

# Automatic Question Paper Generation System using Randomization Algorithm

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**Abstract**— Examination process is an important activity for educational institutions to assess student performance. Thus the nature of the exam questions would determine the quality of the students produced by the institutions. Preparing the exam questions is very challenging, tedious and time consuming for the instructors. Thus with the help of this paper we present the solution in form of Automatic Question Paper Generator System (QGS) which makes use of shuffling algorithm as a randomization technique. This system includes several modules like user administration, subject selection, difficulty level specification, question entry, question management, paper generation, and paper management. The design process performs the scrutiny and composes the examination paper using an efficient algorithm with a high rate of success. With this algorithm, the user needs to specify the subject, the question type and the difficulty level. From the entered input, the examination paper will be generated automatically. The editing of questions is performed using Word processor and the final paper may be stored as “.doc” files. The system shows characteristics like simple operation, a great interface, good usability, immense security, and high stability along with reliability.

**Index Terms**—Automation, Question Paper Generation, Randomization, Shuffling.

## I. INTRODUCTION

With the onset of computer based technology there have been evolutionary changes in many areas of our professional environments. Most strangely e-education and e-learning is highly influenced. There is a shift from manual to automated systems for different aspects of education system. At every stage/level of education some admission procedure is present. The fundamental to this admission procedure is a test paper.

However the main problem is, a low quality of papers generated because of some human factors such as instability and relatively narrow scope of topics. Teachers need to invest

a lot of time and energy in composing examination papers.

**Manuscript received December 22, 2014.**

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Also, the concern remains is how the current technologies would also help the instructors automatically generate the different sets of questions from time to time without being concern about repetition and duplication from the past exam while the exam bank keeps growing. Making assignment sheets, daily practice tests, weekly tests, test series, online tests, etc. is a repetitive and time consuming task which involves both teacher as well as computer operator. Using this software the same action can be accomplished in minutes and even in absence of operators. The finest part of the software is that it takes intelligent decisions to eliminate repeated questions and checks even for the alternatives. Not only this, for formation of a question paper it is also possible to restrict the search to questions which have not been used at all or have been used less than specified number of times. This makes it greatly advantageous as the headache of manually avoiding repetition at the time of feeding is totally eradicated. These automated systems provide cost saving and time-efficient solutions.

## II. PROPOSED MODEL

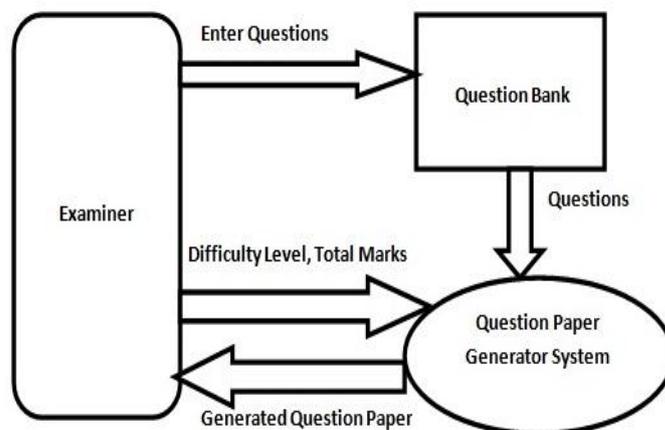


Fig. 1: Working of Question Paper Generation System

Automatic Question Paper Generator is 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. This paper introduces the usage of shuffling algorithm in Automatic Generator Question Paper System (QGS) to overcome the mentioned problem. The main part of the shuffling algorithms is to provide randomization technique in question paper generation system, thus different sets of question could be generated without repetition and

duplication. Fig. 1 displays the general block diagram of Automatic Question Paper Generator System.

Fig. 2 shown below describes the different modules included in QGS.

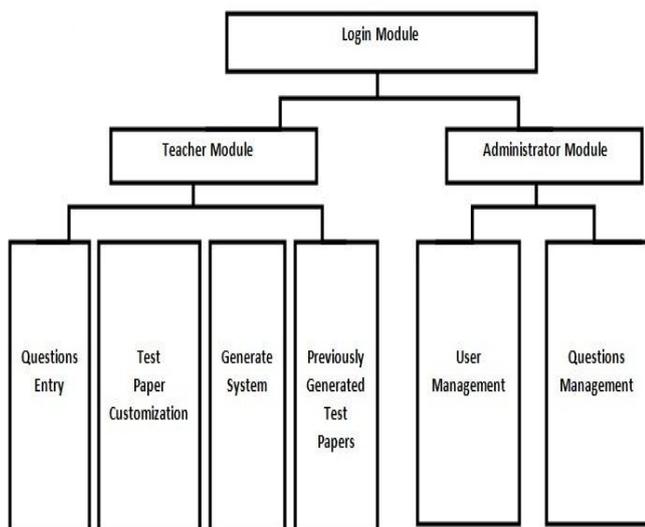


Fig. 2: Modules in Question Paper Generation System

### III. SHUFFLING ALGORITHM

Shuffling algorithms is a suitable and very effective way to implement for randomization of stored questions.

This algorithm checks for duplication and repetition of the randomly generated questions. The nature of this algorithm is as followed, for a set of N (the total number of question in the database) elements for generating a random alteration of the numbers 1–N, the algorithm goes as follows:

- Step 1: Create an array of N locations.
- Step 2: Generate random number.
- Step 3:if(loc==0)
  - store generated number.
  - else
  - compare the generated number with previous number in array.
  - if matching value found, go to step 2;
  - else
  - store the no in next location.
- Step 4: Repeat step 2 for N numbers.
- Step 5: Select questions from DB matching with values from array location one by one.
  - ex: select \* from question bank where question no=array[n];

### IV. CASE STUDY

- Step 1: When the application starts the user authentication takes place.
- Step 2: After successful user authentication, the program asks for number of questions to be included in the test paper.
- Step 3: When the number of questions is specified, the user is asked for mentioning the particular subject and topics to be referred from previously stored question banks.
- Step 4: Finally the user needs to select the difficulty level for generating the test paper.
- Step 4: After specifying the difficulty level, the user has to click on the “Generate Paper” which results into successful

generation of question paper using randomization by means of shuffling algorithm.

Consider an example, where we have entered the number of questions that will appear in test paper to be 5. The examiner then selects the subject and topics. The program then asks for the percentage of difficulty level for test paper. Let’s assume that the user enters value a value 60.

Finally after computing the questions based on given input parameters, the user will be returned with an appropriate test paper as displayed in the figure below.

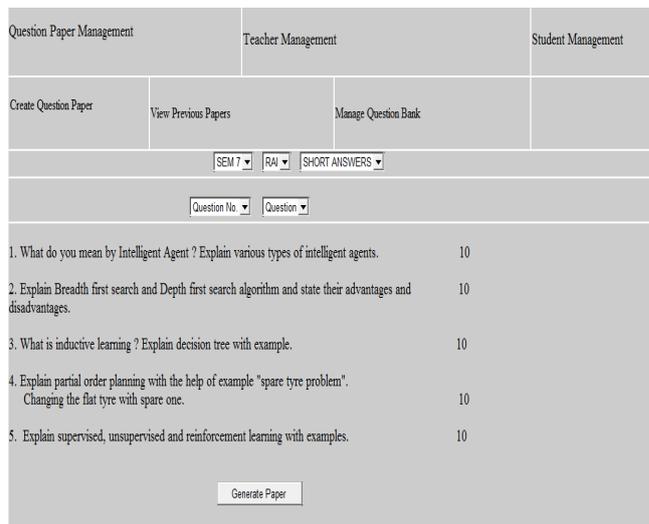


Fig. 3: Sample Output generated using QGS

### V. FEATURES AND BENEFITS

#### A. Features

1. Simply copy and paste your questions in given editor in any language, as question bank generator software is provided with different language support.
2. Prepare Question Paper in 25 Seconds in Easy Steps which covers all the topics from different subjects.
3. Question Type can be Single option, Multiple Option, Comprehension type question, MCQs, Short questions, OSCE questions and station material.
4. Questions that integrate rich text, scientific diagrams, mathematical/chemical formula and pictures can also be included.
5. Formatting can be done for the generated Questions.

#### B. Benefits

The QGS brings various advantages to user when compared to the traditional manual system. Listed below are some of the advantages of the system:

1. Examiners can generate test papers randomly by using QGS instantly, thus saving a lot of time.
2. QGS can help examiners to generate the question paper based on the learning outcomes elements.
3. Shuffling Algorithms helps randomization process by choosing questions in the database thus preventing duplication and repetition.

4. A new question can be added to the bank at any instance. Different sets of test papers could be generated without any limitation.

## VI. CONCLUSION

A novel prototype of randomization scheme has been described in this paper. The main purpose of this application is to describe automatic question paper generator using shuffling algorithm for randomization. This system is web-based as well as desktop-based application system with several features mainly producing unduplicated sets of exam paper. The result shows the potential proofs of employment of such algorithm for this type of system. Our future effort is to employ different types of randomization as well as in addition to question generation we can enhance the same software by making provision to produce questions from simple online text, which can be achieved using natural language processing algorithms.

## ACKNOWLEDGMENT

F. A. Author thanks all the Professors at Bharat College of Engineering for their unconditional support and encouragement.

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