COLORADO SCHOOL OF MINES

Background

Each term in the Applied Mathematics & Statistics department consists of 2-3 exams consisting of 8-10 problems per exam, per course. With the advent of Gradescope and Canvas statistics on the students' performance has been recorded per problem over the last 5-7 years. The problems are not identical from term to term though they are somewhat similar. Unfortunately, they may also differ in difficulty. There is a need to archive these problems in such way that a sample exam could be constructed based on problem type and statistical performance. For example, 'I need a problem on Integration by Parts of medium difficulty'.

Project Description

This tool is basically a problem bank. Exam problems over the years would be archived along with student performance. The user would be able to construct a new exam by requesting problem types and difficulty levels. The archive would be maintained and grow with each subsequent terms adding to the problem bank.

The tool needs to support 2 very simple operations:
1. Allow user to add test problems and associated (if any) graphics/files along with topic categories and performance statistics per problem.
2. Allow user to 'build' an exam by specifying problem category and difficulty level.

However, beyond these simple tasks are the following requirements:
1. A majority of the instructors use LaTeX for test creation. Thus, the problems would need to be stored in their raw form, preferably LaTex.
2. Some problems have associated graphics which would also need to be stored and accessed along with the problem.
3. Statistics (e.g., mean/median, recommended points, etc.) needs to be stored and referenced/reported upon request.
4. The category of problems requires flexibility as the list may grow over time.
5. More recent problems also have an associated rubric which should be reported upon problem request.

Desired Skill Sets
- Some database understanding. This project is not necessarily requiring the use of a database application, but some understanding of relational database concepts may aid in the development of the archive structure.
- An understanding of LaTeX. Some problems may have dependencies that are not immediately obvious (i.e., additional packages, user commands/defines, etc.). The developers should have some familiarity with the language.
- Some fundamental understanding of user interface design.