ECSE 321 - Intro to Software Engineering
Requirements Document

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1 Functional Requirements

Please Note:

- The requirement's ID is its list number, i.e. 1.1.1.
- The priority of requirements starts with the General Requirements from 1.1.1 to 1.1.6, followed by the Non-functional Requirements. More specifically:
    1. Total completion of Desktop app requirements in numerical order.
    2. Total completion of Web app in requirements numerical order.
    3. Total completion of Mobile app in requirements numerical order.
    4. Implementation of XML persistence across all platforms.
    5. Implementation of database persistence across all platforms.
    6. Intercommunication between all platforms under a centralized persistence system.
    7. Total completion of Non-functional Requirements in requirements numerical order.

1.1 General Requirements

1.1.1 The Teaching Assistant Management System shall include a desktop application.

1.1.2 The Teaching Assistant Management System shall include a web application.

1.1.3 The Teaching Assistant Management System include a mobile application.

1.1.4 All applications (desktop, web, and mobile) shall have an XML persistence layer.

1.1.5 All applications (desktop, web, and mobile) shall have database persistence.

1.1.6 The three applications (desktop, web, and mobile) may be capable of communicating with one another.

1.2 Desktop Application Requirements

1.2.1 The desktop application shall only allow be accessible to users with administrator credentials.

1.2.2 The desktop application shall be written in Java with the Java Swing library.

1.2.3 The desktop application shall be capable of storing in its persistence layer a list of courses with their hours and credits.

1.2.4 The desktop application shall be capable of manipulating a list of courses with their hours and credits from its persistence layer.

1.2.5 The desktop application shall provide the ability to store a list of courses and their attributes listed in (1.2.3).

1.2.6 The desktop application shall be capable of storing the student enrollment data in its persistence layer.

1.2.7 The desktop application shall be capable of storing the TA/Grader salaries of all McGill Departments from a CSV file onto its persistence layer.

1.2.8 The application shall be capable of accessing TA/Grader schedules from its persistence layer.

1.2.9 The scheduling algorithm shall never appoint work hours for prospective students that are beyond the students' available hours.

1.2.10 The scheduling algorithm shall hire a certain TA for as many time-slots as possible for a given class with multiple lab or tutorial sessions.

1.2.11 The scheduling algorithm shall limit individual TA/Grader hours to within the range of a minimum of 45 for each course to 180 hours total per semester for all courses.

1.2.12 The scheduling algorithm shall prefer graduate students to undergraduate students.

1.2.13 The scheduling algorithm shall account for students' indicated priorities when assigning job placements.

1.2.14 The desktop application shall provide administrators with the opportunity to review instructor modifications to the TA/Grader hours.

1.2.15 The desktop application shall provide administrators with the opportunity to accept or reject the instructors' modifications.

1.2.16 The desktop application shall be capable of sending job offers to the selected TA's and Graders *once the administrator has explicitly accepted the placements.*

1.2.17 The desktop application shall allow the user to perform the instructor actions described in section 1.2.

1.2.18 The desktop application shall allow the user to perform the TA/Grader actions described in section 1.3.

1.3 Web Application Requirements

1.3.1 The web application shall only allow be accessible to users with instructor credentials.

1.3.2 The web application shall be programmed in PHP with the use of HTML and CSS.

1.3.3 The web application shall be capable of retrieving the course data from its persistence layer.

1.3.4 The web application shall be capable of displaying the course data from its persistence layer.

1.3.5 The web application shall be capable of retrieving the student enrollment data from its persistence layer.

1.3.6 The web application shall be capable of displaying the student enrollment data from its persistence layer.

1.3.7 The web application shall be capable of creating job postings with the attributes requisite skills and previous experience.

1.3.8 The web application shall be able to save job postings in the persistence layer.

1.3.9 The web application shall be capable of retrieving the course data from its persistence layer.

1.3.10 The application shall be capable of displaying the list of TA/Grader placements from its persistence layer.

1.3.11 The application shall allow the modification of TA/Grader placements without allowing the modifications to cause budget issues.

1.4 Mobile Application Requirements

1.4.1 The mobile application shall only allow be accessible to users with student credentials.

1.4.2 The mobile application shall be programmed in Java for the Android operating system.

1.4.3 The mobile application shall be created using only the tools provided in the Android UI library in Android Studio.

1.4.4 The mobile application shall be able to create a profile that contains the users' student ID.

1.4.5 The mobile application shall be capable of retrieving a list of job postings from its persistence layer.

1.4.6 The mobile application shall be capable of displaying a list of job postings from its persistence layer.

1.4.7 The mobile application shall limit the amount of applications of the user to a maximum of three.

1.4.8 The mobile application shall allow the arbitrary ranking of job applications by the user.

1.4.9 The mobile application shall be capable of retrieving a list of job offers from its persistence layer.

1.4.10 The mobile application shall be capable of displaying a list of job offers from its persistence layer.

1.4.11 The mobile application shall be capable of submitting acceptance or denial of the aforementioned job offers.

2 Non-functional Requirements

2.1 Performance Requirements

2.1.1 The three applications provided with the product (desktop, web, mobile) shall limit RAM usage to within 750MB.

2.1.2 The scheduling algorithm of the desktop application shall not take longer than one minute to complete.

2.1.3 The three applications shall provide error messages to handle unexpected behavior.

2.1.4 The three applications shall, in case of a system crash, restart the application with the last saved persistence file.

2.2 Security Requirements

2.2.1 The desktop application shall include a secure authentication procedure to ensure that only administrators gain access.

2.2.2 The web application shall include a secure authentication procedure to ensure that only instructors gain access.

2.2.3 The web application shall be able to identify the current user and associate users with their modification histories.

2.2.4 The mobile application shall include a secure authentication procedure to identify which student is currently using the software.

2.2.5 The mobile application shall be capable of associating student security information with the respective student account information.

2.2.6 The persistence of administrator, instructor, and student passwords shall be achieved cryptographically, using RSA/NTRU cryptosystems.

2.3 Compatibility Requirements

2.3.1 The desktop application shall work on Windows 10, Macintosh OS X 10.5 Leopard., GNU/Linux 4.9.8, and BSD 10.3 systems.

2.3.2 The web application shall be compatible with Google Chrome version 25, Mozilla Firefox version 50.0.0, Safari 10, Microsoft Edge, and Internet Explorer 9.

2.3.3 The mobile application shall be compatible with Android phones running Android 4.0 (Ice Cream Sandwich) or a more recent version.

2.4 Graphical Requirements

2.4.1 The three applications provided with the product (desktop, web, mobile) shall share a common logo (app icon, desktop shortcut, web logo).

2.4.2 The three applications shall have consistent (i.e. the same) color palettes.

2.4.3 The three applications shall have the ability to select between Light and Dark themes for optimal comfort in a variety of lighting conditions.

2.4.4 The color palettes (light theme and dark theme) shall be designed in a color-blind-friendly manner, to promote a common experience to all users.