Academic Job Position

Under the supervision of
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Summary

Twenty-two (22) Java applets that demonstrate numerical computation algorithms using interactive 2D graphics need to be ported to JavaScript and HTML 5 in order to run on standard web browsers.

Background

Prof. Mak is the author of the highly rated book, *Java Number Cruncher: The Java Programmer's Guide to Numerical Computing*, which was published by Prentice Hall in 2002, ISBN 978-0130460417. See https://www.amazon.com/Java-Number-Cruncher-Programmers-Numerical/dp/0130460419/ref=sr_1_1?ie=UTF8&qid=1545158046&sr=8-1&keywords=java+number+cruncher

The book included 22 interactive and graphical programs written by the author as Java applets. These applets demonstrated various numerical computation algorithms, and they relied on seven Java support libraries (jar files), also written by the author, that contained common computational code and graphics routines. The applets were designed to be downloaded from a web server to be executed on the user's web browser. They could also run on the user's desktop outside of a browser using the Java appletviewer, or as standalone Java Swing programs. See http://www.apropos-logic.com/nc/index.html

Current web browsers no longer support Java applets. In order to continue the usefulness of these demonstration programs, they need to be ported to a better supported execution environment.

Position and tasks

One student will be hired to work closely under the guidance of Prof. Mak to port the Java applets and their support libraries to JavaScript and HTML 5.

The port can use third-party (no-cost) graphics libraries. However, since the purpose of the demonstration programs is to show how to implement the various numerical computation algorithms, the port should directly translate the algorithm code and not use other math libraries.

The completed work will include

- Ported demonstration programs that users shall be able to download without cost and run them locally in any standard web browser, including Firefox, Chrome, Safari, and Microsoft Edge.
- Documentation on how to build and maintain the ported demonstration programs.

Job requirements

The requirements include all of the following:

- Excellent knowledge of and experience in Java programming as demonstrated by previous school project or industry work.
- Strong software engineering skills, including project planning and scheduling, and object-oriented analysis and design.
- Basic knowledge of calculus and linear algebra.
- Interest in learning about numerical computation algorithms.
- Excellent knowledge of and experience in JavaScript programming, including how to write interactive 2D graphics programs using the HTML 5 canvas, as demonstrated by previous school project or industry work.

Remuneration

The student will be paid $16/hour for up to 100 hours by the Department of Computer Engineering and receive a copy of *The Java Number Cruncher* book. The student will adhere to a mutually agreed work schedule. The port should be completed to the complete satisfaction of Prof. Mak by the end of Summer 2019. No academic credit will be given unless arranged separately with the student's advisor.