COSC 491 Computer Science Senior Seminar
Dr. Gene B. Chase, Spring 2007
Project Ideas

Collaboratory database

Student Kaitlyn Campbell, the Information Management Team Leader for Collaboratory projects, writes that they need an on-line database to be written and deployed. Although this is more of a project for Database Applications, I include it here because I don't teach the latter, and I promised Kaitlyn that I would at least offer it as a project for a senior interested in databases. You got my email about this with more details on October 1.

Solar Hot Water

Messiah College's Collaboratory is designing a so-called "thermo-siphon" solar water heater. In this way, African Christian organizations like the Theological College of Zimbabwe will be able to save money. The first design step is to simulate the heater in software. A "proof of concept" for this step was done as a senior project by a senior engineering design team using Microsoft Excel. It required satisfying multiple constraints simultaneously in a way that was simply too slow in Excel (but clever—recalculating intentionally circular references!). Because of the slowness, adding the second step to optimize the design parameters was not possible. The Collaboratory would be grateful for even the first step done in a well-documented way, fast enough to allow it to be an analysis module of the second step. A team might be able to accomplish both steps.

This is a project with a strong service component and at least two engineering alumni working in our geographic area who are eager to provide whatever assistance in understanding the project that you need, Brendon Earl and Joseph Longenecker.

Solar Scholars

The Solar Scholars project is a collaboration between the Department of Engineering, the School of Health and Natural Sciences, the Collaboratory, the Sustainable Energy Fund, Gannett Fleming Engineering, and several other partners to install a solar energy training facility on Messiah's campus. This facility will be just outside of Frey Hall and will provide electricity in part to Frey Hall.

One of the requirements for the project's grant is that information about the performance of the system be available live on the internet 24 hours a day. Internet access and a computer will be installed in the pavilion with the solar components.

The project needs a team who can interface the components (via RS-232) to a database to log the data, which will be used to update a webpage in real time. Jon Shambeda is working on Solar Scholars for his senior engineering design project. You may remember collecting real-time data from your First Year CS Seminar, when Mr. Barrett provided the ability in Visual Basic to interface with a real-time device (a joystick).

XEN on USB

IBM has the idea that you should be able to carry your computer desktop's "state" around with you. One way to accomplish this is to have a virtual machine that runs on top of whatever machine you come to. If you have a remote file server available via the internet, you might be

able to carry this virtual machine on a single USB memory stick, from which you can boot.

The history of this project: Windows Vista hoped to integrate the desktop and the internet, too, but it's not there in the first release. Other students have investigated the free virtual operating system XEN (prounounced "zen") for me for their Operating Systems project. One student, Matt Phillips, did a project for one of my courses on a diskless workstation. This takes that project one step further: Put XEN on a portable bootable device and allow it to contain "your" desktop's state.

Field Linguist's Toolbox modifications

A linguistic database called Toolbox is used by Wycliffe Bible Translators to store and analyze unwritten languages. Making needed enhancements would be a worthwhile project.

Topic Areas: These are not specific projects but areas that you might want to explore

IBM Mainframe Computing

IBM has been disappointed that more colleges aren't teaching using IBM mainframe computers. Thus they have instituted a program to encourage that. This project would investigate some topic that could be explored in such an environment. If your goal is to work in a large corporation, the IBM zSeries computer (heir to the legacy of the System 360/370/9370) is still a valuable tool. Think of this as a resume-building project.

Bioinformatics

It's often been said that the most fertile fields of study are at the intersections of disciplines, where the thinking of one discipline provides fresh insights to the other discipline. Bioinformatics is such a field. It is applying computational insights to Biology; it is applying biological insights to Information Science. As an example of the former, freely accessible genome databases can be mined by anyone to discover patterns. As an example of the latter, Ben Crouse has already expressed an interest in genetic programming.

Autonomic computing

Autonomic computing is sometimes called self-healing computing.

Assistive technologies

Speaking XML tags, such as VoiceML, perhaps tying it in with speaking mathematics via MathXL.

Mashups/AJAX

It's currently hot to use Javascript to create a more dynamic, desktop-like experience for web pages. This includes gluing together multiple applications ("mashups") as well as allowing speedy connection with a web server by transmitting less than whole pages.

Your choice

Of course ....