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Enhancing the Thread-Safe Graphics Library

TSGL is a Thread-Safe Graphics Library with the goal of providing thread-safe 2D graphics. This means that graphics can be drawn in parallel on a computer screen, providing for faster drawing times and increased efficiency. The graphics library also provides visualizations that can be used by Computer Science educators in order to teach students about parallel computing concepts such as threads, common problems in parallel computing, livelock/deadlock amongst threads, and more. TSGL has been developed on the Windows, Linux, and MacOS X operating systems. To this end, TSGL is intended for a broad range of users. We currently have a way to install TSGL on users' machines. However, the installation process is a bit tedious and error-prone. I was given the task of making the installation process for TSGL on a user's machine more convenient and foolproof. Before I began my work, a user had to download the source code for TSGL from our online GitHub code repository, and then follow a lengthy procedure.

A more convenient approach is to use a binary installer for the installation procedure. This makes it much easier and less error-prone, allowing a user to install the library with ease. I had to create binary installers for the Linux/Red Hat, Windows, and MacOS X operating systems. The Professor and I decided to create Debian/Aptitude packages for Linux, RPM packages for Fedora (Red Hat), and automated installers for Windows and MacOS X. This simplified the process of installing TSGL on a user's machine, for they no longer have to download the source code and install from source. All they have to do is get the binary installer and let it do the work of installing TSGL for them. This automation of the installation process provides a convenient and foolproof way to get TSGL in users' hands. We will still provide the option of installing from source for users who prefer that method, but will strongly recommend this new option of installing TSGL using a binary installer.

Not only are we providing binary installers, we are also enhancing the library by tweaking a few of the existing visualizations that are in the library as well as adding new ones. The two that we are currently tweaking are the Dining Philosophers and Producer-Consumer visualizations. They illustrate two common problems in parallel computing, and aid in the understanding of these problems.

My research methods were reading online manuals for creating Debian/Aptitude packages, as well as those for creating RPM packages. Online forums and message threads were utilized in an effort to solve debugging problems, and a book on the Bash shell was used in order to learn more about programming with the scripting language, Bash. These methods helped culminate the effort that I put forth in creating binary installers for TSGL.

This opportunity was immensely helpful and insightful. I knew little, if anything, about Debian/Aptitude and RPM package creation. This internship opportunity provided a plethora of knowledge and experience, which will help immensely in my career. I also learned a lot about automating installation processes for software, library dependencies, and the importance of library versions. I am so grateful that I was able to work on this library once more, and I hope that my work will benefit the library as a whole.