Exam Management System - PROPOSAL

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Exam Management System

- Exam Management System
- מערכת ניהול מבחנים

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Customer

- Customer Name – Dr. Mayer Goldberg
- Customer Representative Person – Dr. Mayer Goldberg
  - Role – Lecturer, Head of Teaching Committee
  - Email – gmayer@little-lisper.org
  - Phone Number - 055-660-3392

Project's Motivation and Purpose

- General Problem:
  - With the increase in the size of the student body, it has become difficult to manage grading within the given time constraints. This has led many courses to adopt a multiple-choice format, which is faster to grade, and easier to analyze.
  - The creation of challenging multiple-choice tests in the sciences is a non-trivial task.
  - The creation of one-time-use questions is costly and unsustainable.
- Specific Problem:
  - Maintenance of a large and growing pool of questions is proving to be difficult.
  - Current implemented system is local, inaccessible and hard to learn.
  - Division of labor between TAs and test examiners is done by hand and is hard to track.
  - The possibility of tracking quality of questions & answers is crucially needed.
- What is the solution?
  - A web-based System for managing work, subjects, questions.
  - Intended to replace current offline system.

What already exists?

- The client, Mayer Goldberg, has developed a theory of meta-questions and their translation into multiple-choice questions.
- A scheme-based system was created to synthesize & generate multiple-choice and implement said theory.
- The existing system has now been in use for 6-7 years in a large number of courses.

- Current system's low accessibility is too hard for people without deep knowledge and understanding to use comfortably.

Customer's Vision

- Workflow Management System:
  - Support various roles (for TAs, graders, instructors, etc).
  - Manual+Algorithmical generation of tasks based on priority and needs.
  - Manual+Algorithmical spread of tasks throughout configured workforce.
  - Tracking over work velocity and output (= blame feature).
- UI:
  - Web-based system.
  - Dashboard based on Role.
- Content creation:
  - Manage content by subjects/keywords/classes.
  - Creation and management of stems, meta-questions, questions, appendices.
  - Creation and management of possible solutions/distractors per question.
- Output creation:
  - Flexible LaTeX-based creation of exams/keys/solutions.
- System:
  - Have both WMS and content handled in DB.
  - Version control of questions, handled in DB.
  - Easy install, migration, backup and cloning of the system.

Project Description

- Frontend+Backend - developed in JavaScript as it is widely user, stable, with frameworks that allow easy implementation of features.
- Simple, intuitive and smooth interface - better UX is key for adoption by new users.
- PostgreSQL based DB – stable and strong relational DB.
- Features – Detailed in org file.

User Interface

- Role based workflow management interface:
  - View and filter content by subjects/keywords/classes.
  - Creation and management of stems, meta-questions, questions, appendices.
  - Creation and management of possible solutions/distractors per question.

- Create new Exam

Project’s Risk Assessment

Challenge	How to overcome? (Bonus)
Security and confidentiality management	Working on a private network (VPN environment may be established)
Working with new languages such as JS, LaTeX	Introductory online courses, working with established APIs.
Time management	Working with task boards such as Jira/Github with weekly meetings.

Project’s Environments and Languages

- The Project UI and BE will be developed in JavaScript
- System state and information will be managed in PostgreSQL – an SQL based DB
- Document generation will be done in LaTeX

Evaluation and Testing Plan

- Accessibility Testing
- Unit Testing
- Sanity Testing
- Acceptance Testing
- End to End Testing
- Security Testing

Project’s Steps and Timeline

User Interface:

Web-based

Login page

Role dependent dashboard + actions

Workflow Management:

Ask for work

Watch pending tasks

Perform specific task

Maintain history (continue where left off)

Manual urgency control

Automatic/Algorithmic urgency control

Exam Management:

Meta-question management

Appendices management (appendices + their meta questions)

Stem management (stems + their appendices + their meta questions)

Selection of meta-questions by keywords/substring

Question production

Exam production

Catalog production

Version Control