

CSE 255 Final Examination Handout

Background for Select Exam Questions

May 1, 2003

To upgrade UConn into the computer age, you have been asked to design an information exchange (X-CHG) system that will allow and facilitate the activities that faculty and students perform within the university community, striving towards an electronic, paperless environment. Interactions by users of X-CHG will occur via computers within the university network (PCs, MACs, Suns, etc.) and externally through on-line and Internet service providers (WWW browsers). Many different versions of hardware/operating system combinations must be supported. Such a system would allow professors to distribute homeworks and project assignments electronically to all students in their classes via e-mail. Students also submit their 'solutions' electronically via e-mail, so that they can be time-stamped to verify that they have been submitted by the due date. Through X-CHG, interactive discussions among students and faculty are also supported, allowing students to ask questions to their professors from their dorms, the library, the computer lab, etc.

A list of the capabilities that will be available to users of X-CHG is as follows:

- *Registrar/Student Record Access:* In this situation, faculty are given the ability to interact directly with Registrar computing systems to:
 - Check transcripts of his/her graduate advisees - replaces a written report each semester from the Registrar/Grad School.
 - Check transcripts of the students that are enrolled in a class currently being taught by the faculty member.
 - Electronically submit midterm and final grades - supports the direct modification of Registrar databases by faculty.
- *Managing Course Materials:* A faculty member must deal with managing course materials (e.g., homeworks, exams, solutions, student answers, etc.) not only for the current semester but for past semesters. Actions include:
 - Creating and modifying course materials.
 - Archiving 'old' material for use in later semesters. archiving protects the material from access by unauthorized users.
 - Posting materials on WWW homepages and notifying students of their availability by e-mail.

When creating and archiving, the materials must be protected from access by unauthorized users.

- *Electronic Quizzes and Exams:* In this mode, a faculty member can test students electronically in a classroom where each desk is equipped with a workstation (e.g., PC, Mac, Sun, etc.). Individual students have a path to ask questions of the instructor - but talking and mail between students during the exam must be disabled. The testing can be customized and/or different for each student. In a Virtual Classroom (see below), this testing may occur over the Internet.

- *Cooperative Design*: This option supports formal student interactions for team problem solving and brainstorming. While the record mode of the original description is still needed, it must be upgraded in functionality to support the following:

Joint work on a homework or project - in this case, it is possible to utilize different documentation preparation tools (e.g., editors, word processors, drawing programs, etc.) in parallel on the 'same' document. Students can simultaneously edit one document from different locations. Generates a hard-copy, printable document.

Developing an overhead/slide presentation - again, utilize shared document preparation tools that can automatically generate either overhead transparencies or photographic slides for the presentation.

- *Remote Office Hours*: A faculty member 'announces' his/her availability on the system for questions during a fixed period of time, i.e., starts an interactive talk session. Students can join and leave this on-going session to either follow the discussion or ask questions on assignments, homeworks, exam solutions, etc.
- *On-line Course Registration*: Allows students to register on-line via a WWW browser to take courses during a given semester or summer session.
- *Integration with UConn Legacy Applications*: Allows students and faculty to interact with UConn legacy applications (HOMER, UCLID, UCONNect, etc.) from the common interface of X-CHG.
- *Virtual Classroom*: Using specially equipped multi-media, video-conferencing classrooms, faculty can "originate" courses that are transmitted onto the Internet. These "virtual" classes can be taken at UConn branches, can be available in dorm common areas, or can even be viewed individually by students in their rooms.

The previous list represents capabilities, that while complex, are attainable utilizing available technologies.

To support the functional and operational requirements of X-CHG, there are a number of databases that must be available:

- *Student and Faculty Profile Databases*: Contains both confidential and public information needed by students and faculty as they utilize X-CHG. The information contained in this database ranges from the traditional that is shared by all users (e.g., name, address, phone, email, fax, etc.) to specialized information (e.g., in-person and remote office hours for faculty) to sensitive information (e.g., student passwords for cooperative projects, faculty passwords for submitting grades and protecting course materials, etc.). There is also the potential to track the preferences of users, which is similar to what most WWW browsers do, to have X-CHG work in a customized fashion.
- *Cooperative Work Database*: This database represents the information that must be tracked to support cooperative and joint design between multiple students on a given project. A database is needed rather than just local files, so that there is control to prohibit two or more students from changing the same part of a cooperative document at the same time.
- *Course Materials Database*: The information in this database is very extensive, to support all of the materials needed when teaching a course. Homeworks, exams, solutions, student answers, etc., must all be stored to support many of the capabilities that have been previously described.

- Video Database: A database of video images that correspond to “virtual” classes can be stored for limited duration (1 to 2 weeks) to allow students that miss classes to view them at a later time.
- External Databases that exist within the UConn community. These include databases that contain course registration information, transcripts, library contents, contact information (addresses, phone, email), and so on.

These database are critical for supporting and promoting the sharing and exchange of information among the many individuals that require access to -CHG.

To support the required functionality of X-CHG, there must be a diverse set of tools available for use by faculty and students, which also provide access to and/or utilizes appropriate databases. Some possible tools include:

- Help Tool: A help facility where users can receive on-line instruction on using X-CHG. Help for both faculty and student access should be provided.
- Chat Tool: An interactive ‘talk’ mode where two or more users can converse electronically via window-based interfaces. A ‘record’ option will track the discussion in an electronic form for later use. This is critical to support Remote Office Hours and Cooperative Design.
- Email Tool: For supporting the sending/receiving of messages. This tool should be customizable to employ a user’s favorite email tool in addition to the default version.
- Converter Tool: A converter module which allows local files in multiple formats (e.g., Ascii, WordPerfect, MacWrite, MicroSoft Word, Latex, Troff, Postscript, etc.) to be translated to another format before transmission.
- Homepage Tool: A WWW based tool to allow users to create homepages and resumes which are then automatically converted to html and installed on the appropriate server.
- Course Materials Tool: Needed by faculty to create and maintain course materials. Faculty can create both hardcopy and electronic versions of course materials. The electronic versions would be needed for the Virtual Classroom.
- Legacy Wrapper Tools: These tools allow students and faculty to access the various legacy applications (registrar, HOMER, UCLID, etc.) by providing wrapper that control and manage the interactions between X-CHG and the existing software.
- Exam Taker Tool: Used by faculty to administer and by students to take an exam electronically.
- Cooperative Design Tool: Uses and expands the Chat Tool to support the cooperative design and simultaneous editing of documents in multiple locations.
- Registration Tool: For students to register for courses.

A number of these tools may be bundled together to form larger tools that represent the user interfaces available to students and faculty. For example, a **Stu-GUI** may contain Help, Chat, Email, Converter, Homepage, and Registration Tools, while **Fac-GUI** would have Help, Chat, Email, Converter, and Course Materials Tools. This differentiation is critical, since **Fac-GUI** has access to sensitive information (i.e., registrar database, course materials, etc.) that must be prohibited from **Stu-GUI**. It is also important to identify these smaller tools so that they can be reused multiple times in larger tools.