that if you could solve it in polynomial time, you could solve a whole class of important problems without known polynomial-time solutions.

used on Friday. I have added the routine `EmphasizeTime` to `GLout.c`. In the main subroutine, I register this with GLUT as the “`glutSpecialFunc`” – the function that is called when the user presses “special” keys on the keyboard. Look at the code for `EmphasizeTime`. What keys does it respond to? What variables does it modify? I’ve placed a link to the GLUT manual on the course website, although you should be able to figure out this question without it.

5. The variable modified in `EmphasizeTime` allows the user to pick a particular time from the samples of  $C$  stored in `GLC`. Your job is to add OpenGL calls to `DrawC` so that time-slice selected by the user is plotted as a green line. Remember, to create a colored line in OpenGL, you first pick a color, then call `glBegin(GL_LINE_STRIP)`. You then specify a series of line segments by calling `glVertex2d`. Finally, the line is ended by calling `glEnd()`. When you get your green lines to work, copy your `DrawC` routine into an e-mail and send it to me.