Teaching Tools
Specifications Document

February 4, 2003
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Project Description

This project was inspired by several years as a TA in the computer science department. Every year there is a discussion on where grades should be kept, where lecture notes and assignments were stored last year, where they should be this year and numerous other discussions about the various components of the course. Teaching Tools is a stand-alone program that would centralize all this course information. Grades, lecture notes, assignments and all course-related materials can be stored, managed and classified.

The target users for Teaching Tools are professors and teaching assistants at any academic institution. This semester we will target local users, who include college-level professors and teaching assistants in varied departments. Users are not assumed to be very computer literate. Teaching Tools will be designed to be extremely user-friendly. New users should be able to sit down in front of Teaching Tools for the first time and be fully acquainted will the program's features and functionality. This requires easy navigation, helpful graphics and an intuitive user-interface. Easy navigation implies that users should be able to access the major work areas of the program in 1-2 mouse clicks. Drop down menus will only be one level and large buttons will guide the user to each part of the program. This will be discussed at greater detail later in the document. An intuitive user-interface implies that windows, workspaces and menus are arranged in such a way that they are obvious, convenient and visible to the user. There will not be countless windows that are sometimes hidden, containing overwhelming information, as seen in software such as Adobe Photoshop. Teaching Tools should be an easy program for novice computer users to learn quickly.

Teaching Tools: Version 1.0

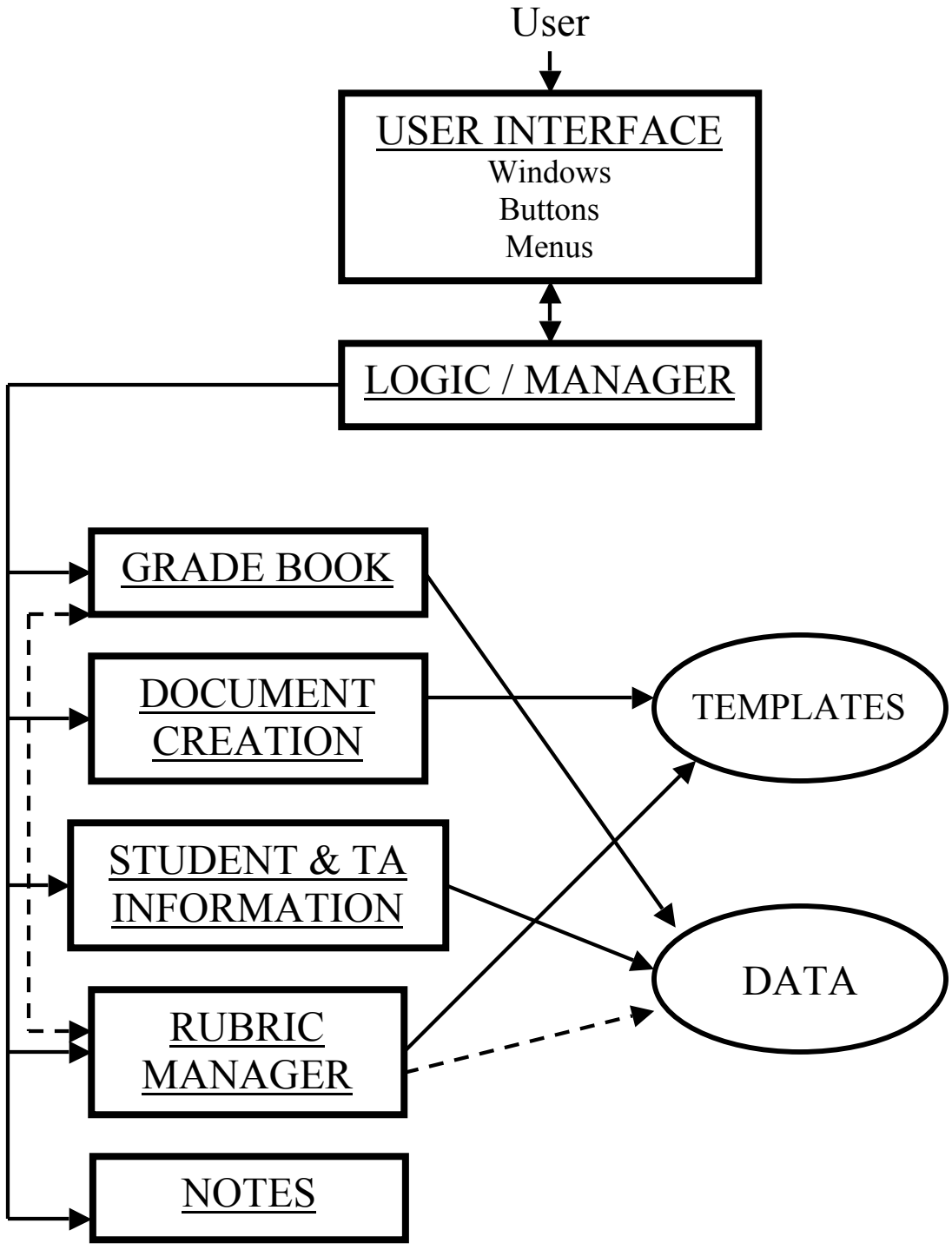
- Centralize information used in teaching a course. Main Parts:
  - Grades
  - Student & Teaching Assistant Information
  - Lecture Notes, Assignments & Tests
  - Professor & TA Central Note Posting
  - Rubrics

- User-friendly Interface
    - Button Navigation: there is a toolbar containing a button for each section of the program that is always visible. Users can always access another part of the program with one mouse click.
    - Menus will contain only one level; therefore, there are no menus embedded in other menus.
    - Wherever it makes sense to do so, parts of the programs will have similar layouts. For example, Student & Teaching Assistant information will be laid out in a grid format, as will the Grade Book. Users will be familiar will fewer layouts this way, making the program simpler to learn.
- Logical Connections between Parts of the Program
    - Where it makes sense, parts of the program will interact. For example, graders will complete rubrics for assignments. When the rubric is complete, the final grade calculated may be automatically entered into the grade book. This is not automatic. Users can specify this connection.
- Templates & Toolboxes
    - Templates will be provided for document creation and rubrics. The templates will add some punch to lecture notes, assignments and tests.
    - A toolbox will help the user create rubrics. The tools available will be text box, input box and some elementary drawing tools. The user can click and drag them onto the rubric to create a simple form for graders. The user can also relate an input box to an assignment in the grade book, so that the grade book is automatically updated when grading is complete.
- Multiple Course & Archive Capabilities
    - The program is capable of handling several courses at once. This means that past courses can be 'archived' and professors of more than one course can manage them all in the same program
- Authorization required to access program
    - Limits access to the program. Users must have a login and password. This will prevent students from tampering with course information.

Add-Ons for Teaching Tools 2.0

- Networked Teaching Tools
    - Same functionality as the stand-alone version, but can be accessed by multiple users across a network.
- Course Website Creation
    - Provides templates and functionality for a course web page. Users would simple provide the content.
- Student Version
    - This version would provide limited access to students. Students would be able to access grades (if the professor desired), take quizzes, complete practice exercises, etc.

Data-Flow Diagram



Data-Flow Diagram Explanation

- *User Interface*
  - All interaction between the user and the program occurs through the user interface's buttons, windows and menus.
  - User Interface communicates solely with Logic/Manager; therefore, the UI is replaceable.
  - See diagram A in visuals section for a visual representation of what the GUI will look like. There is a main menu that is always visible and a working window that changes according to the part of the program in which you are working.

- *Logic/Manager*
  - Interprets messages from the user interface. It then sends the message to the appropriate part of the program, where it is carried out.

- *Grade Book*
  - The grade book is where grades are entered, edited and managed in a grid-like fashion. (See diagram B in visuals section for grade book GUI).
  - The grade book receives user input messages from Logic. It requests and stores data. When the user opens the grade book, all students and their grades appear. The user may then modify the grade book or enter/edit individual assignment grades.
  - When the user clicks on Modify Grade Book, options appear that allow the user to add/delete columns, move columns and edit columns (change grade from numeric to alphanumeric).
  - When users complete their session in the grade book, all updates are stored.

- *Document Creation*
  - The Document Creation section of the program allows users to create course-related documents such as lecture notes, assignments and tests. It receives user input from Logic.
  - Document Creation has access to multiple templates that users may choose to implement. Templates are essentially like stationary with a style sheet.
  - When users complete a document they may save it for later use or editing. Users may also load a saved document instead of creating one from scratch.
  - Document Creation provides tools for users to utilize when making their documents: basic lines and shapes, text, multiple fonts, colors and font styles. These tools will be available to the user through a button toolbar across the top of the document creation work window.

- *Student & Teaching Assistant Information*
  - This section displays relevant information about students and TAs in a grid format, very similar to the Grade Book. Relevant Information is up to the user but may include, name, phone number, e-mail address, etc.

- Student & TA information requests and stores data. It receives user input from Logic. When this section of the program is opened, the grid displays all previously entered data.

- *Rubric Manager*
  - Rubric Creation: Users may create rubrics using the same tools described in the document creation section. Input boxes may also be connected to the grade book. If the box is connected to a column in the grade book, data entered into the rubric will be automatically entered into the grade book. Input boxes are also capable of calculations. For example, a totaling input box will calculate the total of specified input boxes within the form.
  - Filling in Rubrics: Graders may enter grading information into the previously created rubrics. If the input boxes are connected to a column in the grade book, data entered into the rubric will be automatically entered into the grade book.
  - File I/O: users can save and load rubrics, so they must be stored in some format recognizable to the program.

- *Notes*
  - Note Posting: Users can press a button that allows them to post a message that will be visible to all users.
  - E-mail: Users can create group e-mail lists to facilitate e-mailing the entire class. E-mails can be sent directly from the program.
  - See Diagram C in the visuals section for a graphical representation of the Notes section.

- *Templates*
  - Templates are available in Document Creation and Rubric Creation.
  - Templates essentially define the style of the document, creating a stationary-like feel for the user. Templates define background, color scheme and font.
  - See Diagram D for example templates.

- *Data*
  - Data is required for the grade book, student & TA information and possible the rubric manager.
  - The amount and type of data is determined by the user but will most likely include: student names, grades, e-mail addresses and grader names.

VISUALS

Diagram A: Graphical User Interface

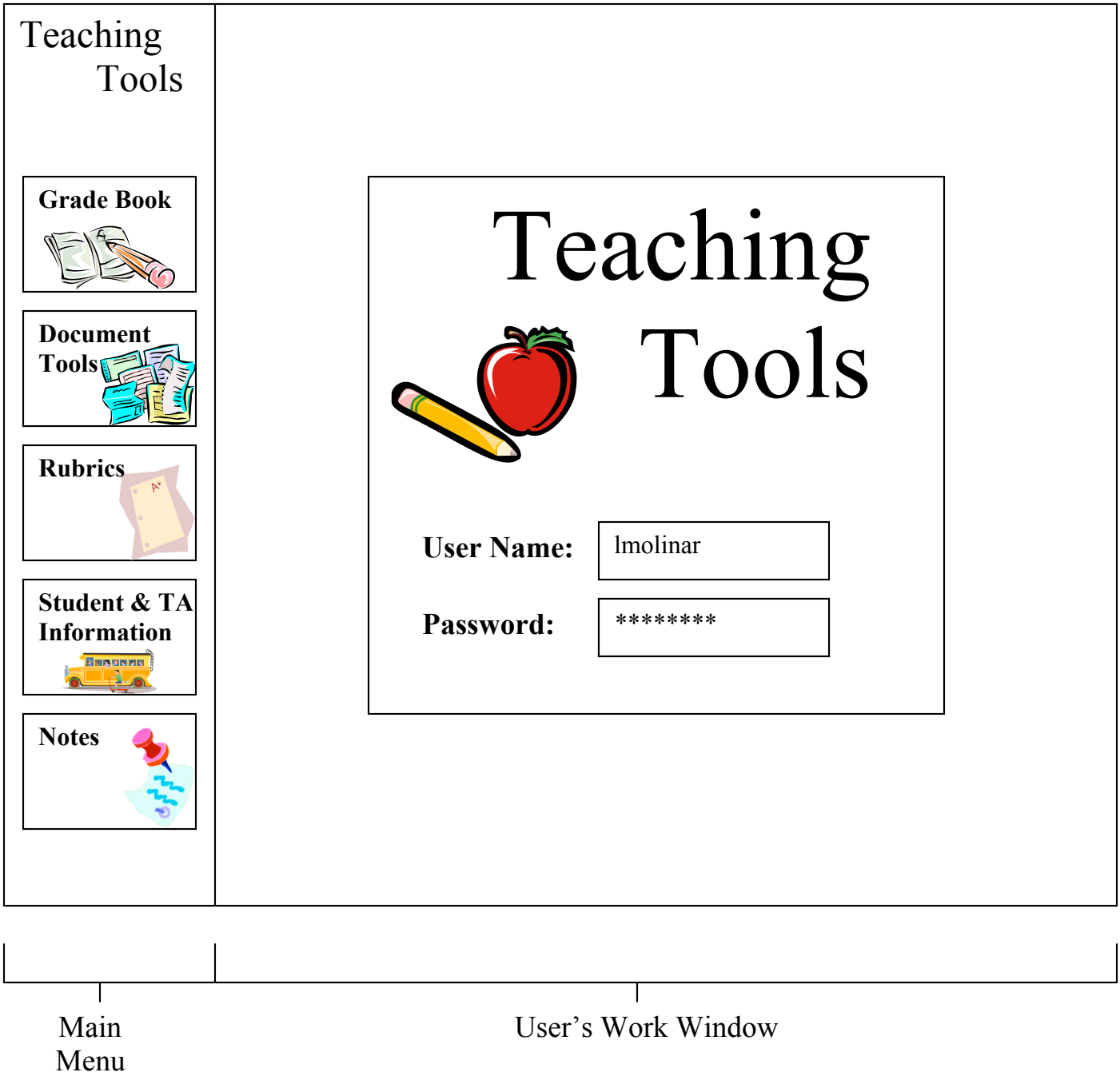
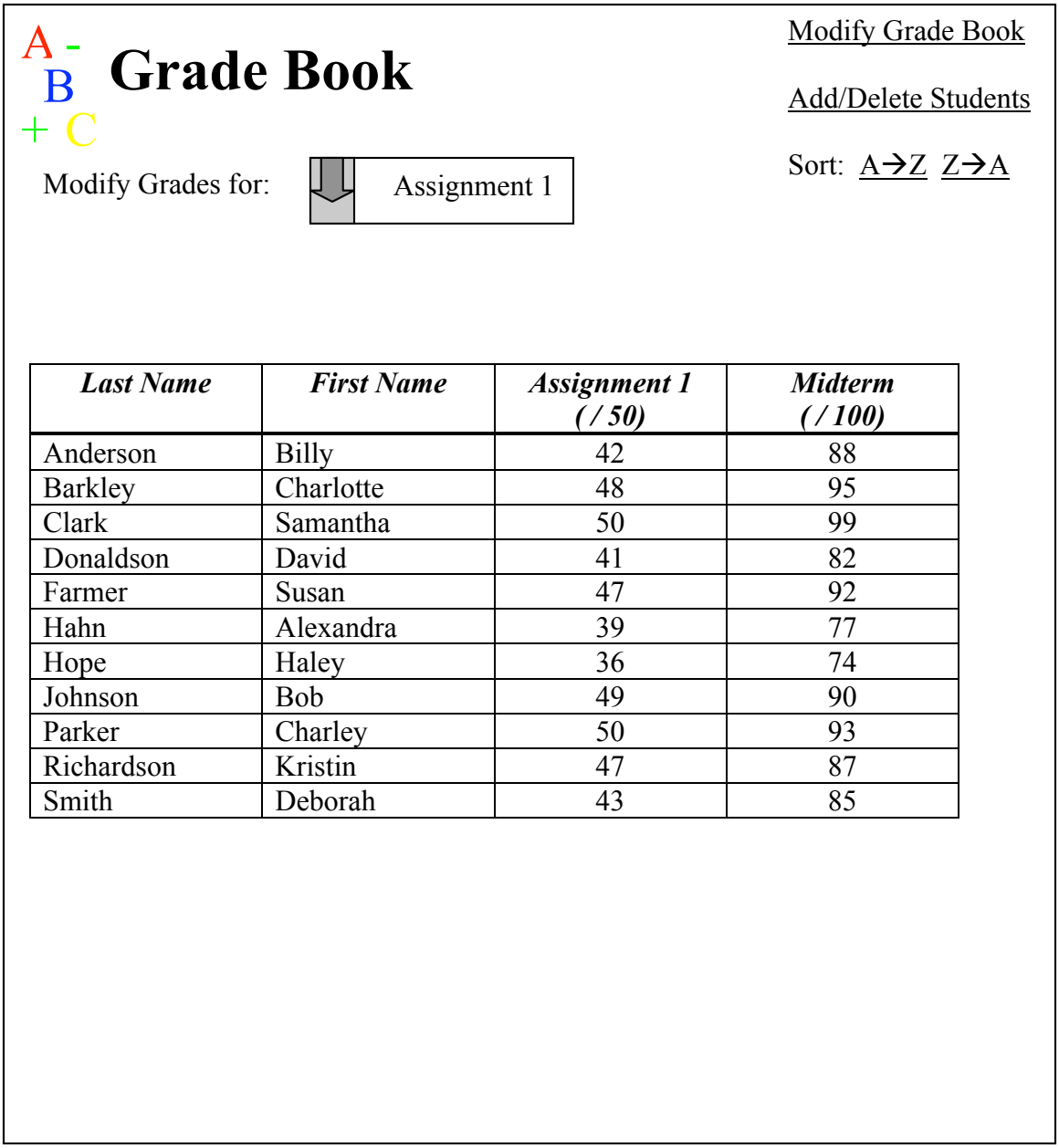
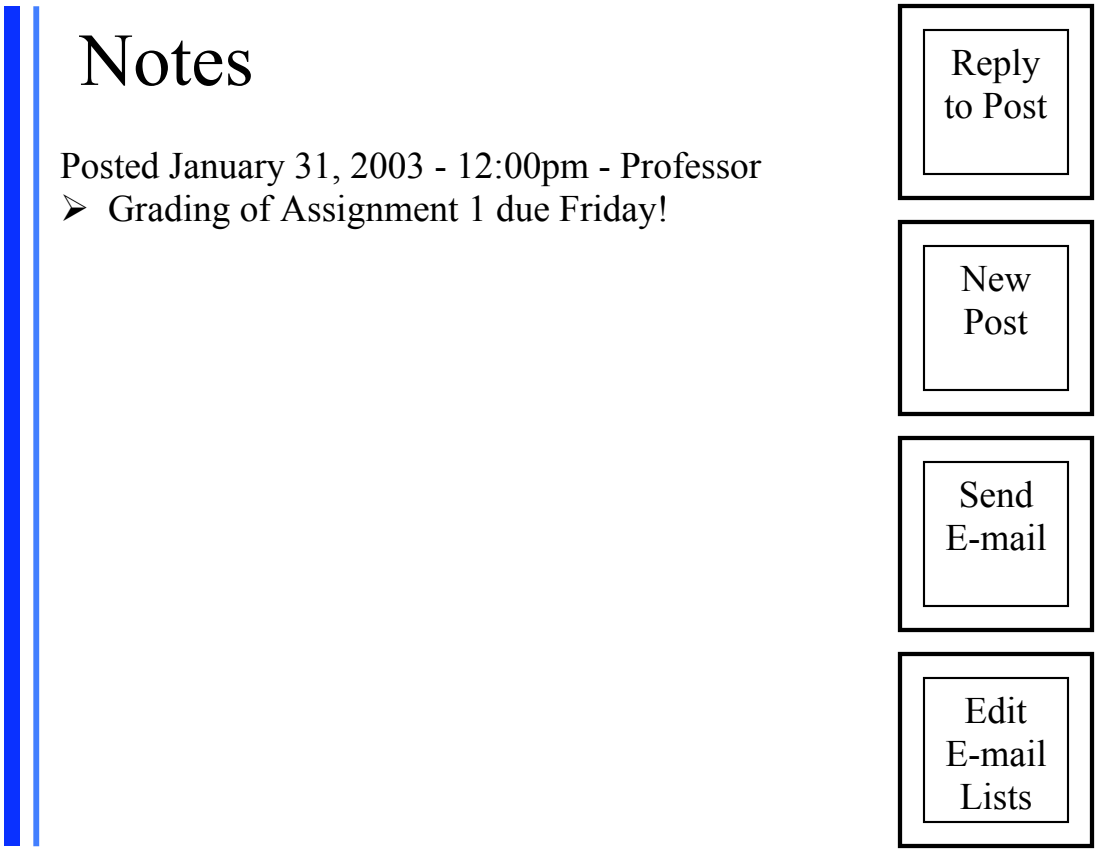


Diagram B: Grade Book Work Window



Last Name	*First Name*	*Assignment 1 (/ 50)*	*Midterm (/ 100)*
Anderson	Billy	42	88
Barkley	Charlotte	48	95
Clark	Samantha	50	99
Donaldson	David	41	82
Farmer	Susan	47	92
Hahn	Alexandra	39	77
Hope	Haley	36	74
Johnson	Bob	49	90
Parker	Charley	50	93
Richardson	Kristin	47	87
Smith	Deborah	43	85

Diagram C: Notes Work Window



Sample of E-mail List Creation Window:

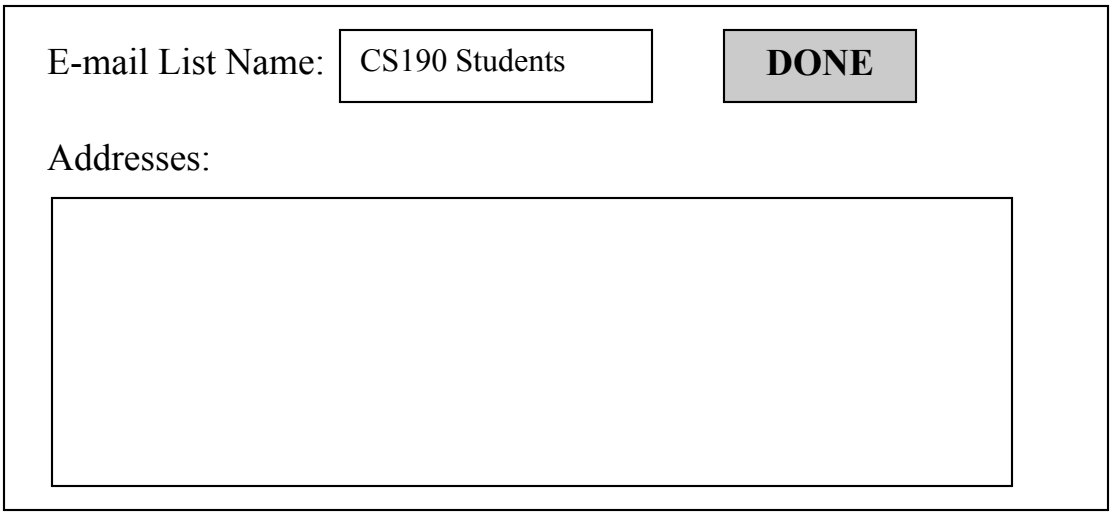
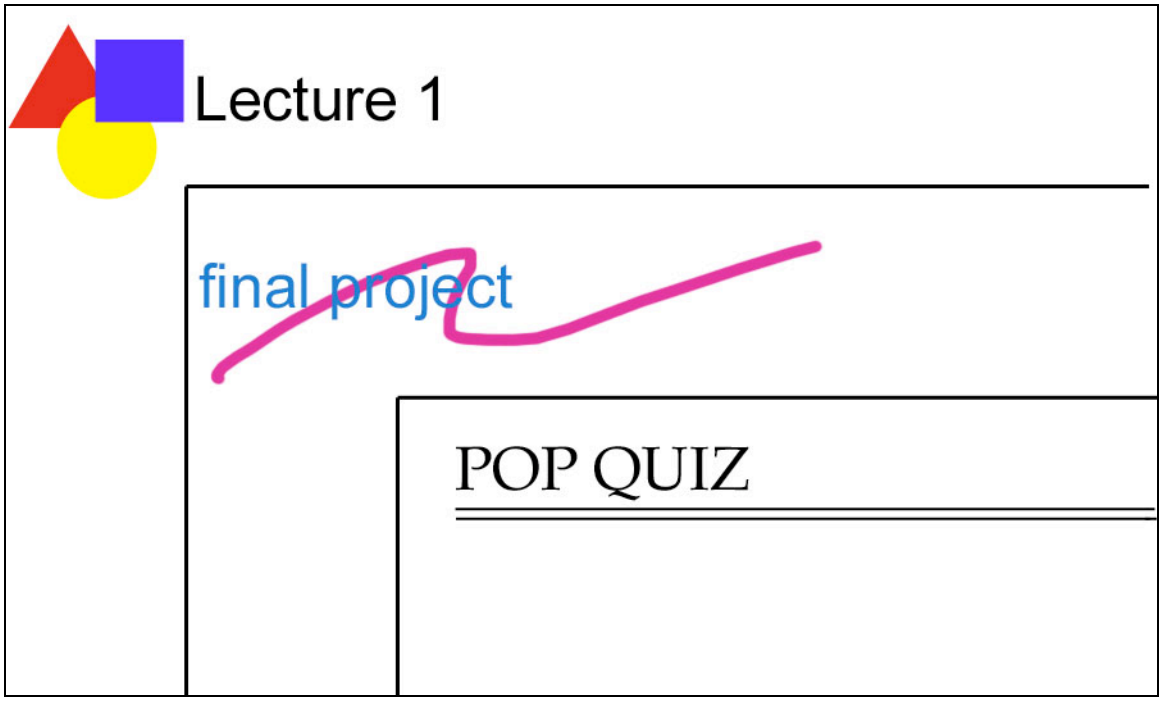


Diagram D: Example Templates



Visuals Description

- *When the Program First Starts*: The window seen when the program first starts is shown in Diagram A. Users must login with a user name and password. After they are authenticated a window will appear asking them which course they would like to view. They also have the option to create a new course.

- *Main Menu*: The Main Menu (labeled in diagram A) is visible throughout the entire program. Having a button that takes you to each section of the program with one click simplifies navigation.

- *Work Window*: The work window (labeled in diagram A) is where the user works and inputs data. Each section of the program has its own work window. You cannot view two sections of the program at once. You must completely exit a section, saving your work, before you can move to another section. If a user tries to exit a section before saving work, they will be prompted to save.

- *Grade Book*: The grade book (shown in diagram B) is in a grid format. The top link allows users to modify the grade book, add/delete students and sort. These were explained earlier in the system model explanation. A pull down menu allows users to select for which assignment they would like to modify grades. The student first and last name columns cannot be edited. In order for a student to receive grades, they must be in the student information table. This simplifies data entry, as students will only need to be entered into the student information table.

- *Document Creation*: The document creation section allows users to make a document. The kind of document they create is up to them. This is like a very simple word processor. Templates (described in the system model explanation, examples shown in diagram D) are available to the user. A simple set of tools, described in the system model explanation is also available to the user. The tools are buttons across the top of the work window.

- *Student & TA Information*: This information is stored in a grid. The GUI for the work window is extremely similar to that of the grade book. The common GUI will simplify the process of learning the UI for the user.

- *Rubric Manager*: This section of the program is visually the same as the document creation section with more capability. The tools available are very similar to the document creation section as well. Users create form-form like rubrics by clicking and dragging text and input boxes onto their work window. Student names are automatically at the top of the rubric. When an input box is dropped, a window appears giving the user the following options:

- Connect Input with Grade Book: When clicked a window appears with a pull down menu of columns in the grade book with which the user can associate the input box.
- Make Input Box a Total: When clicked, a window appears asking the user to choose which input boxes this box should total. Only numeric input boxes may be totaled.
- Change Input Type: By default input type is numeric. When clicked, the user can change the input type to alphanumeric.

- *Notes*: This section appears in diagram C. Buttons on the right toolbar allow users to post a message, reply to a message, send e-mail or edit (create) and e-mail list. When clicked these buttons display a window each similar to the example shown in diagram C.

NON-FUNCTIONAL REQUIREMENTS

Testing

Teaching Tools will be tested on local users, Brown University teaching assistants and professors. Ideal testing would require a sample of course staffs to use the program for the entirety of the semester for their course. However, since the entire idea, design, creation and implementation of the program must occur in one semester, this is not possible.

A sample of professors and teaching assistants will sit down with Teaching Tools and a packet of activities for them to complete. The activities will require them to use each part of the program, including adding students, entering grades, creating documents and rubrics, grading and using templates. In order to gauge the degree to which the program is user-friendly, instructions will be limited in each activity.

When the user has completed the activity packet, they will be asked to give written feedback. A prepared form will be available for them to fill out, asking them to rate the features of the program. They will also have the opportunity to write their own comments.

Performance

Each operation performed in Teaching Tools should be quick, almost instantaneous. Professors and teaching assistants are busy people and will not use a slow program. Templates should not be such that their use slows down the program.

Throughout testing, speed of tasks should be recognized, especially after adding 100+ students and working on multiple parts of the program, one after the other.

Reliability

Teaching Tools is required to be extremely reliable. Loss of grade information could be disastrous to a course. Loss of lecture notes or documentation would also be an extreme annoyance, turning the user off to the program forever. Reliable storage of data is crucial to the success of the program.

Documentation

The documentation should be extremely clear and concise. The author should not assume any computer knowledge on the part of the users. Each task offered by the program should have detailed instructions.

Potentially Risky Areas

The only potentially risky area of the program is effective and reliable storage of data. As stated above under Reliability, data loss would be detrimental to the success of the program.

Ease Of Use

As stated earlier in the program description, ease of use is a focus for this program. Since users are not expected to have any computer knowledge the program must have an intuitive interface.

Portability

The stand-alone version of Teaching Tools is not portable.

Dependencies on Other Systems

Teaching Tools is not dependent on any other systems.

Logistics

Brown University CS 190 students will complete Teaching Tools in the spring semester of 2003.

UPDATED REQUIREMENTS

- High Priority
  - Grade Book
  - Document Creation
  - Notes Area
  - Rubric Manager
  - Templates
  - Student & TA Information

- Low Priority (Version 2.0 Features)
  - Networked Teaching Tools
  - Course Website Creation
  - Student Version
  - Permissions set by Professor