

CS 121, Software Development

Project Opportunities, Spring 2002

Guidelines:

1. Project teams typically have four members each. Team membership is assigned by Professor Keller, based upon preference inputs from each student. Due to the number of students in the class, there may be some teams with three or five students.
2. Each project is listed with its client, who can be contacted by a team if there are questions of interpretation.
3. Final project approval is by Professor Keller, based on team input. Usually no two teams are allowed to do the same project, so choice conflicts are negotiated before final approval.
4. Projects initiated by students in the class may be allowed, but only if there is an external client, and then only with the professor's approval. If you are considering proposing such a project, please make it known early to avoid possible disappointment. Last-minute changes of a project to a student-defined one are unlikely to be approved, unless the idea is really compelling.
5. Each team is free to rename its project, assuming approval of the client.

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Product: On-Line Faculty Elections

Clients: Professor Hank Krieger (Chair of the Faculty), x76656, hkrieger@hmc.edu, and Professor Art Benjamin (election algorithm architect), x18688, benjamin@math.hmc.edu

The problem: Every Spring, the faculty hold elections to fill seats on various committees. Under the current system, faculty receive paper ballots in their mailboxes which they return to the Dean of Faculty's office within a few days time. The ballots are processed by outgoing members of the Faculty Executive Committee. The rules for processing the ballots is described on <http://www.dof.hmc.edu/elections/elections.html>

There are several drawbacks to the current system.

1. Faculty who are away from campus (e.g., on sabbatical) cannot vote.
2. Ballots can be added or taken away from the ballot box.
3. Sometimes faculty do not understand the voting instructions and cast meaningless or ambiguous votes.
4. Faculty who process the ballots may not be 100% comfortable with the election algorithm.

The proposal: Develop a web based means for running faculty elections. Ideally, all faculty who are eligible to vote should be able to go to a secure web page and cast their votes in a convenient way. Members of the election committee should then be able to run an Election Program (EP) that will determine the outcome of the election and provide the election committee with as much detail of the election as it desires.

Important Features:

1. The Dean of Faculty's office should be able to easily modify the web page each year when conducting elections.
1. Faculty should feel secure that their votes will be anonymous.
2. Faculty should be able to vote at most once.
3. If the faculty decide to continue with paper ballots instead of electronic ones, the committee should still be able to run the EP when the ballots are entered manually. A convenient user interface needs to be in place for this. (Potentially, this program could be useful to other organizations as well.) The program should also allow the option of allowing the users to process the election by hand with helpful assistance from the program.

Product: Student Portfolio Manager

Client: Dr. Margaret Kasamatis, Executive Assistant to the President for Assessment, x 18340,
Maragaret_Kasamatis@hmc.edu,

This will be a web-based program that would allow students to store their best work that demonstrated their achievement of a set number of educational outcomes as identified by the college. The web portfolio would be structured according to these outcomes. The program would need to accept a variety of file formats, including scanned documents, photos, video, audio, and electronic files. It would also need to have confidentiality features so students who store materials grant access to select individuals (such as their faculty advisors or prospective employers). The college also would need to be able to access the stored work for assessment purposes, and the collection of portfolios should be searchable on certain dimensions, such as class year, major, or outcome. Finally, another possible feature is that we'd like to provide a CD of the stored material for each student to take with them upon graduation.

Product: You Oughta be in Pictures

Client: Prof. Mike Erlinger, CS Dept. Chair, x 18912,
mike@cs.hmc.edu, Damon Rapp, System Administrator, x 73485,
drapp@cs.hmc.edu

Build a software/hardware system for the pictures of students, staff, and faculty. my idea is to install touch screens in the

hallway, approx where the current picture board is. the screens would be connected to a machine in Damon's office. The machine would have a database of pictures by name, year, etc. In the quiet mode the system would just display each picture for some time period (e.g., 5 sec). Using the touch screen someone could ask for all the students of a certain class year, or select a particular student, staff or faculty, etc. Also, the whole input system of taking pictures, filing them to disk, etc., should be part of the project.

Product: Virtual Dormitory for Prospective Students

Client: Dean Guy Gerbick, x18301, guy_gerbick@hmc.edu

It should be possible for there to be on our website, after the assignment of incoming frosh, a graphic representation of each dorm where people could "walk" through the dorm, stop by other people's rooms, and see if others are virtually in their room. It could perhaps be set up like an AIM or ICQ program where you could see who is in the dorm/online at any particular time. Then people can speak with each other privately via the site, with a suite, or with the whole dorm. I think this could provide a good way for incoming students to meet their roommate, other frosh in their dorm, and upperclass students prior to their arrival on campus, thereby easing the transition to Mudd. It would need to be possible to make administrative changes to this site easily.

Product: Prospect Map

Client: Mr. Jeff Watson, HMC Development Office, x77072, jwatson@hmcadm.admin.hmc.edu

I need software that would map the name and home or business address for the donors and prospects in the development database. Last-minute requests for visits for the HMC President or other development officers causes a race to zip code-based list generation and then actual location and evaluation of those in the list by rating and giving. I've been asked to have a wall map with these mapped out, but the density of donors and prospects varies so greatly that one big map really wouldn't do (and the data changes often, especially for our prospects and donors in Silicon Valley). This type of map would most helpful in planning trips based on donor or prospect density in addition to the reactive types of requests I get.

It would be great if the software took the rated prospects and donors, got their addresses then mapped them via GPS data to a physical map that could be zoomed in and out (much like MapQuest or MapBlast zooming features). The donor's or prospect's icon on the map could be color coded for rating/giving and have a 'H' or 'W' for home or work address. Maybe the icon could be the prospect's or donor's last name with the color coding and address type.

Being able to ensure security of the information being displayed is an essential aspect of the product.

Product: Proctor Evaluation System

Client: Dean Guy Gerbick, x18301, guy_gerbick@hmc.edu

Develop an online proctor and dorm evaluation process. I do one each fall, then input all the information, by hand, into a database.

If students could complete it online, it would likely boost response rates and save many hours of data input.

Product: Stag Football Strategy

Client: Mr. Steve Retzlaff, CMS Football, x71610, steve.retzlaff@claremontmckenna.edu

The project should provide for a simple data entry system, a sorting routine followed by compiling reports that will help find patterns and tendencies. We enter and sort on 10-12 different field, such as: Down, Distance, Field Position, Hash, Formation, Motion, Run/Pass, Play, Pass Patterns, Ball Carrier, Result, Defensive Front, Defensive Coverage, Blitz. We expect report on each of these fields sorted by multiple priorities. Both graphic and text reports would be best as we all digest information differently. (I have seen some programs of this type that tie info to the video from which the info is taken.)

Product: Free the Parents

Client: Professor Geoff Kuenning, x 71610, geoff@cs.hmc.edu

Construct software that implements a babysitting collective. The idea would be to have a centralized list of potential sitters, and an easy way for parents to share sitters, reserve time slots, etc. This seems like an ideal Web-based application. Sitters could register as babysitters, giving their standard rates and possibly known busy times. Parents could then enter a request such as "I need a sitter Friday from 6 to 11". The system would somehow

contact potential sitters, broker the arrangement, and confirm to all parties. Sitters could be given jobs in a round-robin fashion, but there should also be a way for parents to identify favorite sitters, and possibly a way for them to evaluate them on basic criteria such as reliability, interaction with the kids, etc. It is likely that the babysitting collective is a special case of a larger problem. The team should implement their system in a general fashion so that it will later be usable for other similar applications.

Product: Food Service Inventory System

Client: Mr. Aaron Neilson, x 72675, aaron_neilson@hmc.edu

Inventory Database Parameters (700-1200 items, about 10 fields):

What we need to do with the data:

- Add up to 20 storage areas.
- "copy" products from 1 storage area to another
- Print Inventory worksheets by storage area and sequence
- Sort products by all database parameters
- Update prices by quick key input of our choice of methods: Product code, Product name, etc.

Information the program will create for us:

- Inventory value (Weekly)
 - by product flagging inventory "growth" or price changes exceeding percentage we can manipulate
 - summary by account number

- Product usage reports (beginning inventory plus purchases less ending inventory)
- Non-menu item cost
- Cost increase or decrease exception reports
- A weekly meal count input module to calculate cost per meal served based on about seven categories.

Program must renew every week, making the ending inventory the beginning inventory clearing out purchases and archiving data to the user's choice of media for easy access at a later time. An import/export to MS Excel would be a bonus.

The use of a handheld device for taking inventory would be a HUGE bonus. The handheld device must be searchable, and will not upload unless values (including zero) have been input into each inventory item.

Product: Wally Game

Client: Ms. Stephanie Graham, Senior Editor, College Relations, x76722, stephanie_graham@hmc.edu

Wally Mudd, HMC's unofficial mascot, will turn 10 next year. In celebration of this occasion College Relations would like to develop a game, available on a CD-ROM, featuring this talented Mudder. Wally, you may know, is a wart akin to the cinder blocks which give the campus its distinctive look. In the spirit of HMC, Wally is well-rounded and well-versed. He/she has portrayed a Shakespearean actor, a unicyclist, and a studious mathematician tangled up in ordinary differential equations. We like to think

that the possibilities for what Wally can do, as with all true Mudders, are endless.

We envision a game that would show, as only Mudders can, the trials, tribulations, joys, and successes of a journey through Mudd. We want the game to be challenging and humorous. Some basic guidelines are:

- No murder or mutilation of Wally or any other "person"
- No insulting remarks or innuendos directed at anyone
- No defacing or destroying of property
- No profanity

The intended audience would be alumni, prospective and current students, parents and friends of HMC.

Should you decide to take on this project, we have plenty of illustrations that could be used as the foundation for the "game Wally."

Product: Dynamic Web Bot

Client: Professor Robert Keller, x18483, keller@cs.hmc.edu

Develop a web "bot" that can check periodically for the presence or absence of particular information content (as identified by keywords, regular expressions, etc.) on specified web pages or sets of related web pages. The intervals of checking would be programmable by the user. The GUI for setting the pages, defining content, etc. would itself be web-based. Part of the project is to design an appropriate interface.

Product: Chord Visualizer

Client: Professor Robert Keller, x18483, keller@cs.hmc.edu

Develop an application can be used in a music theory class for explaining chords. The application would be able to display several chords in a row using music staff notation and piano keyboard notation. The chords come from a variety of sources: pre-entered in a file, entered via the mouse, entered through the keyboard, or entered via a MIDI input interface. Simple mouse-based editing should be possible, such as moving individual notes and making them sharp, flat, or natural. It should be possible to transpose any chord or group of chords by a selected number of half-steps. The application should also be able to play the chords as selected using MIDI output. The platform would be either a Mac or PC.