Graduate Project Report

On-line Automated Chem-Lab Organizer

Submitted by
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Abstract

The purpose of this Computer Science Master's project was to design and implement a World Wide Web-based tool to be used by the faculty and students of the Department of Chemistry at Texas A&M University - Corpus Christi to facilitate various aspects of laboratory work. The project provides a user-friendly student interface that is used to upload course assignments, view the status of their individual assignment (e.g., assignment received), view grades and semester average, and view digital video presentations of various lab techniques. The software also provides a user-friendly faculty interface that is used to view assignments, grade online, track graded and un-graded work, keep grading information for each student, and calculate the semester averages.
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1 Introduction

The faculty and teaching assistants of the Department of Chemistry at Texas A&M University - Corpus Christi are required to track the submission date and the grading information of each student before evaluating the student’s final semester average. This becomes a challenge in a class of 170-200 students because there are usually some students who turn in their assignments after the due date. Keeping track of all this information in order to evaluate final averages is a difficult task for those faculty members who still use manual techniques. Some students forget to turn in their assignments and later claim they did. However, in fairness to the students, sometimes a faculty member might accidentally misplace an assignment or grading information for a student. That student will not notice this until the final semester average is calculated, which might result in a lower grade.

There are commercial World Wide Websites, for example www.blackboard.com, that are used to upload an assignment from a student account to a faculty account. These sites also document assignment arrival time and date. However, there is no supported method for a faculty member to keep track of the grading information of individual students and evaluate semester averages of each student automatically. From the students' point of view, no information is provided about the status of their assignments. Other websites available provide some functionality like uploading the assignments and displaying grades, but none of them provides a solution to the very specific requirements of the Chemistry Department. Also, obtaining a license for these websites is time consuming and expensive. This project provides a custom-tailored tool that will be used by the
Chemistry Department in overcoming the grading problems faced by the faculty, teaching assistants, and students.

The project provides a user-friendly interface that can be used by faculty and students with very little computer expertise. This project has two interfaces: the faculty interface and the student interface. The faculty interface of this system allows the faculty to view student information: login names, social security numbers, and email addresses. A faculty member can also view assignments sent by the students. These assignments are sorted by the assignment number. The faculty see the time at which a particular assignment arrived in the inbox. The inbox has the student’s login name and full name for proper identification. The faculty can grade the assignments online and send the graded assignment file back to the appropriate student. A faculty member also sees the most current overview of the assignment submission status. This system allows a faculty member to submit the grades for assignments, quizzes and exams. A faculty member can use the built-in messaging component of this system to read the message sent by students or send messages to a particular student or to the whole class. This system can calculate the overall semester percentage for each student enrolled in a course. This process of calculation of overall semester percentages is useful especially for those faculty members who previously performed manual computations; it thus saves them time. This tool documents the assignment’s arrival time and date, thus supporting the faculty member’s decision to penalize a student for late submission. It can also be used to refute a false claim of timely submission by the students.
The Student interface of this system allows the students to submit assignments online. Online submission frees the students (and the instructor) from having to be physically present on campus to turn in (receive) assignments. Therefore, an assignment due at close of business on Tuesday can be submitted at 4:59 p.m. from the student’s home or other off-campus site. This is a particularly useful feature for the large number of students who live and work off-campus. The student receives a system generated message after the assignment submission, helping them to keep track of their assignment’s status. The student can also use the messaging component of this system to send messages to his/her faculty member. The students can see their grades for assignments, quizzes and, exams as soon as the faculty submits it to the system; considerably reducing their anxiety (along with the number of emails and phone calls received by faculty members). Overall semester percentages can also be seen as soon as they become available in the system. Through the student interface, a digital video representation of lab techniques may be viewed. This is especially beneficial for visual learners, thus helping them to work faster in the lab.

This system aims at making grading, grade maintenance, and calculating percentages an easier task for the faculty member. It gives students the choice of location for assignment submission and more time to work on an assignment. This system provides online help to a user in case of problems faced while interacting with the system. The system dynamically updates the student information as soon as a student signs in. While registering, faculty members can add any number of courses which they would be teaching in a particular semester. There is no restriction on the number of faculty members, the number of students, the number of assignments or the number of exams
that can be stored in the database. The number of videos that can be updated to the system depends upon the available space on the server for the video files.

The following chapters discuss the project’s implementation from both a user’s and programmer’s point of view. Chapter 2 gives a detailed Description of the User Interface. Different screen-shots are used to aid in understanding the interface design which is available to a faculty user and a student user of this system. Chapter 3 gives the System Overview. It also describes the database design and the interaction of scripts with the database components. Chapter 4 is the Procedure section which describes the important algorithms in detail. Different scripts (along with the functionality each provide) are also listed in this chapter. Conclusions along with the possibilities of Future Work are presented in Chapter 5.