

Math Online Problems and Placement Evaluation Database (MOPPED)

General Description

The purpose of the math placement test is to ensure all McDaniel freshman has the right amount of mathematical skills to succeed in pursuing classes for their degrees. In order to be eligible to start taking entry level courses with Math prerequisites, students have to register for and pass the placement test to meet the qualification. Students are allowed to attempt the test as many times, but there is a minimum waiting period after one attempt before they are allowed to take the next one. In order to assist students in acquaintance with the formats and the types of questions on the test, they can use practice questions for preparation purposes, or review previous graded test questions before taking the next one.

There will be about 400 students a year register for and take the placement test on- and off-campus. Students can schedule a test to be held at a convenient time given the system is allowed.

Exercise and test questions, along with their solutions, are supplied by the faculty members from the Math and CS department. All questions are categorized in different math subjects, and are ranked by the levels of difficulties. There are two staffs, both the director and the secretary, who oversee and manage every test process and the routine operations of the system.

Basic Operation

User accounts were automatically created for all admitted McDaniel students in the MOPPED system. Students should use their McDaniel credentials to login to the system. Students may choose to see practice questions before they take a real test. Problems ready to be used are categorized by their subject classifications. Users are able to choose exercise questions by subjects. Every question resides in the database is ranked by its level of difficulty. A problem consists of a direction, an optional diagram of the problem, an answer, and an optional diagram of the solution. Other metadata of a problem and the solution can also be included, such as hint statement, problem reference, and study or test preparation pointers. Problems can also be referenced by defined orders, such as ordered lists, subgroups, or predicated subsets.

Every time a student signed into the system, all activities are to be recorded. The data items to be collected for a user session include the timestamps of signing in, accessed questions, supplied answers, and checked-out solutions.

Whenever a user is ready to take a test, and is given the permission, he or she can start the exam by clicking on the start button. A test is offered by giving a sequence of questions composed by the system, but only one question is presented to the exam taker at any given time. After submitting an answer to the current question, then the next question will be presented to the user. During the test, all the questions presented and the answers supplied are recorded. It is expected that

grading is an automatic process by the system once a test is end. The students should be able to look up all the records, including the latest test score, from the account profile at any time.

Administrators of the Math placement test should be able to query all the test records of any student. Once a recent test is over, given the standard passing grade assigned by the administrator, the system can generate grade reports for each individual who took a recent test to indicate if he or she had passed the test. Test results can also be embedded in the official letters to be printed out and sent to the test takers with both physical and electronic mails.

To grow the Math problem database, privileged accounts are created for authors and administrators to contribute new problems. Once a new problem enters the database, the name of the original author is assigned. There will be opportunities that other authors or reviewers would see that a revision is needed. The names of editors in each revision are to be noted along with the changes of the question. All new questions entered the database need to wait for the approvals from the administrators and/or reviewers to be officially loaded as practice or test questions.

The MOPPED system development is planned to proceed in three phases: test compositions from static problem retrievals, test compositions from automatic problem and solution generations, and flexible test question progresses depending on real-time responses from the test takers.

Information Needed

Mathematics Subject Classification

Policies to compose a formal test and decide the passing grade

Models and processes for flexible test proceedings (in the third phase)

Format of Input Documents and Interfaces

TBD

Format of Output Report Documents and Interfaces

Report of all students in a test

Report of all question responses in a test

Use-Cases

TBD

Assumptions

- Every student has account in the system is eligible to schedule a test until the latest scheduled test had passed.
- Every student has a unique student ID.
- Every test has a unique test ID.
- Every test schedule has a unique ID, and test schedules cannot overlap.
- The first time test taker can register for a test immediately, while registering for other than the first test, the waiting period policy would be enforced.
- There is only one original author for a problem in the database.
- Every test generated needs to be assigned with a test schedule.