



Designing a Secure Exam Management System for Mobile Learning Environment

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Abstract — Mobile-Learning has enhanced the e-learning by making the learn process centered. However, enforcing exam security in open environment where each scholar has his/her own movable/tablet device linked to a Wi-Fi network through which it be further connected to the Internet can be one of the most demanding tasks. In such environment, student scan easily swap information in excess of the system during assessment time.

Keywords- Access Control, E-Learning, Exam Engine, Learning Management System (LMS), M-Learning, QR code.

1. INTRODUCTION

One definition of Mobile learning or M-Learning is, "any kind of learning that happens once the learner isn't at a set, preset location, or learning that happens once the learner takes advantage of the training opportunities offered by mobile technologies" (MOBILearn., 2003). In different words, with the utilization of mobile devices, learners will learn anyplace and at any time (Crescente and Lee, 2011).

The term mobile refers to risk of happening in multiple locations, across multiple times, and addressing multiple content areas victimization either static or moveable equipment's like wireless laptops, Personal Digital Assistants (PDAs) and good phones. The quickest developing associate degreed rising computing platform with a calculable one.6 billion mobile device users by 2013 is sensible phones, mobile devices and PDAs. M-Learning focuses on the quality of the learner, interacting with moveable technologies, associate degreed learning that reflects attention on however society and its establishments will accommodate and support a more and more mobile population. This is often as a result of mobile devices has options and practicality for supporting learners. Completely different types of instructional usages are reported, like instruction victimization short messages, vocabulary and apply queries, and plenty of experiential learning state of affairs and informal problem-solving. As net and computers become vital instructional tools, the fashionable technologies become simpler, moveable and straightforward to use.

Mobile devices are rather more within your means than desktop computers, and have a less costly technique of net access. Currently, the pill PCs permits mobile net access with equal or a lot of practicality than desktop computers. The term mobile learning or briefly M-Learning refers to the utilization of mobile and hand-held IT devices, like mobile telephones, laptops, PDAs and pill computer technologies, in coaching, learning and teaching. The mobile learning is thought-about because the third wave of learning with mainframe and, desktop computers because the 1st and second waves. Some students could use their mobile devices in foreign language categories. Different students could use their mobile cameras to photograph blackboards, PowerPoint or the other vital documents.

Therefore, mobile devices are an efficient instructional platform, because of the actual fact that mobile devices are simply accessible by students and supply adequate support for normal net technologies. Victimization fashionable strategies and techniques integrated in M-learning, facilitate in creating the training of our student a lot of attention-grabbing, a lot of interactive, wide obtainable and versatile. M-learning is cost-effective that helps students to be told a lot of while not ancient restrictions. What is more, the likelihood to integrate M-learning systems into existing E-learning systems makes it straightforward to remain involved with the latest advances created in teaching analysis.

2. SEMS EXAM ENGINE CORE SERVICES AND FUNCTIONALITIES

The Quiz Engine embedded in Moodle isn't factory-made established on Service directed design. It enforced as a bulk of PHP code that has got to be accessed through normal net browsers that square measure somewhat slow on mobile devices and can't address the communicating security problems that exist in m-learning surroundings. Moodbile services extension to Moodle doesn't bit the Moodle's Quiz Engine. Thus, we'd like to develop a replacement Quiz Engine that may be deployed as a service directed application, in order that its services will be consumed by a mobile application designed to cater to m-learning specific security needs. As well, it ought to be Integra table with Moodle/ Moodbile so as to own an entire LMS that suite the m-learning surroundings and addresses all of its security problems.

A. 2.1. Preventing the “Unattended Exam” Issue:

In a Wi-Fi based network, we cannot guarantee that each student is going to attend an exam from a dedicated classroom. A student can simply sit in a nearby room and log in to the exam system through the Wi-Fi network. He/she can subsequently open his/her course notes and use it to answer the questions illegally.

2.2.1 Proctor Approval based Strategy:

This strategy best suits the case in which we have a small number of students and the proctor is familiar with them. Once the student logs in to the exam system, before he/she gets enrolled into the exam, his/her name will be populated in a list shown in the proctor's mobile device through the Exam Enrolment Confirmation Interface. The proctor has to physically check that all students whose names are listed are present in the dedicated class room to approve their enrolment request accordingly. In case a student is found to be absent, his/her enrolment request will be disapproved by the proctor and an alert will be auto-generated to be sent to the appropriate person such as an Exam Security Officer.

2.2 Using Alternative Mobile Devices to Exchange Information during an Exam:

A student may bring two mobile devices, sign into the exam system using one of them and then use the other one where SA intuitively is not functioning, to exchange information with his/her colleague during exam. Though the standard paper-based exam systems have the same issue of the possibility of students exchanging information through hidden mobile devices, with SEMS such a scenario can be prevented by the following procedure: Enforce the students to use username and password in order to connect to the Wi-Fi network rather than using a single passphrase for all. Apply a security policy on the authentication server which ensures that a student can sign into the network via a single mobile device only.

2.3 Report Generation:

The design of a Secure Communicating Management System (SEMS) to mitigate the distinctive communicating security threats that exist in m-learning environments. SEMS offers several communicating services such as: secure and random distribution of communicating queries, turbo-mode assessment, hindrance of the “unattended exam” issue, biometric-based authentication service for insect impersonation, preventing students from exchanging their devices throughout associate degree communicating, conducting communicating firmly through on-line or offline ways, and auditing. The paper additionally provides countermeasures against varied network connected problems like network overload, occasional network failures, students trying to use various mobile devices to exchange data throughout an communicating, associate degreeed an unwelcome person employing a Wi-Fi transmitter to bring the Wi-Fi network down. SEMS is integrated with associate degree open supply and wide accepted LMS, particularly Moodle and its Moodbile service extension. The ensuing style may be a complete LMS with secure communicating services which will be consumed by bequest systems through net browsers furthermore as by m-learning systems.

3 SEMS security agent:

It is centralized software which cannot block adhoc Bluetooth communications between students' mobile/tablet devices; neither can it block the regular cellular communications. It cannot address certain issues such as the “**unattended exam**” issue. For such special issues, we need a protocol specifically designed for m-learning environments.

3.1 Online Exam Strategy

In this strategy, students attend the examination through a secure and on-line channel established with the examination Server. This strategy has a lot of blessings over the offline one. as an example, it permits students to access a shared library of e-books or a collection of connected websites pre-specified by the teacher for an open-book examination state of affairs. On the opposite hand, imposing examination security becomes a challenge in such some open surroundings. During this the system needs to adopt a dynamic network access management through that it will produce and enforce totally different policies for various cases. As an example, if the coed has no examination, then every kind of communications, as well as the cellular, Bluetooth, and Wi-Fi communications, area unit allowed. throughout examination time, however, cellular, Bluetooth, and Wi-Fi communications ought to be blocked except the most association to the Server through that the students are to submit answers to queries or access the exam's shared library.

3.2 Establishing the Secure Channel with the Exam Server:

The student gets his/her mobile/tablet device from the students' registration office. The device ID will be associated with the student's ID in the Server's database before delivering the device to the student. The student has to get his/her default login credentials (username/password) from the students' registration office as well. The student has to first log in to the system through his/her personal computer or through a dedicated computer in the students' registration office. He/she will be prompted to change the default password and then to re-log in to the system. The student's account page has a link named “Mobile Device Activation”.

4. SYSTEM SPECIFICATION

This aims to identify varied vulnerabilities which are able to violate communication security in m-learning environments and to vogue the appropriate security services and countermeasures which is able to be place in place to verify communication security. It jointly aims to integrate the following secure communication system with associate existing, open offer and wide accepted Learning Management System (LMS) and its service extension to the m-learning setting, significantly “the Moodbile Project”.

To vogue a Secure Communication Management System (SEMS) that meets the distinct security desires of m-learning environments and to integrate it with the current Moodle/Moodbile platform. This might finish in a whole LMS that is every equipped with secure communication services and acceptable for m-learning. Our intention of integration SEMS with a wide illustrious LMS like Moodle is so to induce the benefits of Moodle’s readymade services in several learning aspects like course material administration, documentation, etc. that area unit experienced and appreciated for the last fifteen years. However, the planned SEMS may additionally work as a standalone secure communication management system for m-learning environments whereas not integration with Moodle.

4.1 Features of implemented System:

1. It has a Service Oriented Architecture.
2. Provide better security.
3. Can be access more lightly.

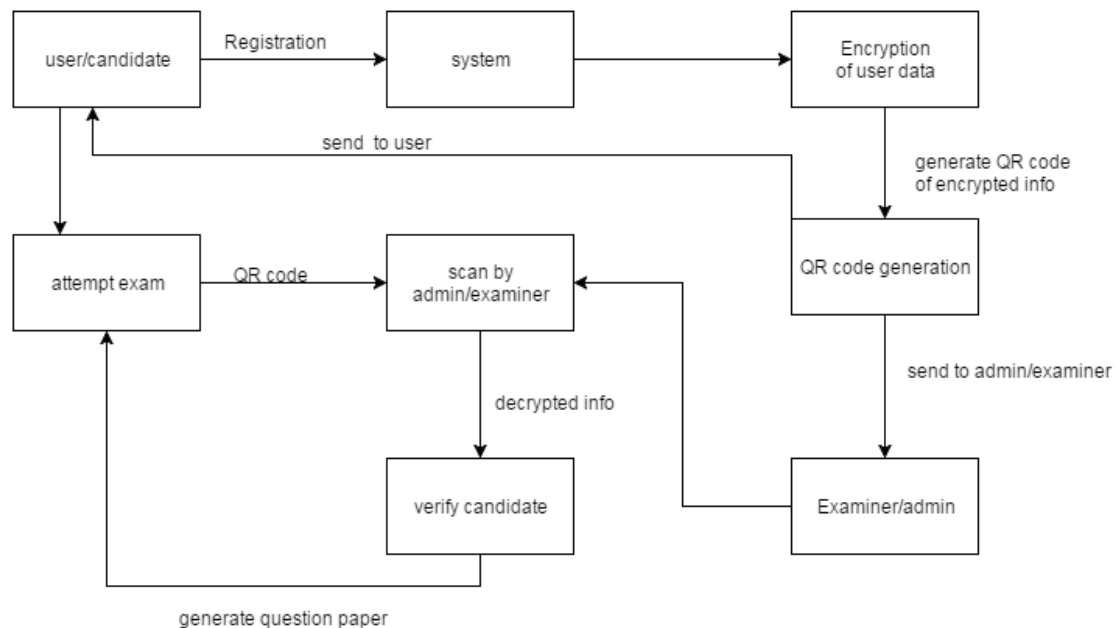


Figure 4.2. Block diagram of system with power supply

In this system, firstly user i.e. student request to server for QR code generation. Server sends that QR code to the users Email-ID. After that server or examiner login into the system and scans the QR code through the QR code scanner. After that server sends an OTP to the users i.e. students registered Email-ID. Then the QR is successfully decrypted through the OTP and user i.e. student is authenticated for attending the online exam.

4. MOODLE / MOODBILE SERVICES

Moodle is associate open supply and wide accepted LMS. group action SEMS with Moodle helps to create use of its ready-made and well tested services in different aspects of e-learning that don't seem to be associated with examination security like administration, documentation, tracking, news and delivery of electronic academic technology.

Moodle is meant following the classic three-tier design. Presentation Tier is supposed for the interaction between a user and Moodle through an internet browser. the bulk of business logic is found at Domain Tier. Knowledge Management Tier provides information connected practicality like storing or retrieving information.

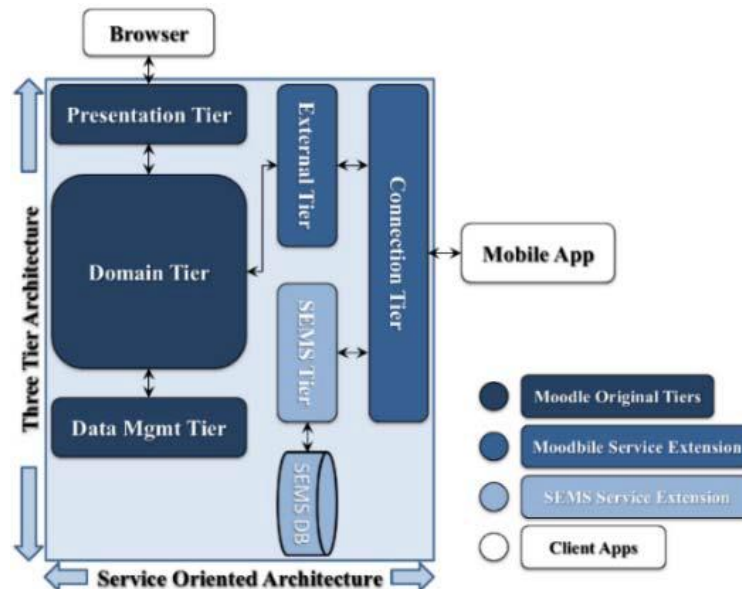


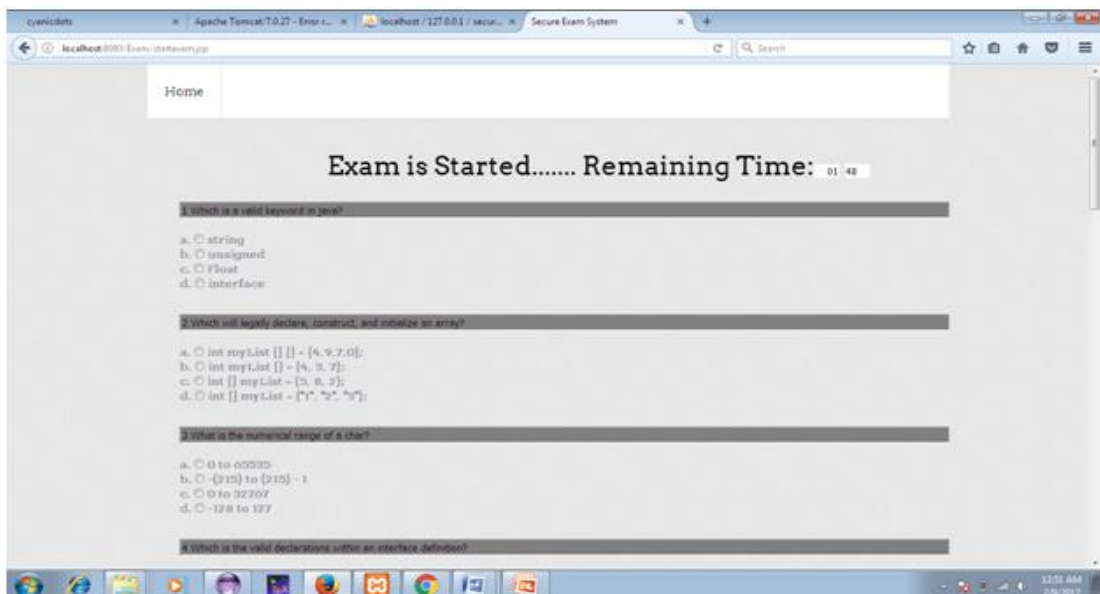
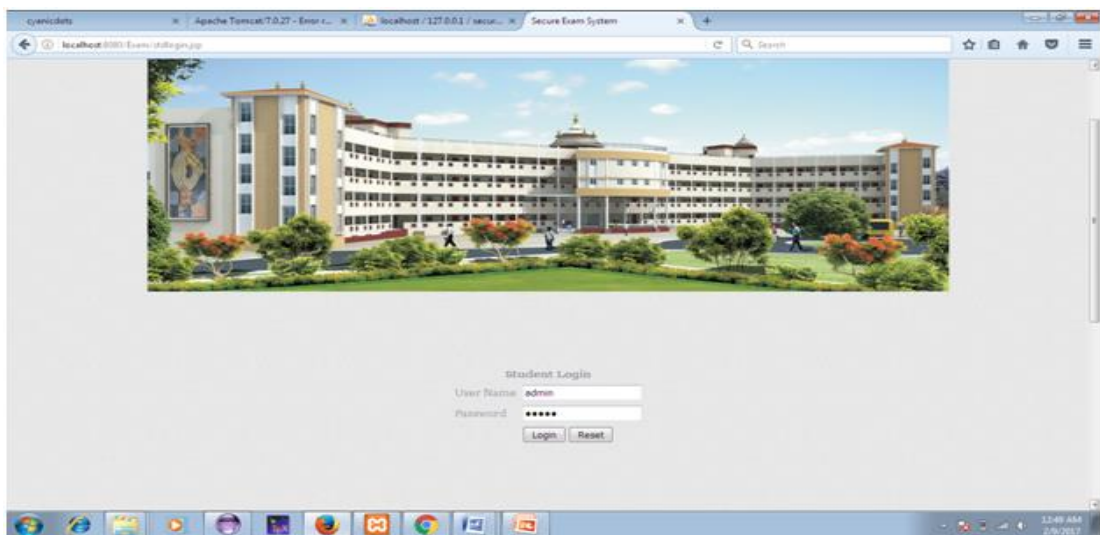
fig.2 SEMS integration with Moodle/Moodbile framework.

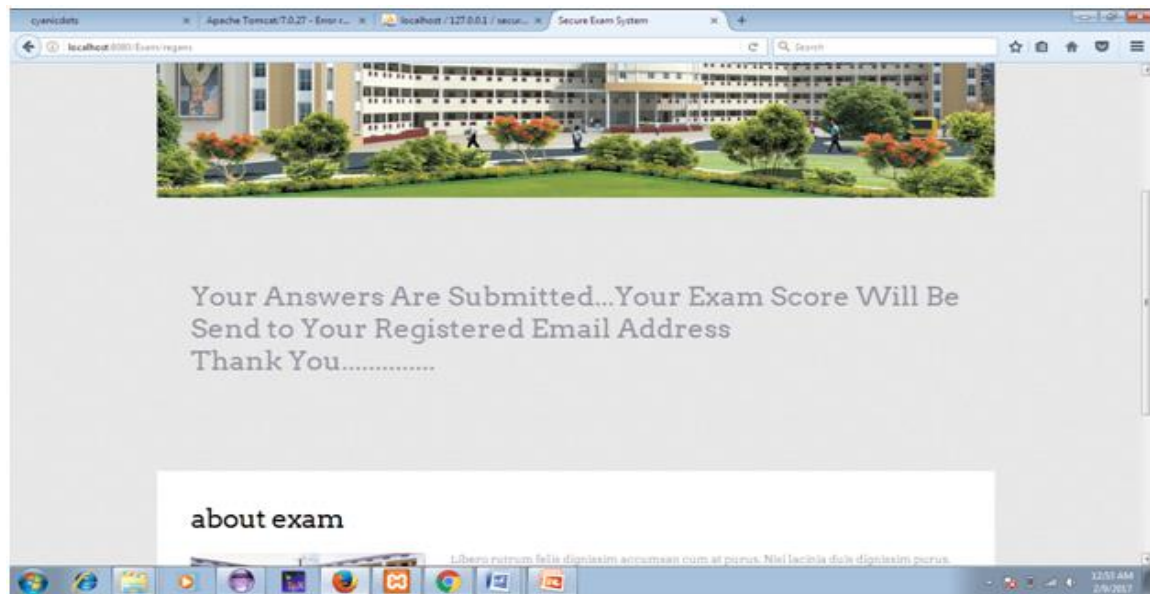
SEMS services are all to be enforced victimization Service adjusted design in order that they don't would like the External Tier services. For that, associate freelance layer is made beside the External Tier wherever all of the mentioned SEMS services are enforced. To boot, SEMS information is made to store and manage SEMS knowledge. The SEMS Integration design is associate open supply LMS that supports a good vary of shoppers, from basic net browsers to mobile apps. It includes all learning services and functionalities, from documentation to conducting examination services. It suits each e-learning and m-learning environment.

6. QR-Code based Strategy

This strategy is suitable for medium/large number of students where the proctor may not be familiar with all examinees. A student gets into the dedicated exam room and obtains his/her access token from the proctor. After he/she signs into the exam system through the Exam Client Software (ECS) installed on the student's mobile/tablet device, ECS asks the student to present his/her access token in front of the mobile/tablet device camera. This process guarantees that no student can log in to the exam system from another room as access tokens are not distributed there. In case a student must leave the room for an emergency during the exam, he/she needs to submit his/her mobile device and access token to the proctor.

7. OUTLOOK





8. CONCLUSION

In this the plan of a Secure Exam Management System (SEMS) to simplicity the exclusive examination safety force that be in m-learning environment. SEMS offers lots of exam armed forces such as secure and random sharing of exam questions, turbo-mode appraisal, avoidance of the “unattended exam” issue, biometric-based verification service for anti-impersonation, prevent student from exchanging their procedure during a test, conduct exam strongly through online or offline strategy, and audit.

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