A Synopsis on

Automatic Question Paper Generator System

Submitted in partial fulfillment of the requirements
of the degree of

Bachelor of Engineering

in

Information Technology

by

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2020-2021

CERTIFICATE

This is to certify that the project Synopsis entitled ***"Automatic Question Paper Generator System"*** Submitted by ***"AnmolSingh Paman (18204003),Rahul Rahi (17104057), Abhishek Jha (18204008)"*** for the partial fulfillment of the requirement for award of a degree ***Bachelor of Engineering*** in ***Information Technology.***to the University of Mumbai,is a bonafide work carried out during academic year 2020-2021

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I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Abstract

Assessment process is an essential activity in educational institutions to test performance of the learners. The essence of examination papers is directly linked to evaluation of quality of the graduates passing out. Nevertheless, designing question papers is laborious/tedious task for the teachers. This system is aimed automated examination question paper generation system (AQPGS) to replace manual method practiced by academics. AQPGS is intended to enable academics to produce quality examination papers on the click, that are unbiased, streamlined, randomized and secure while saving the time and resources in the assessment process. It includes MCQ, open-ended questions. We have 2 types of user- Admin and Instructor. In this, the role of Admin is to Add, Modify, Delete users and store their information in database and the role of the Lecturer is to Add Questions and save them in Question bank database; Generate question paper and Export the generated Question Paper. System returns generated paper and exports it into user's computer.

Introduction

As an education is a key to success, the examination process is a critical activity for educational institutions to evaluate performance of learners. Content of the exam papers is the main criteria to ensure the education quality level of the students brought out by the institutions. Examination as well serves as a guide to students in their gradual journey to knowledge. That is why proper examination paper compilation procedure is essential.

Generating question paper is long and tedious process in a university or institution. The professors spend their precious time in designing the question paper which is not acceptable in these days. This system comes in rescue to professors and helps to create question papers in single click without repeating the same questions again and works in a very simple manner.

As we move ahead we need more resources to fulfill our requirements and that's why this Automatic Question Paper Generator was designed. The questions are stored in the database and new questions can be added later on if needed. This system is so powerful that we can generate one question paper in just one second. Its primary characteristics is the automation of process of creation of question paper which reduces human effort to a very far extent. Although it's most prevalent use is within the universities to generate the question paper. It is also applicable to some institutions too.

It increases the usage of technology. This paper describes the utilization of randomization algorithm in an Automatic Question Paper Generator System which has been implemented specially for institutes. The endeavor needed for generating question paper is diminished after the implementation of this advanced system and because of this advanced system there is no obligation for humans to ponder and employ time which can be utilized on some additional important duty instead of designing question paper The system also provides security to the database so that only trusted and permitted people can access it. The present project has been developed to meet the aspirations indicated in the modern age. An attempt has been made through this project to do all work ease fast.

Objectives

1. Question entered in the database should fulfil the Course Objectives and should cover the Syllabus.
2. Question Paper formed should address the desired Course Objectives
3. Question Paper formed should follow Blooms Taxonomy
4. Question Paper formed should be confirmed by the NBA co-ordinator.
5. Export questions from the system directly to Moodle

Literature Review

1. Importance of quality assessment in education.

In the context of education, definition of assessment includes a number of procedures and methods that instructors apply to measure, evaluate and record the academic preparedness, learning progression, skill attainment, and academic needs of students.

Since the past decade global tendency in higher education has drifted away from the conventional teacher-centered approach which focused on the instructor's input and assessment in terms of how well the students absorb the materials. Such assessment method was considered too limited in evaluating learning, neglecting the nature of coherent ability that is meant to integrate various individual skills into overall practice. Hence the education trend has shifted towards student-centered perspective concentrating on the learning outcomes, or what the learners are expected to be able to do at the end of the studying experience. Furthermore, employers and educational strategists will be better be aware of the graduates' capabilities for employment and liability purposes. It is deduced that student-centered approach to the organization of educational processes provides for better learning and more genuine student assessment. It has been also determined that such method is particularly essential for education for students using Information Systems.

The existing Learning Management Systems (LMS) support very basic level or limited tags such as question types. Even the most preferred LMS, Moodle allows creating only subjective/objective type of questions. Thus automatically generating question paper from a teacher's entered specification using a semantically tagged QR is the need of the hour today. The system to semi automatically tag the questions of a repository is in place.

In any educational course curriculum, the courses are defined with learning objectives. Teachers conduct assessments to know if students have achieved certain learning objectives or not. Teachers generate variety of question papers as per the universities' assessment requirements. It is very challenging for the teachers to make question papers with varied questions and which meet learning objectives of the course. There are no standardized methods to ensure quality of question paper. Hence there arises a need to have a system which will automatically generate the question paper from teacher entered specification within few seconds. Researchers recommend different sets of tags such as cognitive level, difficulty level, type of question, content /topic for defining a question etc. The existing tools are rigid and support very basic or limited tags. The proposed system will automatically generate a question paper from semantically tagged question repository. This system offers flexibility by supporting all four tags and allows entry of every property in the form of ranges i.e. lower bound and upper bound. The question paper is generated in xml format and as PDF document or can also be Mailed.

2. Bloom's Taxonomy in Assessment.

As pointed out by Veilleux(1999), academics often concentrate on material coverage and consider an assessment complete if all main course topics are included in the exam. Coverage of material only concerns the breadth of students' knowledge, however of late an alternative method is preferable to assess its depth. Assessment of knowledge depth can be organized in accordance with Bloom's taxonomy. Taxonomy-based exams measure the level of learners' comprehension by including an organized set of questions, varying from easily resolved by a

learner who grasped basic material, to cases which require creative approach in applying various techniques. Based on the difficulty level of the questions given, students' papers are marked according to fixed criteria, and not based on grade averages.

One of the most problematic tasks of question paper planning is achieving a balance in multiple question types which call for different levels of comprehension. Alternatively teachers can compile diverse examinations involving questions with graded difficulty. If a teacher specifically creates various understanding questions like short questions, application questions and a few analytical open-ended questions to make sure that students who have acquired each level, can show their performance

Prof. Veilleux (1999), further defined how academics benefit from applying Bloom's Taxonomy to ensure they are not missing out essential items out when compiling assessment and are as follows:

1. Frequently instructors find themselves perplexed by multiple standards and syllabus requirements. While Bloom's taxonomy provides a guiding model for subdividing those norms into approachable blocks that can be applied in making routine class plans and also can be aligned with instructor's own class objectives. Same as certain levels require certain comprehensive delivery approaches, they also require specific assessment techniques.

2. Taxonomy can be utilized as an index to verify that all levels of domain are being assessed and correspond the assessment tools with the relevant lessons and techniques. Thereby, Bloom's Taxonomy also helps educators to retain uniformity in assessment practices, educational materials and reveal weak spots.

3. Reference to the elements of taxonomy is a supportive tool for defining objectives and monitoring how well the students understand material. Besides defining the objectives, application of Bloom's taxonomy is also extremely useful in assessing students' comprehension of concepts. Referring to taxonomy levels and reviewing where the students stand among those, allow instructor to move forward from elementary to more sophisticated level of comprehension.

4. A conclusive substantial benefit from assessment based on objectives is essentially meaningful marks allocation, thus less disputable grading criteria –which eliminates doubt among students regarding the grades given and there is no need for marking adjustments from the educator's side. It is an indicator of justified assessment mechanism that can also be used to guide educators in adapting the level of directives for new modules (Veilleux, 1999)

Vidakovic et al. (2004) opined that Bloom's taxonomy has been proven to be a helpful guideline structure for generating short answer, multiple choice and long answer questions which test students' knowledge in various cognitive exercises. The emphasis lies in classification of the test item in a specific level of Bloom's taxonomy depending on the highest level of cognitive problem presented to the student.

3. Advantages of Using Information Systems in Assessment.

Many developing countries have not fully utilized information technology as a way of socioeconomic development. Although educational institutions are progressively acknowledging significance of technology in education and examination practices, in most of the institutions examination process is still handled manually. Manual procedure has many drawbacks such as time consumption and resources wastage to purchase and store paper records; it may cause errors, data redundancy and duplication of work if the same data could be recorded by different examination board members; not communicating examination results instantly and precisely etc. Workload complexity increases, multiplied by number of subjects each instructor has to assess during academic session. By automating the assessment system institutions can reduce human involvement by acquiring the technology since it promises concise storage, rapid data retrieval, tireless rigorous work of processing the information, instant communication of information to users. The recent cases of rail transport computerization and online banking are the prospect examples demonstrating the advantages of using information technology. Thereby learning management systems as well can be efficiently utilized for assessment purposes in higher education. Automated Question Paper Generator System dramatically decreases the amount of work and time instructors spend on manual tasks.

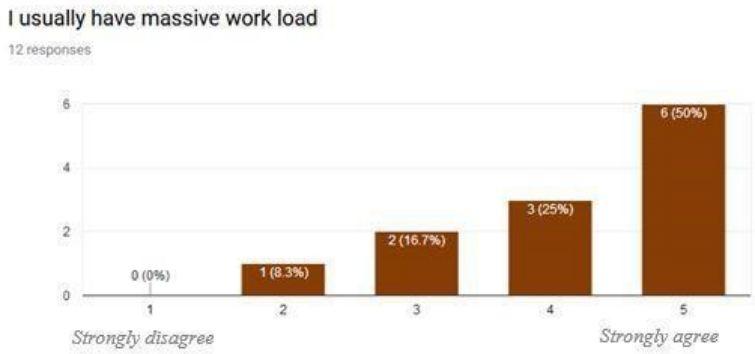
4. Systems comparison.

Manual	Automatic
Prone to repetitions / duplications	Random and unbiased generation
Slow due to human labor	Speedy due to automation
Requires resources	Requires only PC connectivity
Many steps in sorting questions based on difficulty	Automated questions sorting based on difficulty
Questions used are not stored in one place	All questions are stored in database
Low Security	High Security and Encryption

Automated system will significantly lessen the efforts of an instructor, which allows generating a question paper in a few clicks based on the requirements, such as marks and difficulty level of questions. Shuffling algorithm ensures randomization in process of selecting questions from the database hence preventing duplication of the questions.

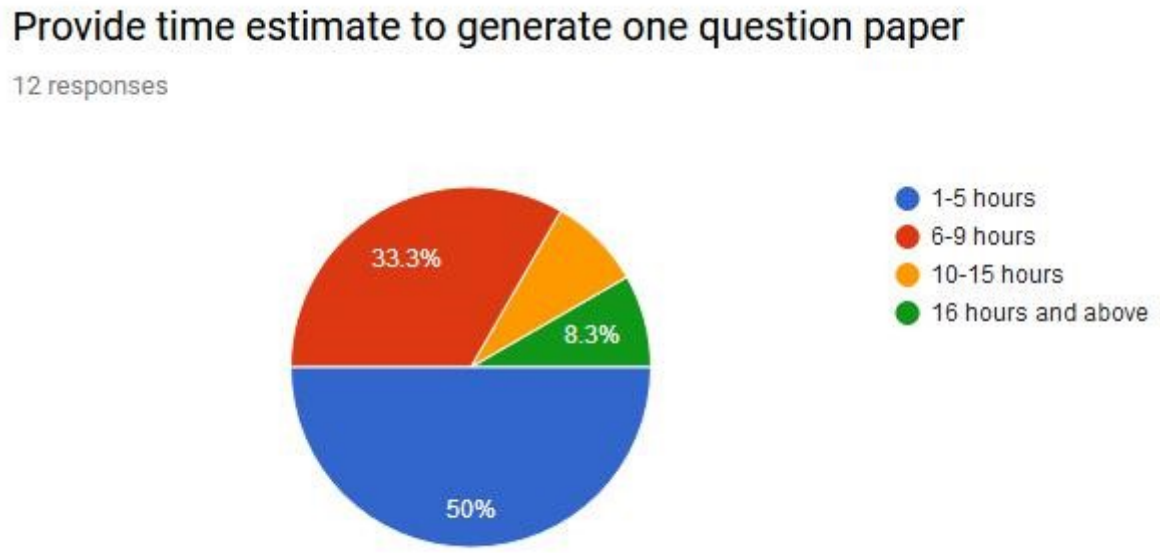
5. Results of the Survey Conducted

Q1.



Assumingly due to wide range of responsibilities, more than 90 percent of respondents agreed that they have massive work load. This illustration means that the lecturers, who answered the survey, are responsible for tasks such as preparing course materials, lecturing for 15 hours/ week, counselling, manually creating assessment questions, invigilating and supervising students. The result above means that the staffs are usually much occupied and automation of some of their tasks would greatly assist them in carrying out their duties efficiently.

Q2.



Problem Definition

existing system for Question Paper Generation requires human staff to chalk out questions that appear in the question paper. Question Paper Creation Is A Tedious And Time Consuming Task. To create a system which reduces Human Working process and also The Instructor to generate and Save Question Paper Automatically.

Proposed System Architecture/Working

Considering the short coming of conventional system, an eager need was felt to redesign the whole system. To develop a new examination system, system was closely observed. Some qualities and capabilities which the system should carry are, developing the question bank automatically, limiting the human intervention to raise the secrecy standards, providing more flexibility in logical selection of questions for skeleton framing and handling multiple attributes containing imprecise data to perform human like reasoning effectively.

Automatic Question Paper Generator is a special software which is useful to schools, Institutes, publishers and test paper setters who want to have a huge database of questions and generate test papers frequently with ease. It mainly deals with the gathering, sorting and administration of a large amount of questions about different levels of toughness from scientific as well as non-scientific subjects related to various classes. The main aim of our system is to provide randomization technique with the help of Shuffling Algorithm in question paper generation system, .The generated question paper will fulfill the Course Objectives according to the Bloom's Taxonomy, thus different sets of question could be generated without repetition and duplication and could be sent to the NBA co-ordinator for confirmation and approval.

Our system divides users in two categories-

1. Admin
2. Faculty

Working of Proposed System

- Before user is able to access system, it is necessary to pass the authentication step through login form where user must enter the correct username and password given by system administrator. If user has admin role, login form will redirect to Admin Portal. If login details match a Faculty role, user will be redirected to Faculty Portal..
- If the user is new and is a Faculty, then the user must fill the Registration form first and after clicking on the Sign Up button, the admin will approve the Faculty. The the Faculty can have access to the system.
- Once user entered username and password which belong to admin role, Admin Portal is displayed, from which Admin has following roles:
    1. **Faculty details:** In this admin has the power to approve or disapprove faculty or even delete faculty by clicking on the respective button.
    2. **Branch details:** In this the new branches can be added using the branch id, branch name and click on the add branch button. It can also be deleted later if no longer required.

3. **Add subject:** In this new subject can be added by entering new subject code, subject name, choosing the respective branch and finally click on the add subject button.
4. **View subject:** View the list of subjects available along with its subject code. Admin can also search using subject name. Or delete it..
5. **Assign subject:** Click on the dropdown menu, select the faculty from the list and click search. A box appears where the subject must be chosen and click on assign button.
6. **Assigned subject details:** It displays subject name and the code also it has the faculty record button which shows the list of faculty assigned to particular subject. Delete button is used to remove the faculty assigned to particular subject.
7. **Generate question paper:** Here we need to select number of questions for each module and difficulty level for each question. After selecting the questions from all the modules, then automatically the submit button will display, after clicking on the submit button, the question paper will be generated.

- If authentication as a lecturer role is successful, user accesses Lecturer Portal. Here Lecturer can do three main tasks:

  1. **Add Questions:** User can add question for a particular subject which is assigned by the admin to the user.
  2. **Display question:** In this section user will see the questions entered by all the faculties and the user can also edit questions which are entered by him only.
  3. **Generate question paper:** Here we need to select number of questions for each module and difficulty level for each question. After selecting the questions from all the modules, then automatically the submit button will display, after clicking on the submit button, the question paper will be generated.

- AQPG system retrieves questions from question bank using randomization and shuffling algorithm. Every word in questions' content is compared against specified **Bloom's Taxonomy** and **Course Objectives** categorization verbs acting as query keywords. If any question contains a verb matched as the specified keyword, it is placed in the respective section based on complexity level. This process is performed until the specified set of questions is retrieved. Upon receiving the specified set of Questions, the Lecturer can select the required questions from retrieved set of Questions to form the Question Paper. After this the System checks the redundancy of the question's i.e. whether or not it is repeated question or not then it checks if the Question Paper is fulfilling the required Course Objectives. If Yes, the lecturer can click on the Generate Question Paper Button. If No, then a prompt message will appear before the user. Upon clicking "Generate Question Paper" button, Lecturer is able to download generated question paper or the Lecturer can simple email the Question Paper or click "Cancel" to abort generation. After the Question Paper is generated, the faculty can send the generated Question Paper to the NBA Co-Ordinator for verification and approval.

Features of the Proposed System:

1. Simple interface which enhances the ease of updating data.
2. Generates and develops well formatted question paper in a matter of few seconds.
3. Questions can be comfortably modified.
4. User can generate test papers randomly and instantly, thus saving a lot of time.
5. A new question can be added to the database at any instance and different sets of Test Paper could be generated without any limitation.
6. With the use of this system for exam paper generation there are zero chances of exam paper getting leaked as paper can be generated few minutes before the exam.
7. This software assures no duplicity of questions in database.
8. Question paper once generated can be downloaded or emailed to the University.
9. The system automatically chooses random questions using Shuffling Algorithm thus eliminating bias.

Security Features of the Proposed System:

1. Password facility to ensure validity of user.
2. Data secrecy.
3. Only Faculties approved by the admin are allowed access.

Applications of the Proposed System:

1. This software can be widely used in educational institutes etc.
2. It is a web based application so user location doesn't matter.
3. Admin can access this software anywhere anytime.
4. This system also evaluates the candidate's capability and skills efficiently.
5. It is fully automated system which fast results.
6. In this system there is no need of transporting paper through police/security vans to all colleges
7. This system provides unbiased result.
8. The usage of this system reduces human effort and save time and resources to an extent.
9. This system can be used in universities for generating and distributing question papers.
10. The system can also be implemented in different organizations that conduct regular exams.

Design and Implementation

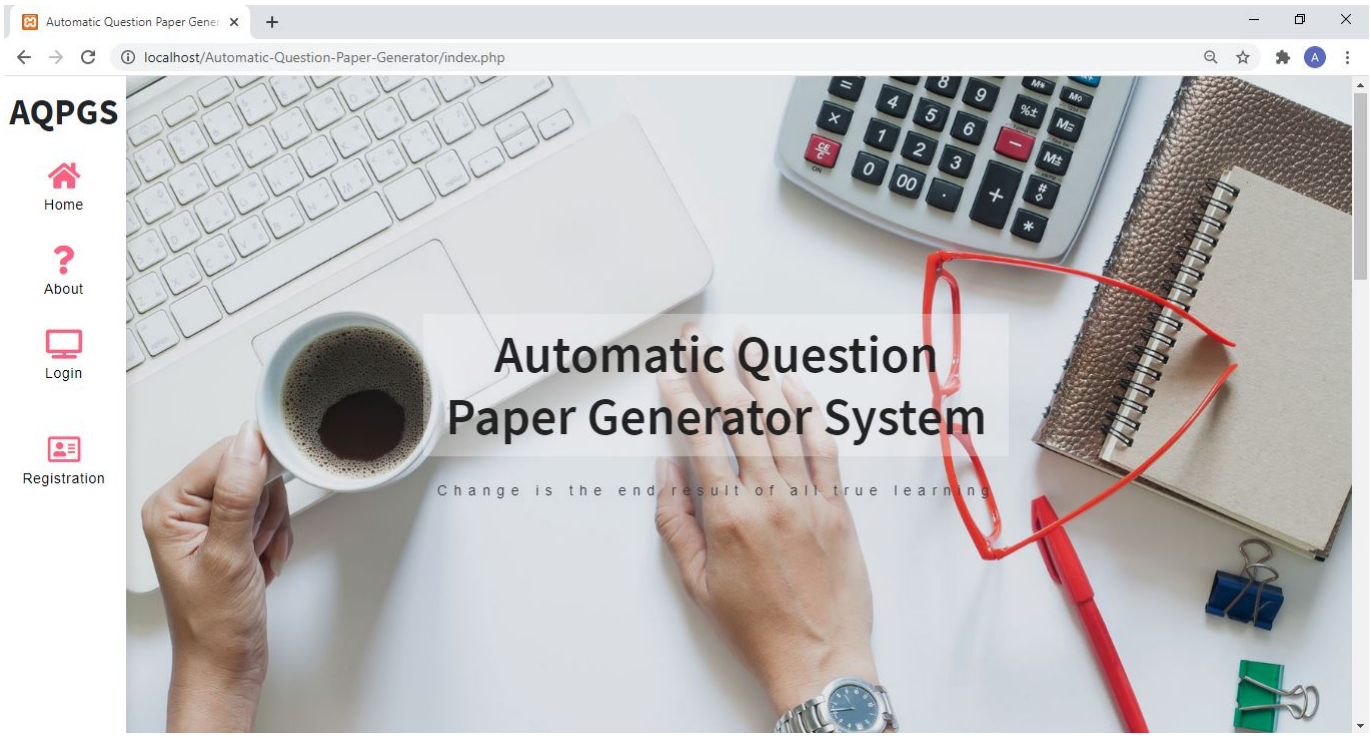


Figure 1: Index Page

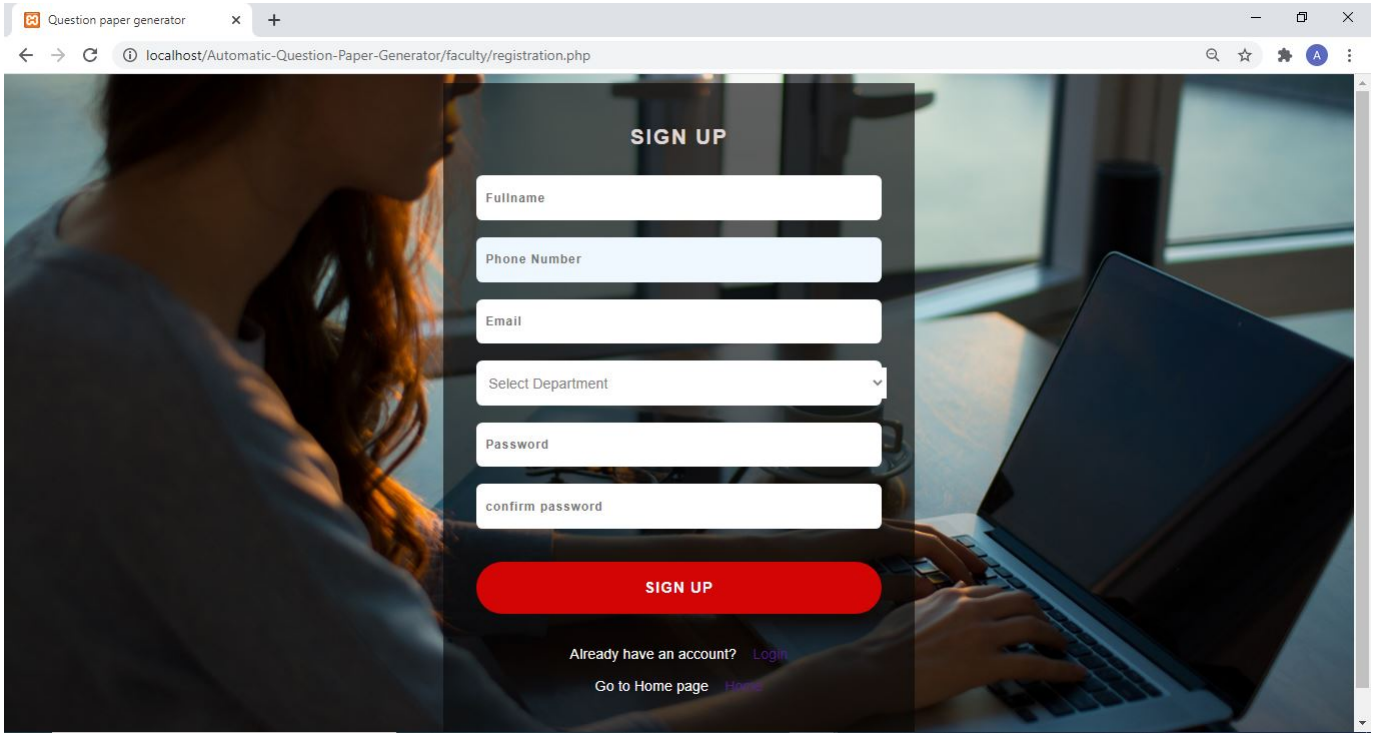


Figure 2: Registration Page

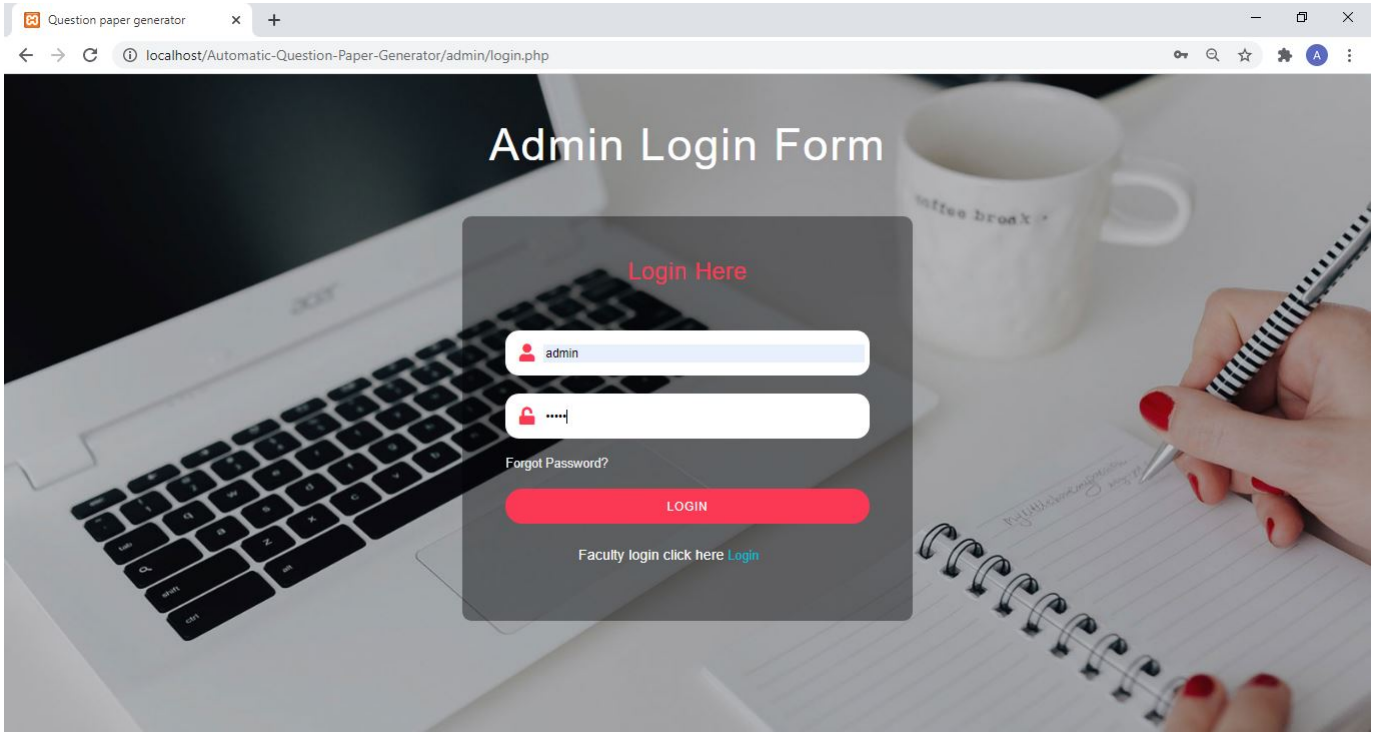


Figure 3: Admin Login Form

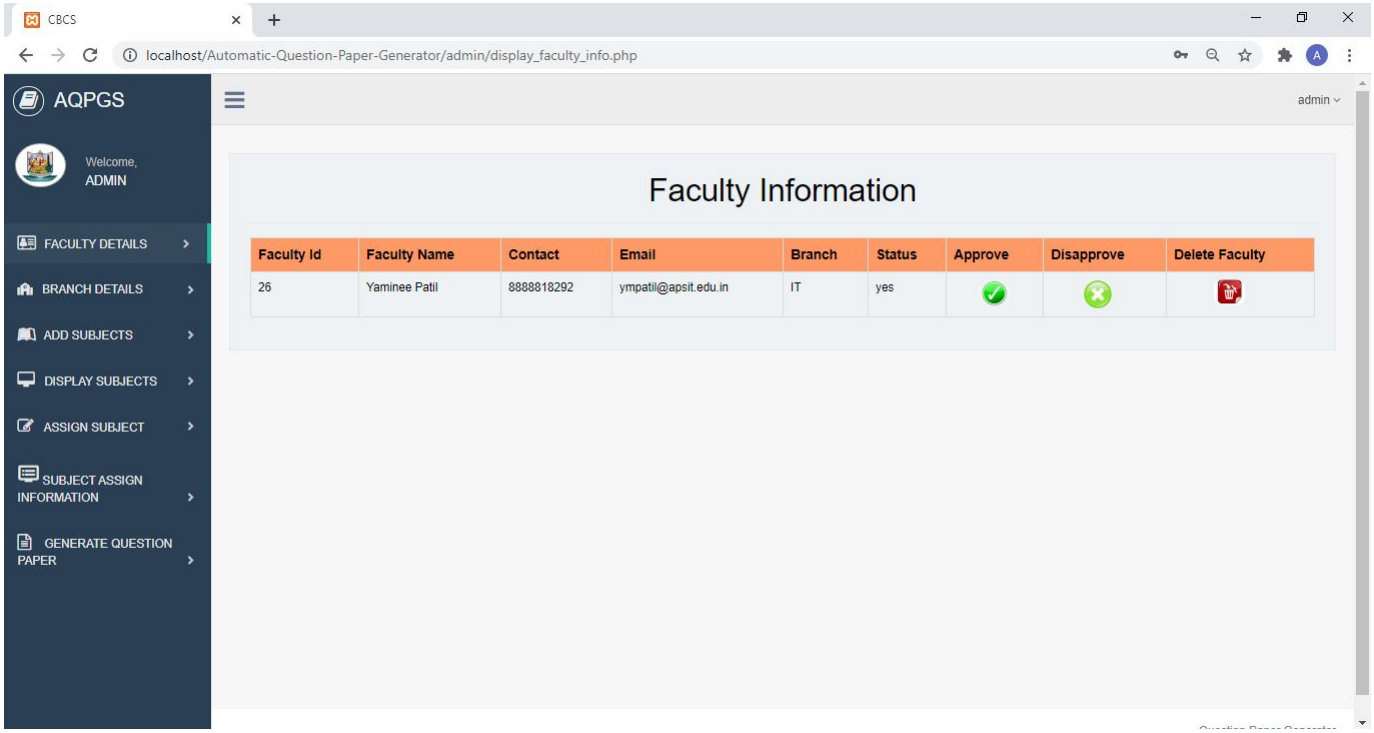


Figure 4: Faculty Details

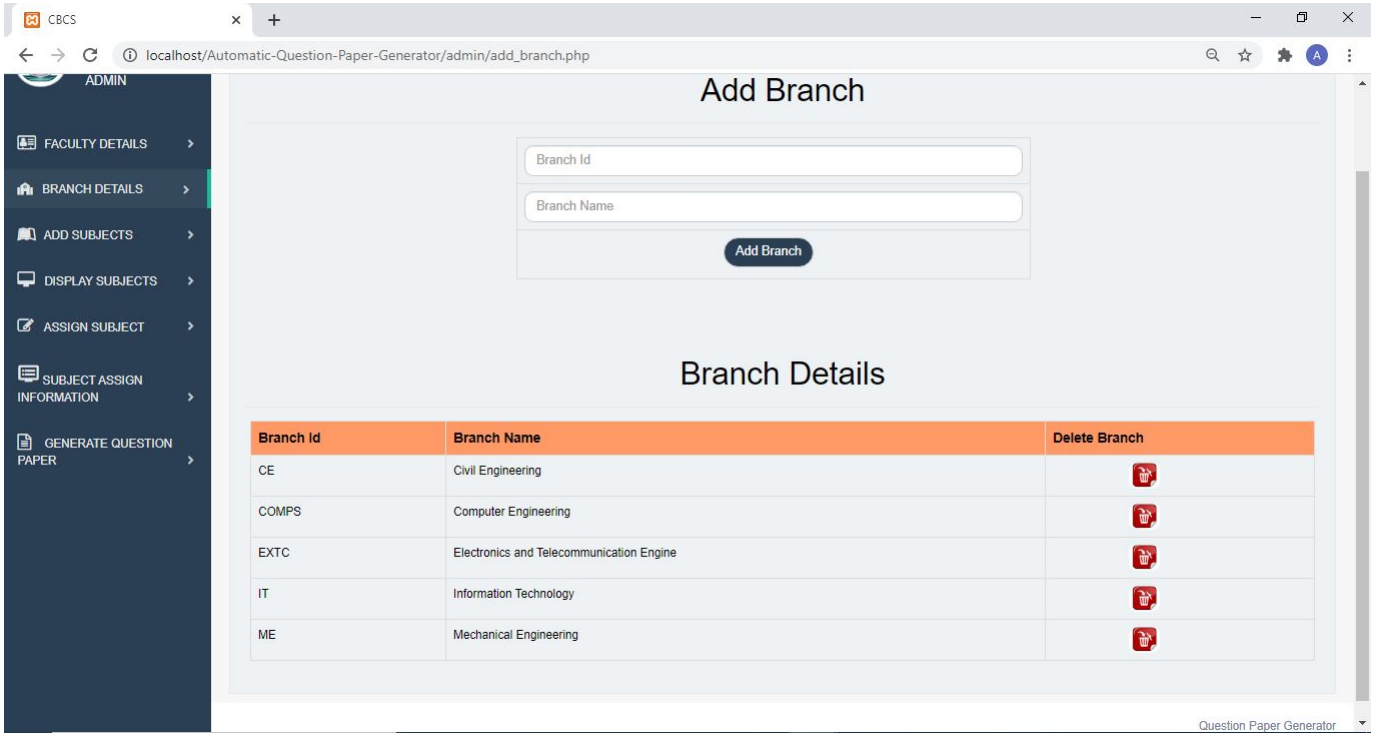


Figure 5: Branch Details

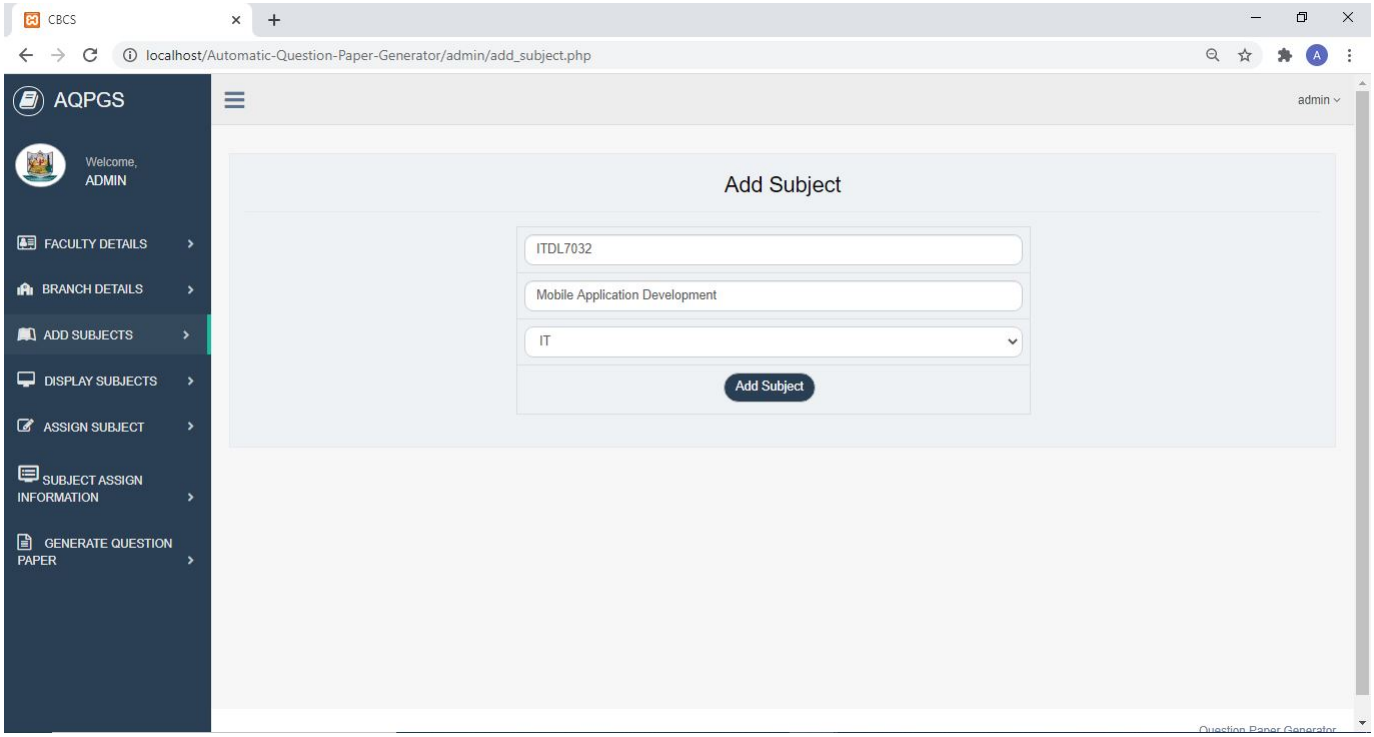


Figure 6: Add Subjects

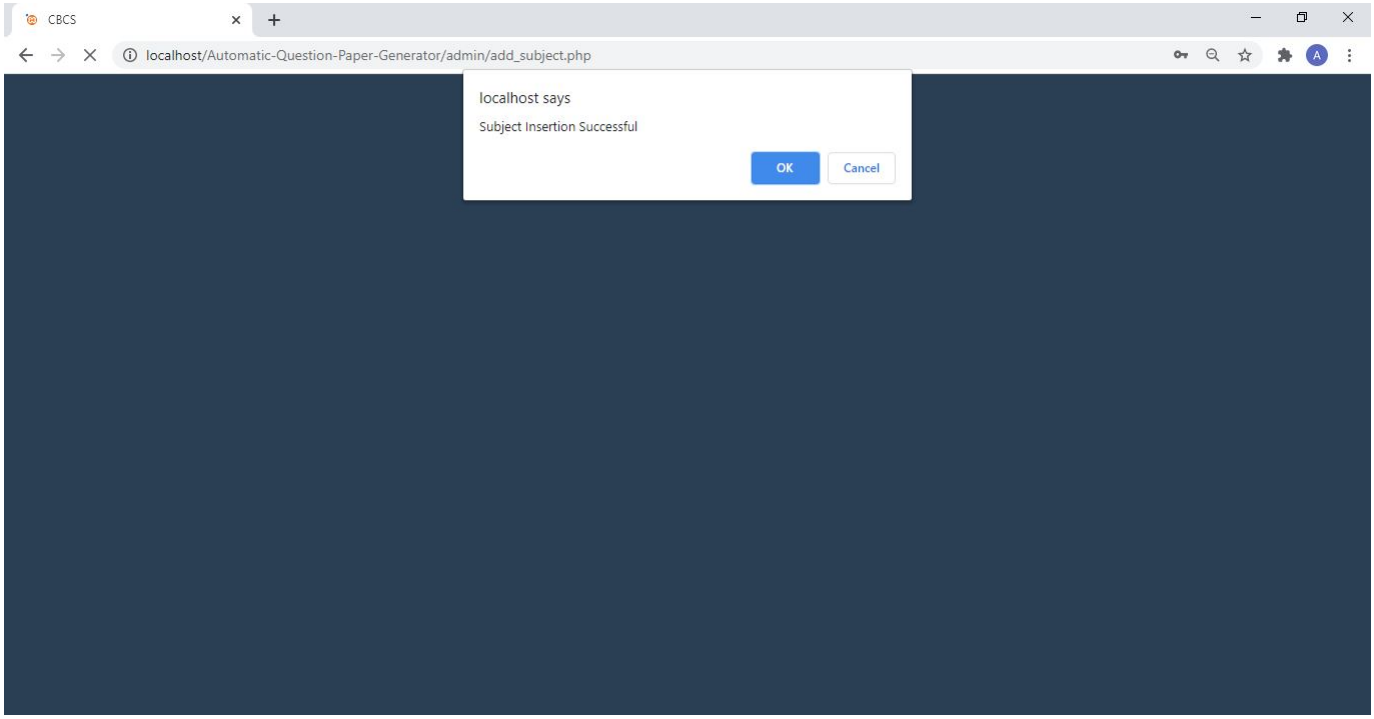


Figure 7: Subject Inserted Successfully

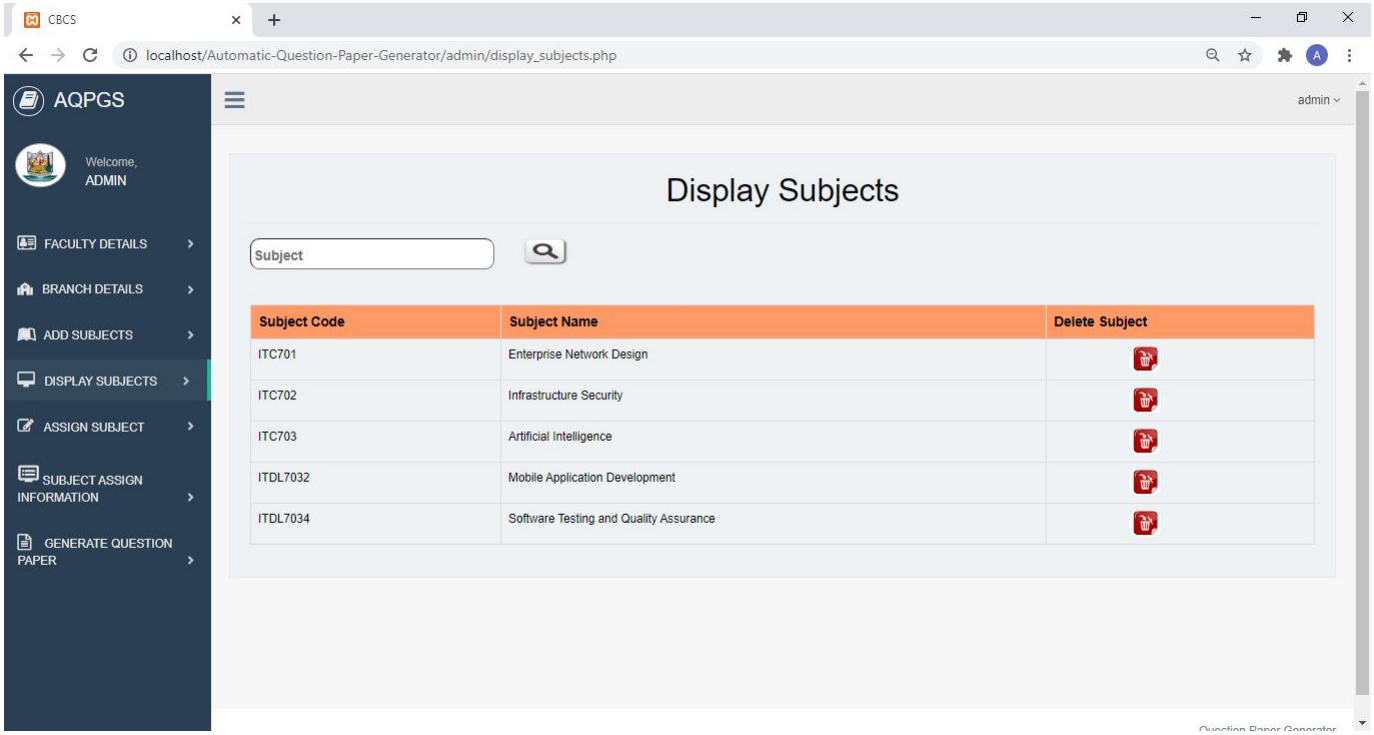


Figure 8: Display Subjects

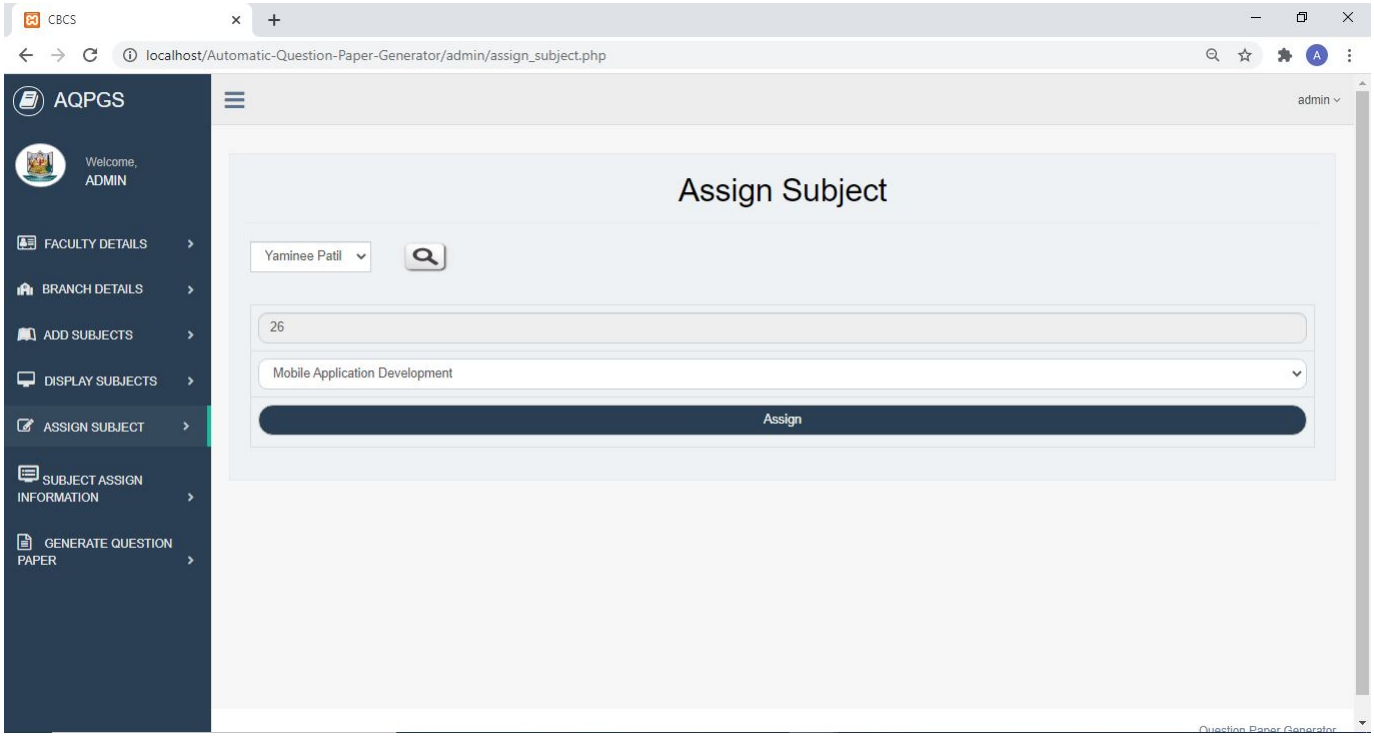


Figure 9: Assign Subject

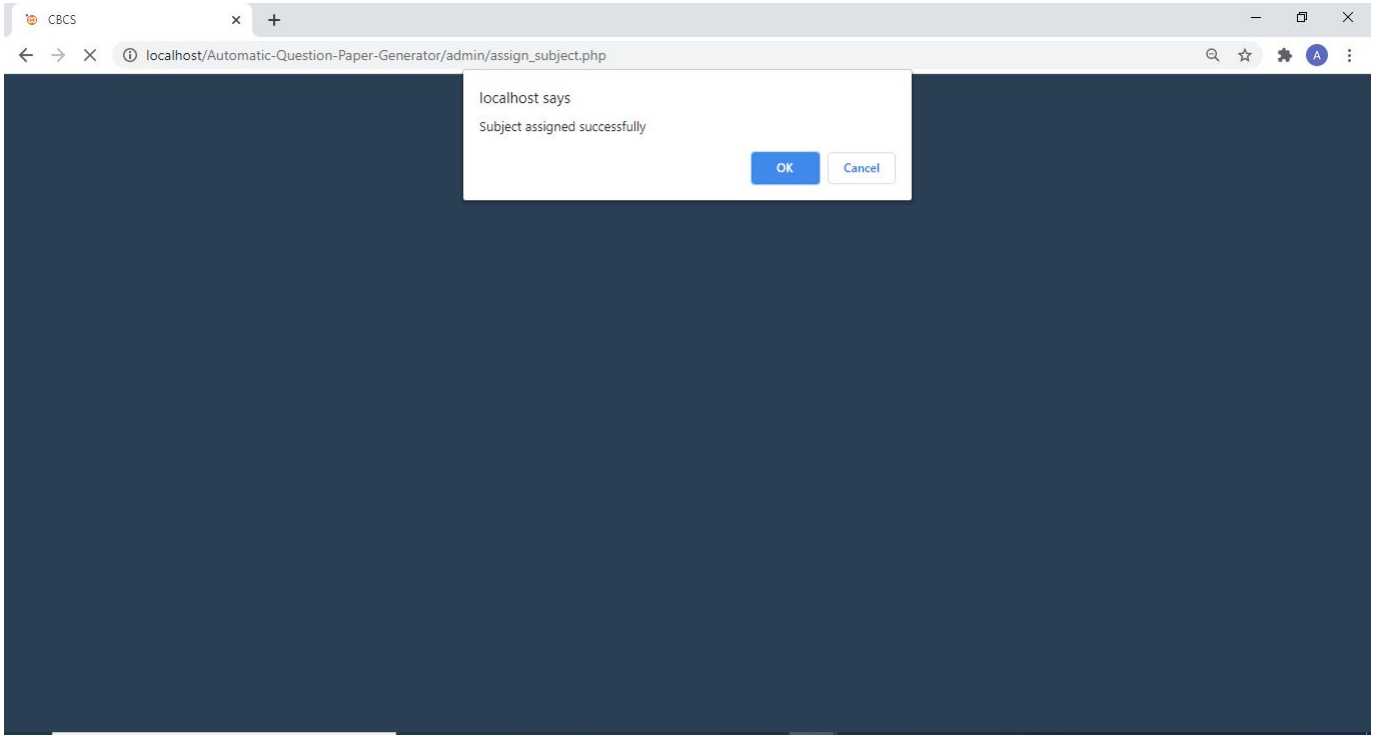


Figure 10: Subject Assigned Successfully

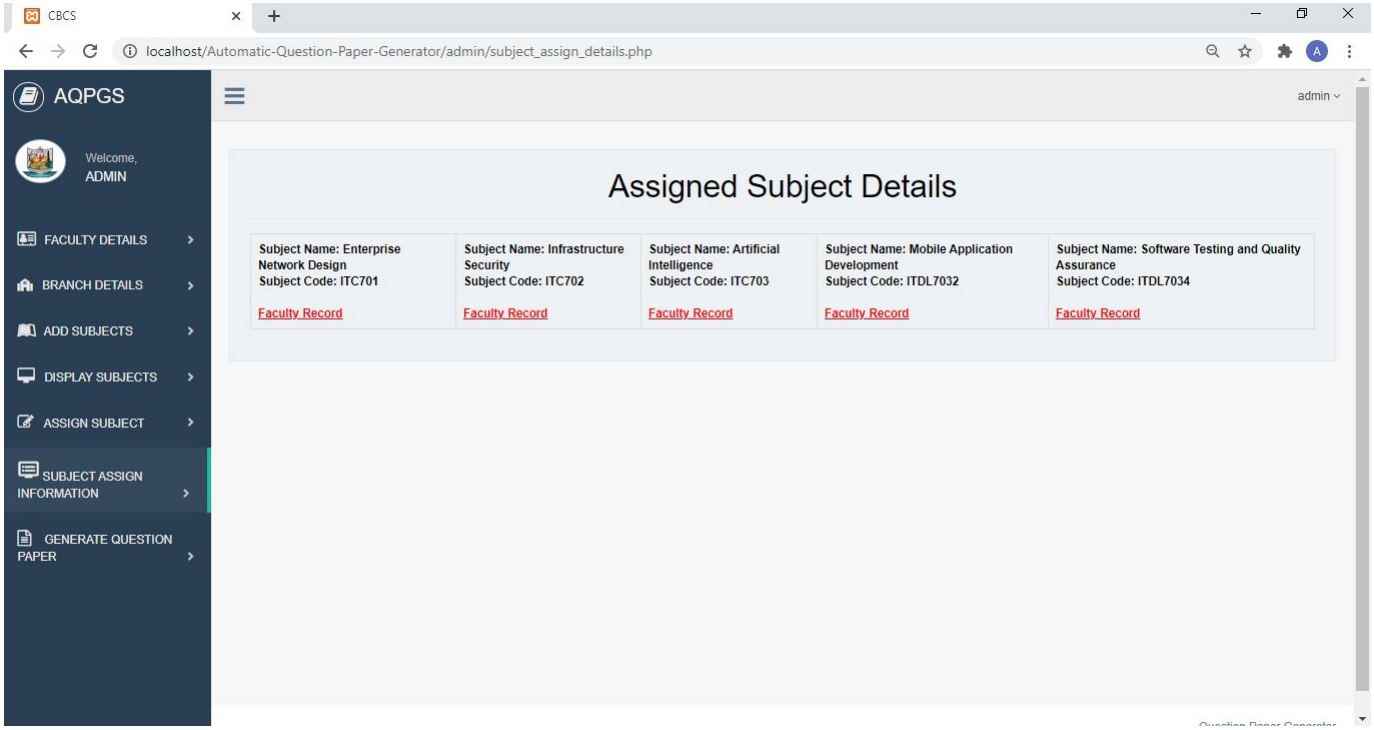


Figure 11: Subject Assigned Successfully

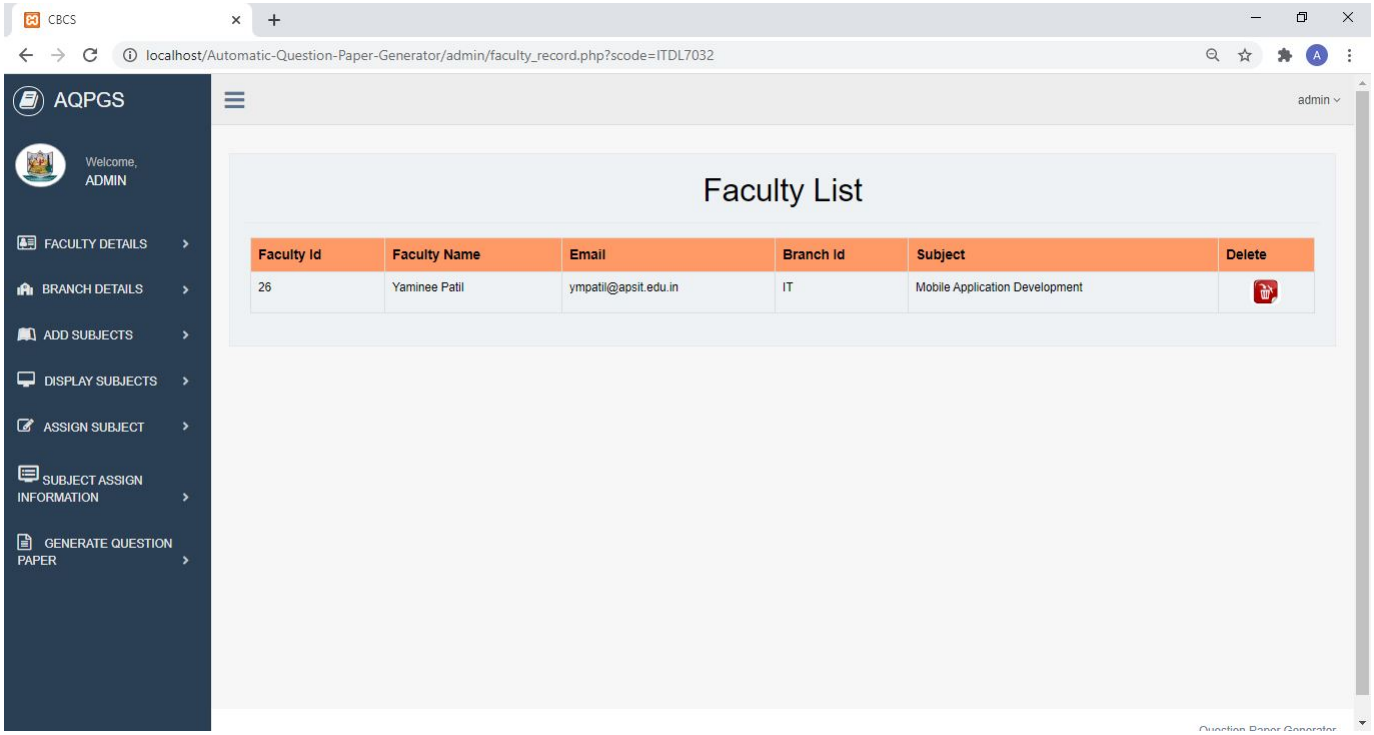


Figure 12: List of Subject Assigned to Faculty

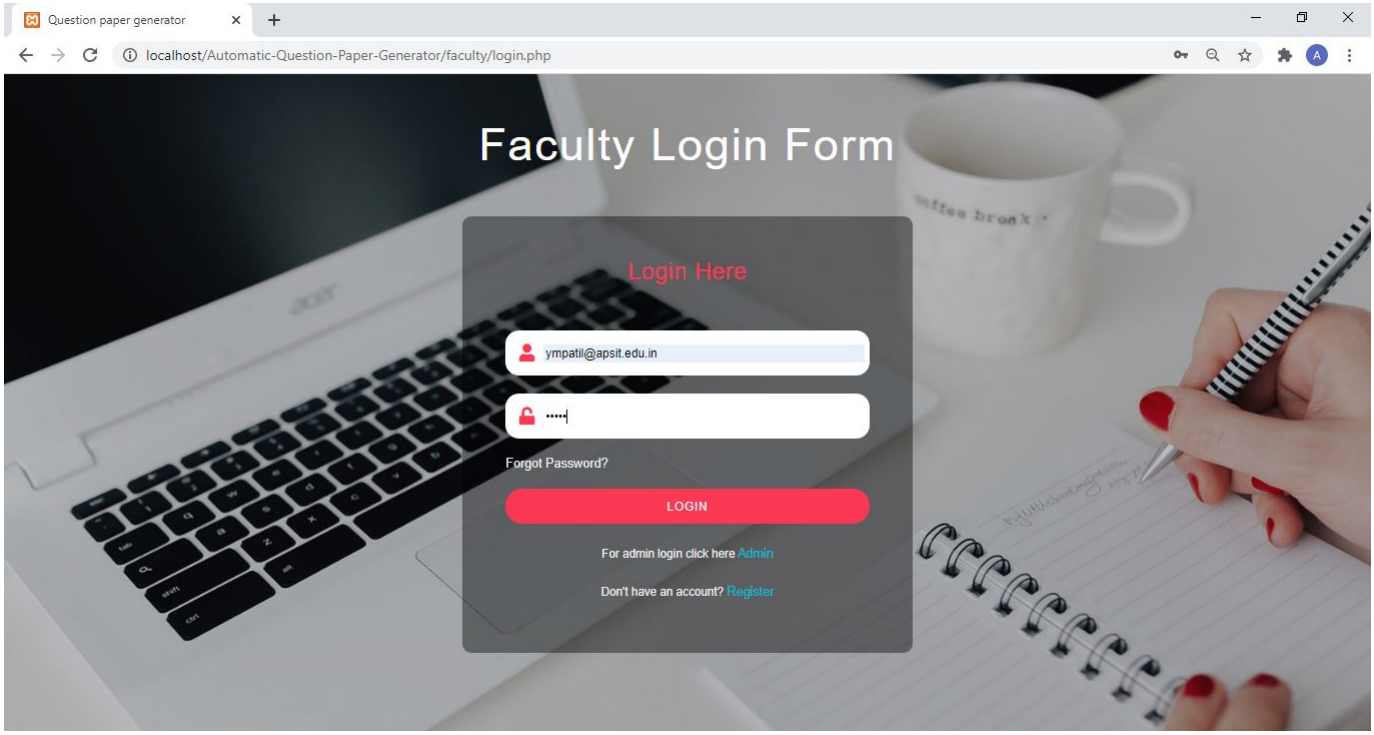


Figure 13: Faculty Login Page

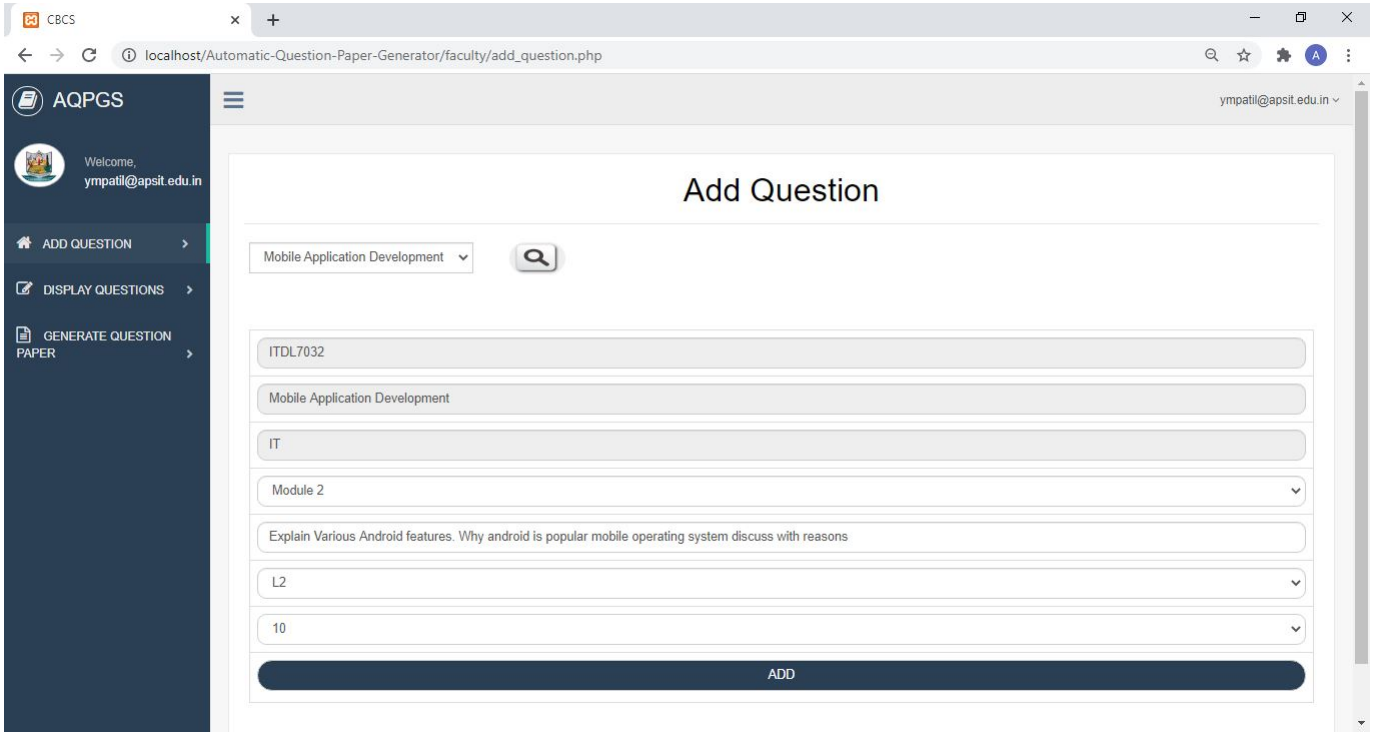


Figure 14: Add Question

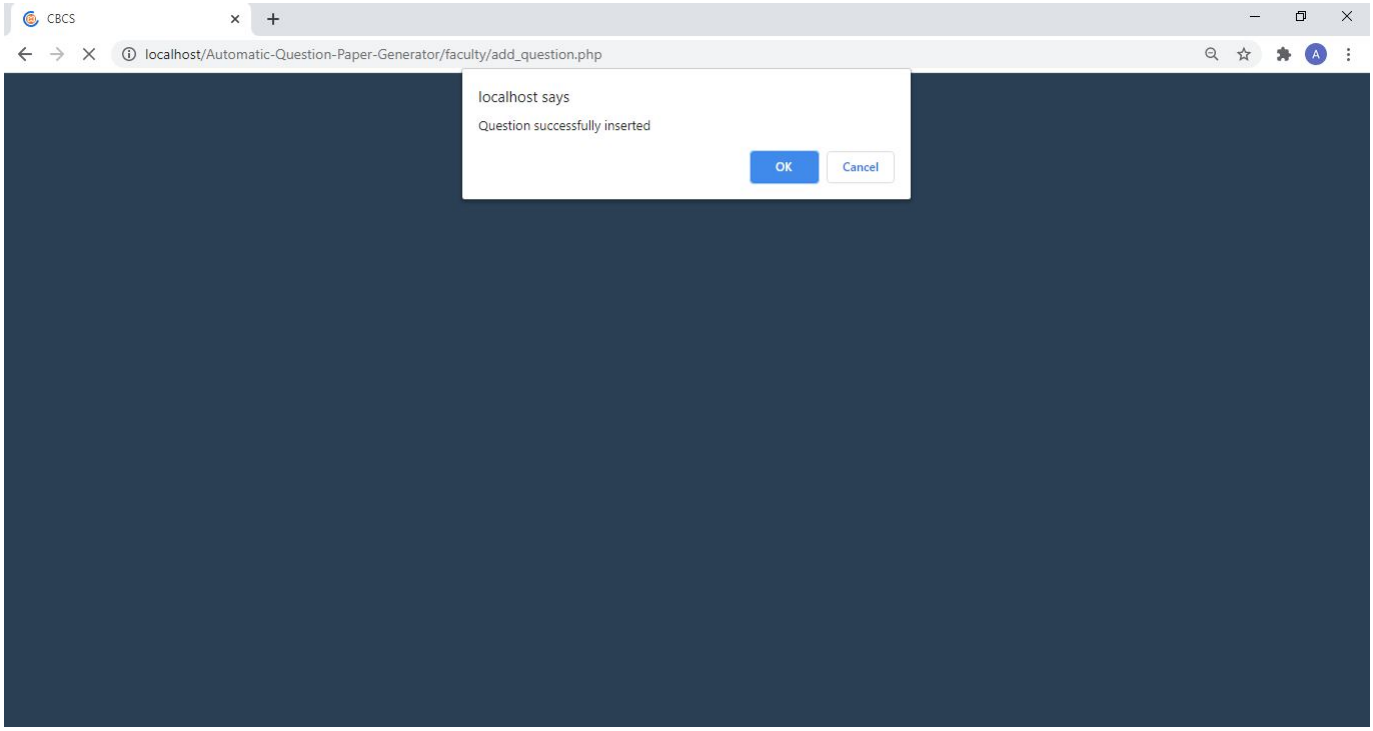


Figure 15: Question Successfully Inserted

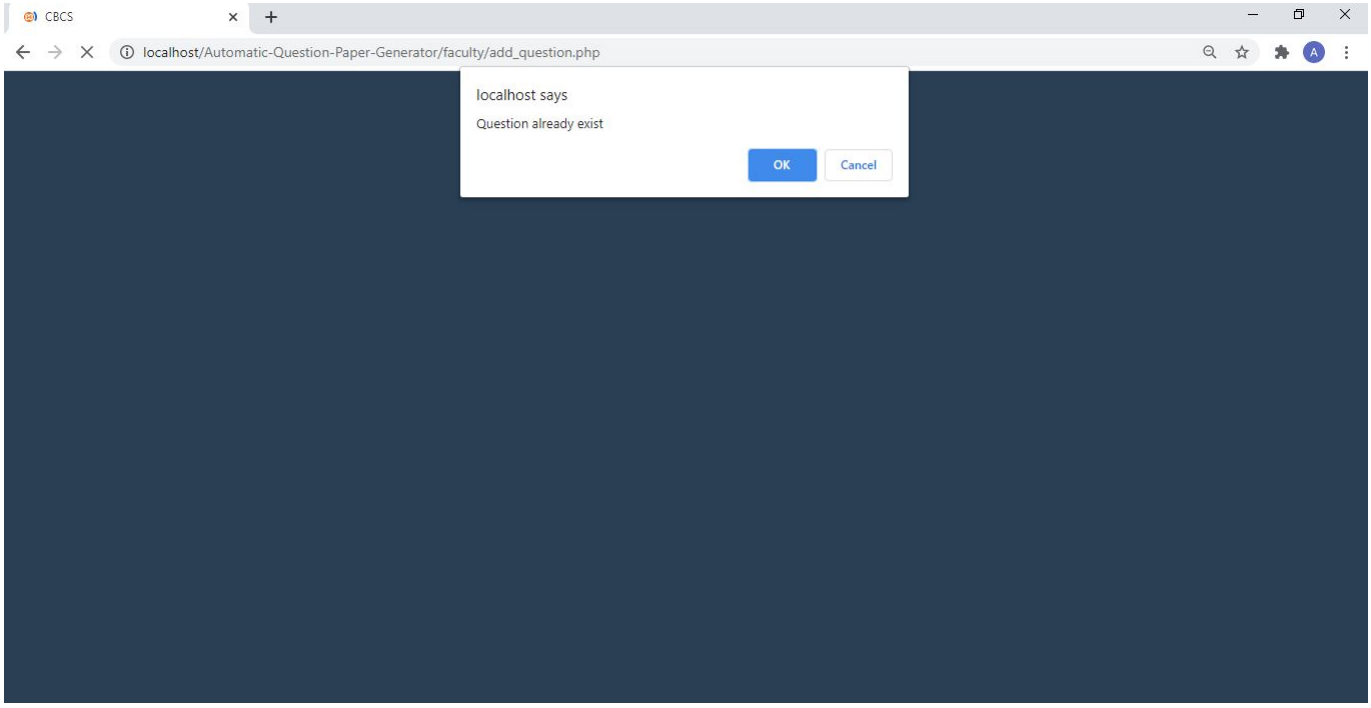


Figure 16: Duplicate Question Error Message

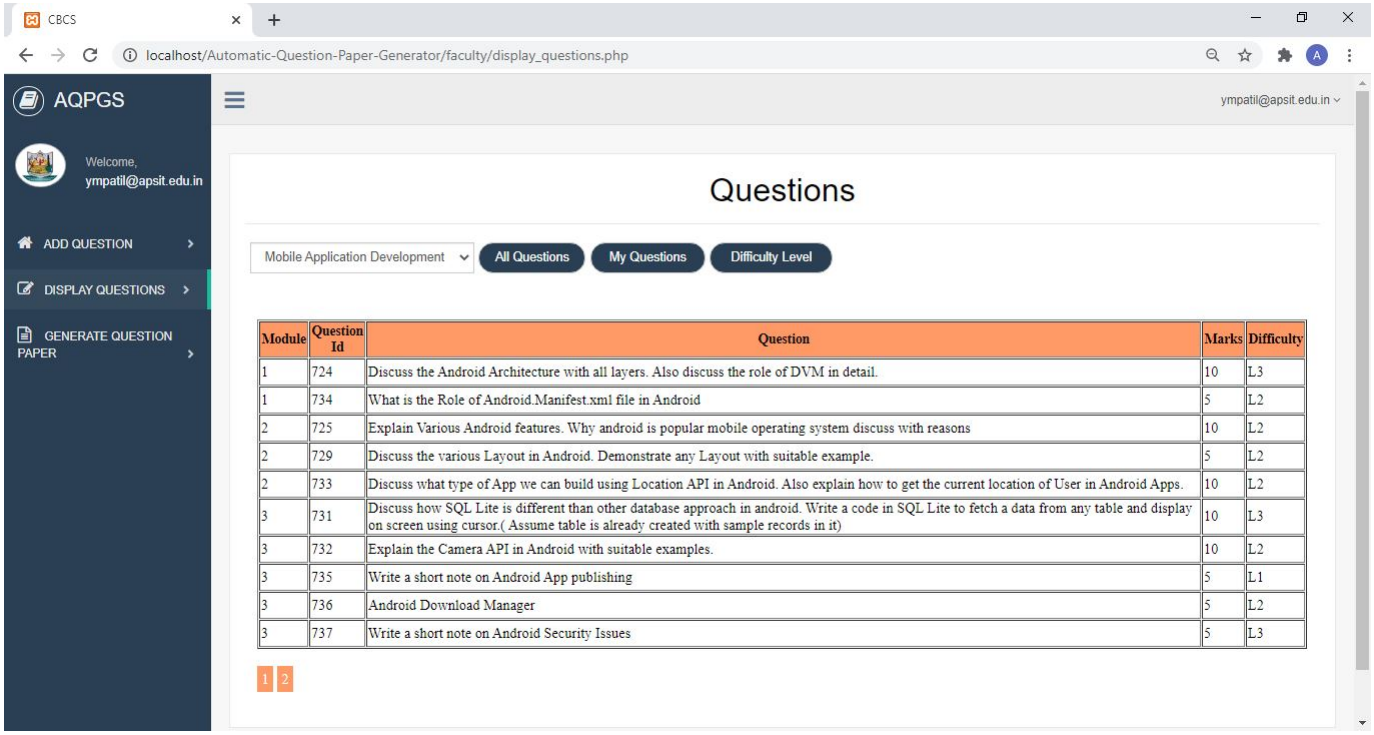


Figure 17: List of Questions Added

Summary

Assessment plays a vital role in teaching, learning process and aligning assessment to the learning outcomes of the course is an important aspect. Question selection difficulty has been modeled as a multi-constraint optimization issue that aims at generating question papers fulfilling many constraints said by the paper setter. The implemented system tries to address the above mentioned issues in an efficient way. The implemented work narrates an automated system that heads away from the traditional process of paper generation to an automated process.

Our future effort is to employee different types of randomization techniques as well as addition to Question Generation, we can enhance the same software by making provision to produce question for online test.

This system simplifies the whole process of question paper generation.

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