



Enhancing Student Assessment -A Comprehensive Study of Online Exam Portals

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Abstract— Online examination or e-exam portal has become important these days because of the rapid evolution in the Internet and Education. Online examination system is more efficient than face-to-face examination. It is more economically enduring because we do not need to print and store papers. Also we do not have to invigilate and monitor the students to prevent cheating. Thus, it is time saving and reduces human labour¹. With this study, we have proposed an efficient online examination system to conduct subject quizzes and lab exams online, for all educational institutes and provide a set of real time questions for training in placement related programming, for students. The proposed system comprises an integrated compiler for the students to test their coding abilities.

I. INTRODUCTION

Today ,Online Examination System is considered a fast developing examination method because of its accuracy and speed. It is also needed less manpower to handle the examination. It is used to conduct assessment test, aptitude test, psychometric test, personality test, entrance exam and campus exams. Organizations can also easily monitor the progress of the student that they give through an examination[1]. As a result of this, the result is calculated in less time. It also helps diminishing the need for paper. Online examination project in JAVA is very useful to learn it, According to today's requirement Online examination system is significantly important to the educational institution to prepare the exams, saving the time and effort that is required to check the exam papers and to prepare the results reports

Organizations and institutions will have a centralized database of questions, from which the tests will be prepared and the internet will be used as a media for disseminating and conducting tests thus maintaining a uniform pattern for all the examinees throughout the organization.

II. ONLINE EXAM

Over time, a lot of changes have come in the universities' examination systems. The manual examination system was meant for times when there were fewer students and courses. However, at present, with the increase in the gross enrolment ratio in higher education, the examination system has to bear an increased load and leading towards inefficiencies. Currently, online examination has been used everywhere in the world due to mass enrolment ratio. The traditional approach of paper – pen examination is prone to errors, greater time consumption, and valuable natural resources being wasted.

The main objectives of automation of examination systems are to minimize human intervention, reduce expenditures, bring efficiency, enhance productivity, optimal utilization of resources, better supervising of examination activities to take quick decisions, timely availability of information/services for stakeholders, integration of isolated but related databases, bring transparency, minimize data redundancy, role-based access to users, improvise public image and reduce psychological pressure.

There are existing web based examinations developed with Java Web technologies that provides the functions, including question bank management and online test. Also the integration of client-side programming and server-side programming techniques were used and analyzed [6]. From the survey, we have proposed a system, an online examination that is different from the existing ones which includes an integrated centralized compiler and making use of efficient software, MYSQL, AngularJS and springboot.

Online examinations are one of the methods that can overcome the problems faced by the traditional paper-pen examination approach. Figure 1 explains how online examination maintains integrity and confidentiality of a person and avoids plagiarism.

III .SYSTEM DESIGN

Online Examination System is a web based application system used to create and evaluate examination. This system architecture consist of 3 sections:- frontend, backend and database server. For the design of the system we used interpreted programming language AngularJS, MySQL and springboot, in order to send and retrieve data from the server, css for the styling of web pages and the relational database management system MySQL.

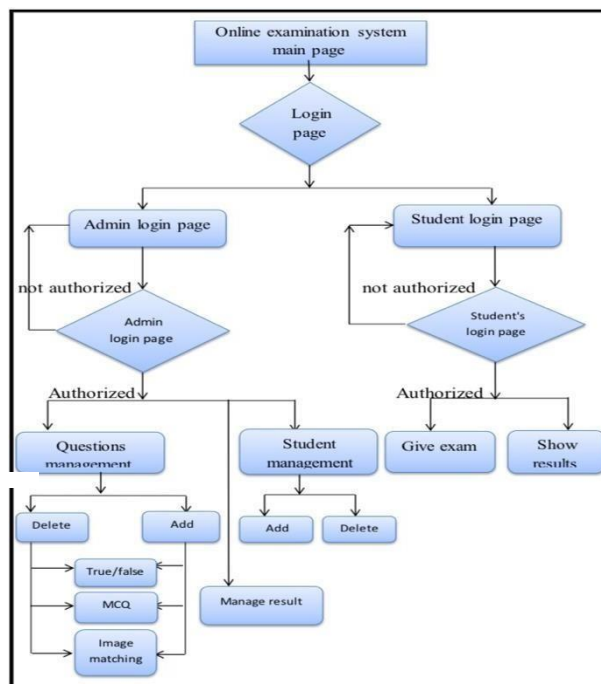


Figure 1: General Diagram

The whole system is divided into three modules: administrator module, teacher and student module.

3.1 Administrator module: The administrator module do the function of system management, add the registered information of the user to the system data base.

3.2 Teacher module: The teacher module includes test management module, automatic organising of examination- paper, examination-paper management, paper analysis , result and so on.

3.3 Student module: The student module have login option to attend the exam and after completing and submitting the exam the result is immediately generate.

3.4 Functionality of the System:

Login:For any student to be eligible for the examination ,they

must be registered. During registration, student fill a form and also given login credentials i.e. a username, password .

Logout: Logout enables the student to return to the login page, after writing the exams.

Create Questions: Create questions enables the admin to createthe questions. The admin input the question, options and then input the correct answer and finally clicks submit.

View Result: Once the student submit the test a score sheet that comprise the result can be viewed.

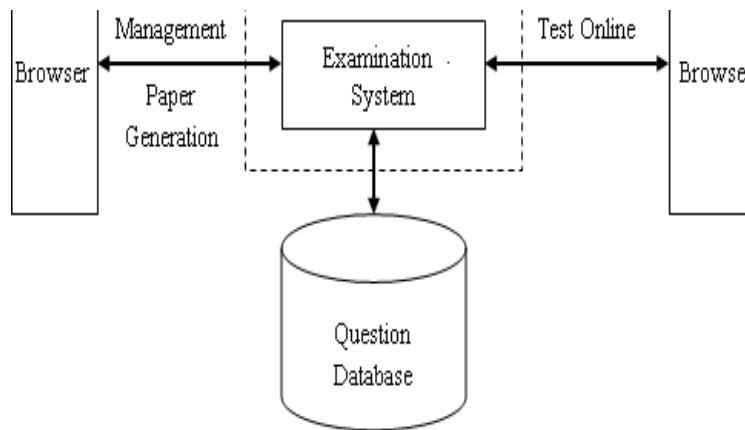


Fig.1 Architecture of an online examination system

Taking into account the examination course content, you can easily add, remove, and update questions in the database as per the convenience. The database will consist of various set of questions as per the difficulty level. The paper can be produced from the database by extracting the questions.

The examination being online, students can log in anytime into the campus network and test themselves and improve their coding abilities. A figure 2 show how online examination approach has various benefits, such as it is time saving, saves resources, paper, allows questions to be easily updated into the database and to avoid paper leaks. Answers can be written quickly in a manner that is advantageous for the reuse of data, which grant an easy access to a growing universe of reusable software components.

IV. Database Design :

In order to fully use MySQL server technology, it is essential to make sure that the database is well designed. The files names chosen to label all the tables created within the database attempt to reflect the table's purpose and, therefore, contribute to well-design system. The intimal step in designing was to decide, according to the requirements and specifications of the project, which tables should be created, and what type of information each one should hold. The final design had taken

V. INTEGRATED CENTRALIZED COMPILER

As java byte code is more efficient and is expected to run efficiently on multiple environments. Using a single integrated java compiler to compile different language code to the user who works in different language environment will reduce the time and space complexity. The tool used for converting different language code to byte code is taken care by java native interface, whereas java virtual machine will convert the byte code to machine dependent language.

Java compiler compiles the program and generates the class files which contains a portable code called as java byte code which is independent of all the platforms. Integrating a single java compiler on the server would be more efficient for the dynamic environment.

Java virtual machine creates a virtual layer on top of operating system (abstract computer). Once the class loader, loads the class file, JVM (Java Virtual Machine) creates machine dependent language that can be executed by the processor. The class file comprises of all the instruction set which is designed to be interpreted by JVM which also reduces the hardware dependences by allowing the code to run on all platforms.

Java native interface is the framework used for converting other language code into native language. JNI (Java Native Interface) enables the java code running on the environment (JVM) to be called by the other libraries and methods written in languages such as C and C++. JNI will be useful when entire code cannot be written in java, the parts or methods which are implemented in other language can call the code running on JVM. The native method can also create java objects to perform its task.

java virtual machine. The centralized compiler is installed in a main server which will be having a set of IP (Internet Protocol) addresses of user (client) computers connected to it.

The user can request access to server through undergoing set of security protocols such as authentication. The server side runs on the Node.js platform and the data communication is enabled by the framework AngularJS and is sent in .json format file, once the data is extracted in the server side integrated java compiler starts compiling, the results are calculated according to the test cases passed and sent to the client using requested IP address.

VI. SECURITY IN THE ONLINE EXAMINATION SYSTEM

Privacy and security are the most important factors in e-learning, especially online examination systems. We propose a system that provides security to improve online examination systems by utilizing technologies such as biometric authentication, internet-firewall, cryptography, network protocol and object oriented paradigms. In addition, we propose a framework for conducting online exams through insecure internet backbone.

The traditional way of identifying the students is checking the student ID card, driving license, resident card or passport. The online process and security of the online examination system helps with eliminating cheating. The survey implies the usage of biometrics which supports the security control, authentication, integrity of online examination and e-monitoring of students using finger prints and cameras, to prevent cheating and substitution of the original student.

The two problems faced are personal identity and unauthorized interference of other users in the network used by clients. The solutions for this are:

1) Challenge of personal authentication:

In order to solve the problem of authentication theft, with the knowledge gained from the survey, the security measures that are to be used are: student logs in with his/her USN, the photograph of the student taken from the students database will be displayed on the screen, and the teacher invigilating should check the photograph shown on the screen and compare it with the student's face to check and see if it is the student with the corresponding USN who is sitting to give the online exam.

The study helps to incorporate biometric scan devices like special cameras for dual purpose of identifying and controlling of the activities inside the examination hall and finger print recognizing devices for confirming the identity of the students.

2) Unauthorized intrusion of other users within the network using other users:

From the survey we concluded that, a domain with the set of students' user id, allocated by the university domain should be created and each instructor will add all the students' user ids. The students who logs in from different IP's cannot use the allocated domain and thus the system is secure.

The online format is considerably superior to paper-and-pencil examinations. From the survey, the above mentioned challenges can be solved by introducing the following security systems.

1. Using biometrics, we overcome the traditional way of checking the ID cards of the students after they start the exam. Biometrics will help to identify the student as he/she enters the exam hall.
 - i. Making use of online signature or student photo and fingerprint
 - ii. Making use of online cameras in order to identify the students answering the test, which is more useful than the traditional method of checking the identity cards.

Another aspect of security in online examination system that the paper considers is to protect a student's test scores from being tampered with others. In order to do this, the test scores after being obtained should be encrypted using an encryption algorithm, with a secret key that is known to the student and the faculty, who evaluates the student's test paper.

VII. ADVANTAGES

Online examination system can make the student's life easier because they don't need any paper and pen for examination. It is eco-friendly and forward-thinking approach to daily processes is essential in a world where students can graduate into an environmental crisis caused by climate change. Students will imbibe these values over the course of their education. online examination can be effective and efficient. The students don't waste so much time to answer the questions because they only click on the best answer that is provided. Great features with this exam conducting system is that there is not any compromise with data security. Question paper leak in online examination is not possible at all. All can full believe on examination process over its security feature. In this online system, set of question papers are a lock in a security system and that will only open at the time of examination. The sheer amount of resources that can be used to set up a single exam is mind-boggling — from teachers setting the test to administrator ensuring that all students receive enough copies of the exam paper.

VIII. CONCLUSION

The survey helps in integrating a compiler for conducting online examinations. Based on the analysis and the survey made the best technology to implement the online examination system using ReactJSSpringboot and MYSQL database.

The survey also focuses on describing the integrated compiler used for the compilation and execution. Security is highly prioritized. The paper also gives detailed explanation about how the security is maintained using appropriate technologies.

With this study, we have proposed an efficient online examination system to conduct subject quizzes and lab exams online, for

all educational institutes and provide a set of real time questions for training in placement related programming, for students. The proposed system comprises an integrated compiler for the students to test their coding abilities.

This system aims at the popular examination system research at present, designing a set of common examinations for the college platform and providing a good condition for organizing all kinds of tests, and also have a great reference value for other colleges and universities

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REFERENCES

- [1]. Dr Mubashrah Jamil, Dr R. H. Tariq, Dr P. A. Shami, "Computer-based vs paper-based examinations: perceptions of university teachers", TOJET: The Turkish Online Journal of Educational Technology – October 2012, volume 11 Issue 4.
- [2]. Jia Shen, Kung-E Cheng, Michael Bieber, Starr Roxanne Hiltz, "Traditional in-class examination vs. collaborative online examination in asynchronous learning networks: field evaluation results", Collaborative Hypermedia Research Lab Information Systems Department New Jersey Institute of Technology, New York, August 2004.
- [3]. Zhao Qiao-fang, Li Yong-fei, "Research and development of online examination system", Proceedings of the 2012 2nd International Conference on Computer and Information Application (ICCIA 2012), North China Institute of Science and Technology Beijing, China.
- [4]. Ibrahiem M. M. EL Emary and 2Jihad. A. A. Abu Al Sondos, "An online website for tutoring and e-examination of economic course", Faculty of Engineering, Amman AL Ahliyya University, Amman, Jordan Faculty of Planning and Administration, Al Balqa Applied University, Amman, Jordan, American Journal of Applied Sciences 3 (2): 1715-1718, 2006 ISSN 1546-9239 © 2006 Science Publications.
- [5]. Prus, Joseph and Johnson, Reid, "A critical review of student assessment options in assessment & testing myths and realities", edited by Trudy H. Bers and Mary L. Mittler, New Directions for Community Colleges, Number 88, Winter 1994, pp. 69-83. [Augmented by Gloria Rogers (Rose-Hulman Institute of Technology) with Engineering references by Mary Besterfield-Sacre (University of Pittsburgh)].
- [6]. Shan Weifeng; Huang Meng; Li Jun, IEEE Xplore Abstract – "An online examination system supporting user defined question type", Inf. Dept., Inst. of Disaster Prevention Sci. & Technol., Sanhe, China.
- [7]. Shufen Liu, Ji Liu, Xinjia Zhang, "Design and implementation of examination evaluation system with multimedia training simulation in the background", Jilin University Chang Chun, China.
- [9]. Mohammad A Sarrayrih, Mohammed Ilyas, "Challenges of online exam, performances and problems for online university exam", IJCSI International Journal of Computer Science, Information System and Technology Department, Sur University College, Issues, Vol. 10, Issue 1, No 1, January 2013 ISSN (Print): 1694-0784 | ISSN (Online): 1694-0814.
- [10]. Yuan Zhenming¹, Zhang Liang², Zhan Guohua³, "A novel web-based online examination system for computer science education".
- [11]. Tudor Matei, MongoDB "Performance in the cloud" by San Jose State University SJSU Scholar Works Master's Theses and Graduate Research 4-1-2013.
- [12]. Dr.K.Chitra, B.JeevaRani, "Study on basically available, scalable and eventually consistent NoSQL databases", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 3, Issue 7, July 2013.
- [13]. Sanobar Khan, Prof. Vanita Mane, "SQL support over MongoDB using metadata", International Journal of Scientific and Research Publications, Volume 3, Issue 10, October 2013 ISSN 2250-3153.
- [14]. Naseer Ganice, Dr. Ruchira Bhargava, "NoSQL for interactive applications", International Journal of Allied Practice, Research and Review, Website: www.ijaprr.com (ISSN 2350-1294).
- [15]. Naseer Ganice, "NoSQL: The big data solution", International Journal of Advancement in Engineering Technology Management & Applied Science, Volume 1, Issue July 2014, ISSN No: 2349-3224.
- [16]. Jaroslav Pokorny, "NoSQL databases: a step to database scalability in web environment", International Journal of Web

Information Systems Vol. 9 No. 1, Issue 2013.

- [17]. Adam Bretz, "Full stack JavaScript development with MEAN", Published December 22, 2014.
- [18]. Karl Dütina, "Analysis of Node.js platform web application security", Master's Thesis, TALLINN UNIVERSITY OF TECHNOLOGY Tallinn 2012.
- [19]. Jameela Al-Jaroodi, Student Member, IEEE, Nader Mohamed, Student Member, IEEE, Hong Jiang, Member, IEEE, and David Swanson, "Middleware infrastructure for parallel distributed programming models in heterogeneous system IEEE transaction on parallel and distribution system", vol.14, no.11.
- [20]. Priyadarashani Doke, Surabhi Shingote, SnehaKalbhor, Anumeha Singh, Heena Yeole, "Online c, c++, java compiler using cloud computing", International Journal of Advances in Engineering Science and Technology.
- [21]. Aarushi Verma Namita Garg, "Online java compiler using cloud computing", Dept. Computer Science International Journal of Engineering Technology, Management and Applied Sciences, November 2014, Volume 2 Issue 6, ISSN 2349-4476.
- [22]. Robert Fitzgerald, Todd B. Knoblock, Erik Ruf, Bjørne Steensgaard, and David Tarditi Marmot: "An optimizing compiler for java Microsoft research".
- [23]. Lori Vinciguerra Alphatech, An experimental framework for evaluating disassembly and decomposition tools for c++ and java.
- [24]. Ramesh Radhakrishnan, Member, IEEE, N. Vijaykrishnan, Member, IEEE, Lizy Kurian John, Senior Member, IEEE, Anand Sivasubramaniam, Member, IEEE, Juan Rubio, Member, IEEE, and Jyotsna Sabarinathan, "Java runtime system: characterization and architectural implications", IEEE Transactions on computers, vol.2.
- [25]. Gang Tan, Andrew W. Appel, Srimat Chakradhar, Anand Raghunathan, Srivaths Ravi, Daniel Wang, "Safe java native interface", Department of Computer Science, Boston College, Department of Computer Science, Princeton University NEC Laboratories America.
- [26]. Michael Kuperberg, Martin Krogmann, Ralf Reussner, By Counter: "Portable runtime counting of bytecode instructions and method invocations", University at Karlsruhe.
- [27]. Christopher League Valery, Zhong Shao, "Functional java bytecode", Computer Science Department, Yale University POB 208285, New Haven, CT 06520 USA.
- [28]. Processor Hai-Chen Wang, Chung-Kwong Yuen Dept. of Computer Science, "Exploiting dataflow to extract java instruction level parallelism computing", National University of Singapore 3 Science Drive 2, Singapore 117543.
- [29]. Mohammad A Sarrayrih, Mohammed Ilyas, "Challenges of online exam, performances and problems for online university exam", IJCSI International Journal of Computer Science , Information System and Technology Department, Sur University College, Issues, Vol. 10, Issue 1, No 1, January 2013 ISSN (Print): 1694-0784 | ISSN (Online): 1694-0814.
- [30]. Deepayan Chakrabarti, Christos Faloutsos, "Graph mining: laws, generators, and algorithms", ACM Computing Surveys, Vol. 38, March 2006, Article 2.
- [31]. Harsh J. Patel, Rakesh Prajapati, Prof. Mahesh Panchal, Dr. Monal J. Patel, "A survey of graph pattern mining algorithm and technique", International Journal of Application or Innovation in Engineering & Management (IJAIEEM) Volume 2, Issue 1, January 2013 ISSN 2319 – 4847.
- [32]. Omar Zughoul, Hajar Mat Jani, Adibah Shuib, Osama Almasri, "Privacy and security in online examination systems", IOSR Journal of Computer Engineering (IOSR-JCE) e-ISSN: 2278-0661, p- ISSN: 2278-8727 Volume 10, Issue 4 (Mar. - Apr. 2013), PP 63-70.