Project Report On

PERFORMANCE MONITORING SYSTEM

Submitted

In partial fulfillment of the requirements for

the degree of

BACHELOR OF ENGINEERING

In

COMPUTER ENGINEERING

Submitted by

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Under the guidance of

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CERTIFICATE

This is to certify that the following students working on the project "Performance Monitoring System" have satisfactorily completed the requirements of the term work as partial fulfillment of the course B.E in Computer Engineering of the University of Mumbai during academic year 2012-2013 under the guidance of Prof. Supriya Shivanath Kamoji.

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Acknowledgement:

It gives us immense pleasure in acknowledging the valuable and co-operative assistance extended to us by the various individuals who have helped us successfully in completing our project.

First of all we would like to thank the Mumbai University for giving us this opportunity to study some good research paper about the topic, and develop a non-existing application named performance monitoring system to track the performance appraisals of students and teachers.

We would also like to thank our guide Prof. Supriya Shivanath Kamoji for guidance throughout the project.

We extend our sincere gratitude to the college for providing access to the IEEE and Science Direct papers. We would like to thank our parents and colleagues who have helped during the making of the project.

It is the encouragement of all these people that made us proceed towards achieving our goals.

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1. Abstract:

Every educational institution has the responsibility of assessing the performance of students throughout the duration of course. Also to maintain the quality of education, teacher's performance is to be monitored. Interaction between teachers and students is vital for quality education. So institutes strive to encourage this interaction. Institutes have their own methodology for above mentioned things. But it is noticed that institutes have separate systems to do this. The above mentioned criteria's are symbiotic in nature and a single system to address all three will prove more efficient and yield better output. The project proposes a system that assesses the performance of students based on various criteria and along with that gives the performance appraisal of teachers. It integrates the platform for interaction thus implicitly encouraging interaction. For formative assessment of students, system proposes a unique Interactive MCQ based exam.

2. Introduction:

Student's performance measurement in the semester is carried out manually. This process is time consuming. This project aims at providing a platform for computerized performance measurement thus reducing manual efforts and increasing efficiency. Also it provides a platform for interaction between students and staff.

2.1 Aim and Objective:

The main Aim of this Project is to provide a fair and computerized method for assessing the performance of students. This includes carrying out periodic MCQ exams for formative assessment of students. Performance Monitoring System (PMS) symbiotically monitors the performance appraisals of teachers. Thus, PMS broadens the scope of Performance assessment and encourages overall development of students. The project provides a platform for interaction between students and teachers by introducing platform for doubt solving.

2.2 Problem Statement:

The performance assessment of students and teachers is calculated by considering very few factors and carried out manually. The criterion for this assessment needs to be broadened and performance should be assessed by considering more factors that can enhance the overall performance. Human interference should also be eradicated to provide an unbiased assessment. Hence the system should be computerized. Lack of interaction between teachers and students creates a gap which can be reduced by creating a platform for the same.

2.3 Scope:

Scope of this project is any educational institution that assesses/monitors the performance of students throughout the duration of course and not just based on Final exam at the end of course. With some enhancements the project can be extended to corporate training sectors, school levels and other academia.

3. Literature Surveyed:

1. Multi-choice versus descriptive examinations-Robert W Brown

Grading of descriptive answer examinations is slow, costly and suffers from the foibles of human variation in judgment and performance over a period of time. Automated assessment can be done in a fraction of the time and is not subject to variations in interpretation, but requires a computer-based system and more time and skill to prepare.

Automated assessment or Computer-based Assessment also allows assessment tailor-made to individuals and offers many other advantages, including rapid feedback and data compilation and adaptive questioning.

The generation of a high quality multichoice examination will typically take at least twice as long as the same examination written in descriptive format.

2. Assessing by Multiple Choice Questions, UNSV Australia

MCQ tests are strongly associated with assessing lower order cognition such as the recall of discrete facts. Because of this, assessors have questioned their use in higher education. You can design MCQ tests to assess higher order cognition (such as synthesis, creative thinking and problem solving), but you must draft questions with considerable skill if such tests are to be valid and reliable.

MCQ tests can aid teaching and learning by:

- Providing students with rapid feedback on their learning.
- Being continually available without increasing the marking load .
- Allowing objective scoring. There can be only one right answer to a well-designed question, so marker bias is eliminated.
- Being immune to students' diverse capabilities as writers.

- Containing recyclable questions. Across the discipline, you can progressively develop and accumulate questions in pools or banks for re-use in different combinations and settings.

Challenges in using MCQ test:

- It is time-consuming to develop and require skill and expertise to design well.
- When they are used for summative assessment, encourage students to adopt superficial approaches to learning.
- Can be answered correctly by guesswork. If poorly designed, they can provide clues to encourage guessing.
- Typically provide students with little direction as to how to improve their understanding. Although you can overcome this with carefully designed feedback.
- Can disadvantage students with lesser reading skills, regardless of how well they understand the content being assessed.

3. Some observations on MCQ Tests – Michael P. Coughlan:

The MCQ format is introduced to facilitate better understanding of concepts and quick self evaluation.MCQ formats used should be amenable to speedy correction as all examiners face many questions and many student answers and deciding which answer best suits the question is ambiguous.MCQ format removes this ambiguity by defining a single answer or set of answer for a given question.

Types of MCQ:

1. Single true/false/don't know type:

This are relatively easy to formulate but the 1, 0, -1 (for correct, don't know, incorrect) marking system usually used leaves a lot to be desired. The Chances of student guessing the correct answer is 50% and hence it is not desirable to test a student's knowledge on this basis.

2. Multiple true/false/don't know type:

In one version of this format the student is asked to state how many of 5 answers to a particular statement or question are correct. He may know that 2 are correct and 2 incorrect but get bogged down because he doesn't know whether the fifth answer is correct or not. Thus, he is penalized even though he knows 80% of the material.

3. Matching type:

"Match each of the examples 'a' in column A with its appropriate prototype in column B"
However, from the examiners' point of view there are 'n' answers rather than 1 to be checked.
The probability of guessing the correct answer here reduces to 1/n.

4. Odd man Out:

Select the option that least suits the given set of values.
This method involves not only careful examination of options but analytical skills along with background knowledge. The probability of guessing the correct answer here reduces to 1/n.

5. Complete the sentence:

Normal fill in the blank(s) that checks not only for concept but also proper phrase that goes well with the given phrase.

6. One from five type:

This type (or the variant i.e. one most suitable answer type) is, rightly or wrongly, the format we have come to use most often in MCQ tests. They take the form of a statement or question followed by five possible or plausible answers. The candidate is asked to indicate the single correct (or most appropriate) answer.

4. Exploring the Potential of Multiple Choice Questions in Computer-Based Assessment of Student Learning- S. Ramesh & S. Manjit Sidhu & G. K. Watugala

The use of multiple choice tests as a tool of assessment are popular in many university courses, particularly in the foundation year where there is large number of students taking common subjects such as mathematics or engineering science.

Multiple choice tests can examine many of the same cognitive skills that essay tests do provided if the questions are tailored with careful attention to quality by following good practice to avoid the pitfalls in their design.

Well-designed multiple choice tests are generally more valid, clear and reliable than essay tests because they sample material more broadly, able to distinguish between performance levels and scoring consistency is virtually guaranteed.

Types of Assessments:
There are generally two basic types of assessment, i.e. formative and summative.
Formative assessment is designed to help students in gaining understanding and develop good learning habits.
Typically, this type of assessment will be represented by activities integrated into the course and may include:

- Feedback within study materials
- Self-assessment tests or quizzes
- Feedback from assignments
- Dialogue with peers, colleagues, and department

On the other hand, summative assessment attempts to measure the extent and quality of the students learning through:

- Examinations
- Course work/assignments/reports/dissertation

• Practical demonstrations/oral presentation

Table 1: Types of Assessments.

Area	***Type***	**Brief Description**
Summative	Exam	An assessment solely for grading purposes such as an exam at the end of a unit of study (Callear & King, 1997; Zakrzewksi & Bull, 1998)
Formative/ Summative	Grading test	An assessment for grading but which also provides feedback intended to direct future studies such as a small test, or weekly problem sets (Callear & King, 1997)
Formative	Open access test	A grading test where students are allowed to practice before sitting the test (Thelwall, 1998).
Formative	Self-test	An assessment designed to provide feedback to students on their progress (Zakrzewski & Bull, 1998)

Ideally, the principle function of formative assessments from the department/faculty standpoint should be to monitor the learning outcome of students. This assessment process would provide the lecturer/instructor with useful feedback about teaching quality, method of delivery and effectiveness of the course. Summative assessment should be tailored to provide an accurate representation of the level achieved.

Advantages of MCQ Pattern.

1.Rapid feedback from the test is available.

2.This pattern is continuously available without increasing marking load(human efforts).

3.Eliminates marking bias.

5. Multiple-Choice Question Enhanced with Interactive Software for Autonomous Learning, Yvan Duroc, Tan-Phu Vuong

MCQ's can be useful in autonomous learning by making them interactive. MCQ is generally used for student evaluations, but with additional interactive functionalities this method could also be considered as a virtual "instructor" improving autonomous learning.

One of the first uses of MCQ was to assess the capabilities of World War I military recruits. Since many studies presented some keys in order to design the questions.
Typical MCQ consists of two parts as follows:
1) Questions 2) Following the question comes a list of answer options from which one has to choose either as many as true or as many as requested.
The proposed study adds a third element: an interactive tool from which one can simulate the scenario.

4. Existing System:

There exists no system which provides all the functionalities that this application proposes to provide. Some of the existing functionalities spread over different systems are:

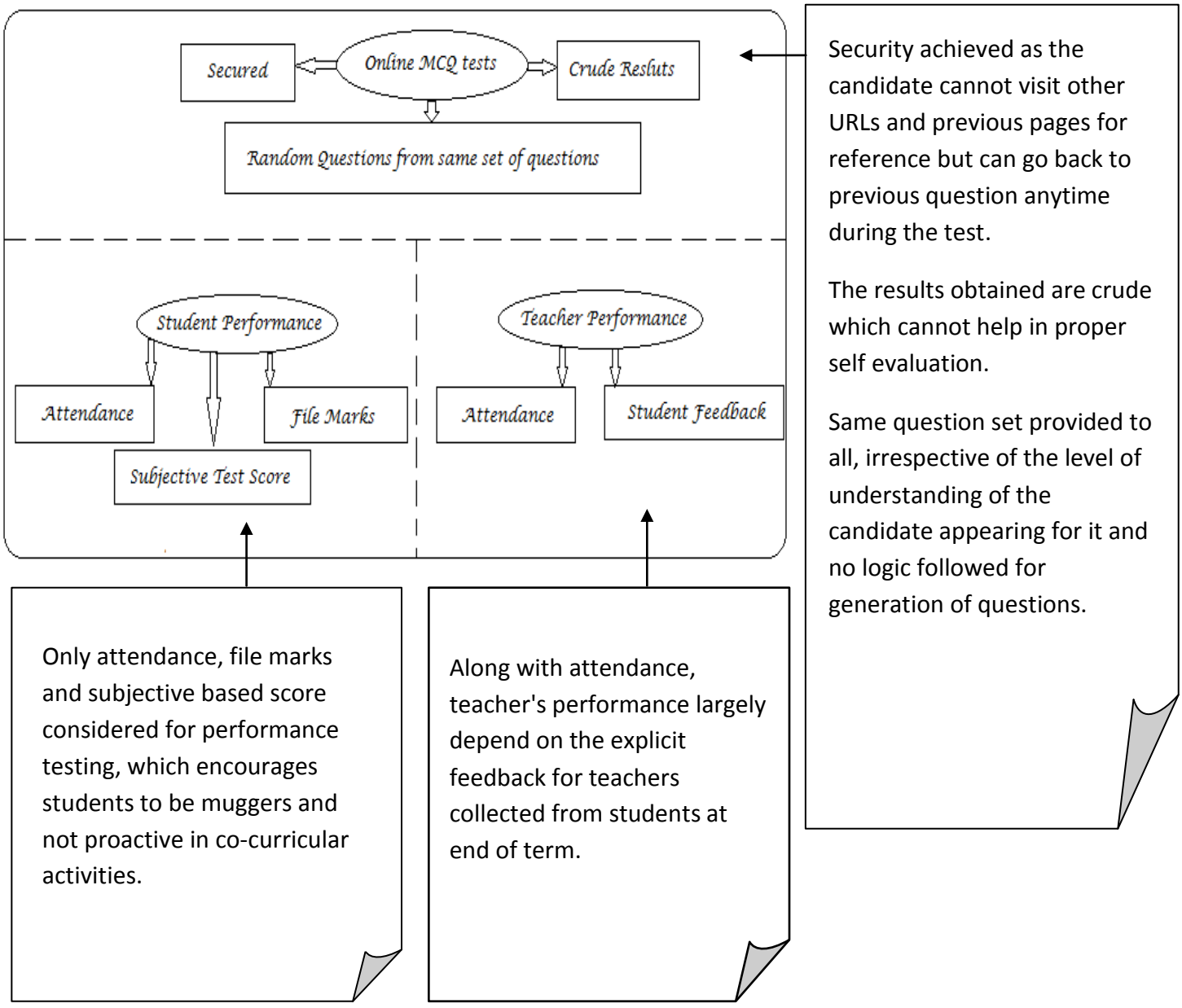


Fig 1: Existing System

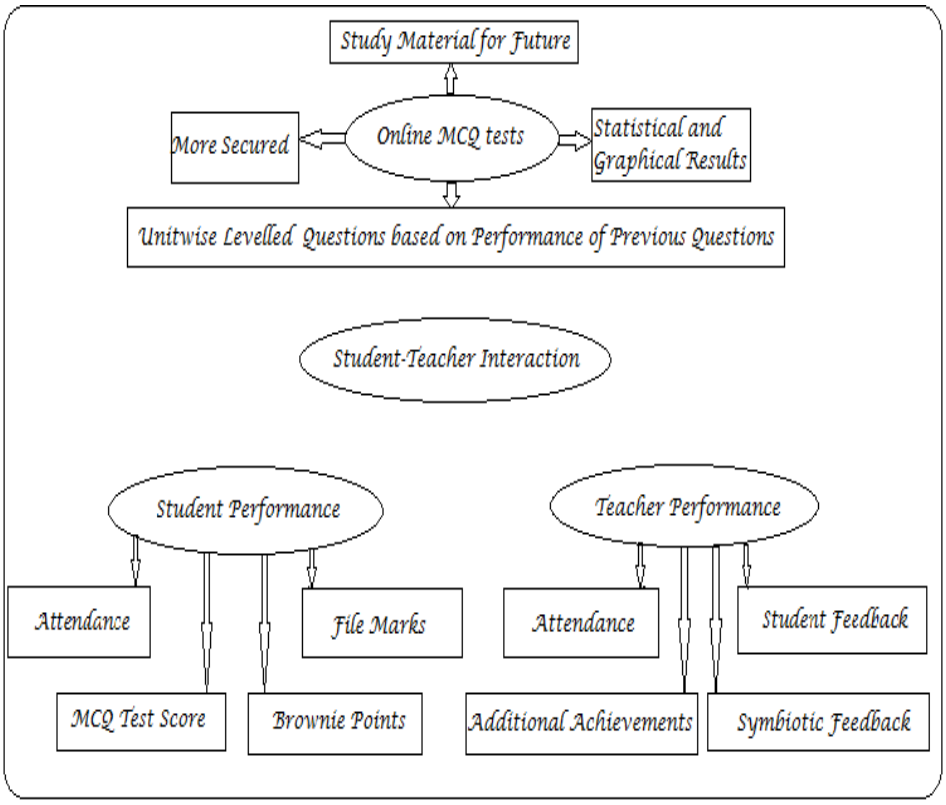
5. Proposed System:

This project proposes to include all the above mentioned functionalities in a single system.

Security enhanced as along with the existing system features, restriction is also put on going back to the previous question during the test. Sequential format is to be followed strictly.

Informative format of results given which helps in self evaluation and filters the areas in which the candidate is good and the one in which there is a scope of improvement. With result, some study material is provided for further reference.

Next question in test is generated from a particular unit and level depending on performances of the candidate in the previous questions. This helps the candidates of different academic levels to give in their best.



Along with attendance, file marks and MCQ test scores, students will be also given some brownie points.

Brownie points can be for various activities like new algorithm used in practical, delivered an outsourced project, technical paper presentation etc.

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Brownie points can be for various activities like new algorithm used in practical, delivered an outsourced project, technical paper presentation etc.

Just as in existing system, teacher's performance depends on small feedbacks collected from students periodically and attendance.

Apart from these, a large contribution is made by information given by the system symbiotically which includes class performance and some additional work done in the field of interest of the teacher.

6. Methodology

Students Marks:

The Final Grades calculated for a student depends upon various parameters observed and calculated throughout the semester. These grades are calculated for each subject.

Input for Students Marks (Subject wise):

i. Marks Secured in two MCQ tests spread evenly in the semester - M
ii. Attendance in lectures - A
iii. Journal file - J
iv. Brownie Points (Marks given by teacher for co curricular activities like certification, research, project, etc. - B

Schema for Marks Calculation:

S=a*M + b*A + c*J + d*B

where a,b,c,d are the weightages assigned to each input attribute.

Grading Schema:

Grades are calculated from the range of marks as follows:

Table 2: Grading Schema.

Marks	**Grade**
(23-25)*4	A
(20-22)*4	B
(16-19)*4	C
(12-15)*4	D
(11-10)*4	E
Below (10)*4	F

Marks Distribution:

The marks secured by any candidate are evenly distributed to normalize his performance during a term test.

Algorithm for normalization of marks:

- Input subject marks scored.
- Find the average of the marks (say avg).
- Calculate (s^2-avg^2) for each score where is the individual subject marks and find its sum and average (say avg2) .
- Calculate root of avg2 as deviation d.
- Calculate no of subjects whose score is less than avg and more than avg.
- If less =1 then add d to the score where score < avg.
- If more=1 then subtract d from the score where score > avg.
- Else score remains unchanged.

Generation of Questions for Test.

The Test consists of three levels .A Candidate begins with level one. His promotion and demotion to any level depends upon his performance in test. The marks associated with each level increases with increase in the level.

The criterion for promotion and demotion amongst the levels is given by the following matrix.

Table 3: Level Criteria

n / C	L1	L2	L3
L1	-	3C	-
L2	2W	-	2C
L3	-	1W	-

States that a candidate with current level L1 is promoted to level L2 if he answers 3 level_1 questions correct..

c : Current Level n : Next Level C: Correct W: Wrong

Marks assigned for each level:

Table 4: Marks v/s Levels

Level	Marks(for each correct answer)	Marks deducted for each incorrect answer
1	1	0.25
2	3	0.5
5	5	1

Teacher's Marks:

The grade for a teacher is calculated by considering various factors observed during the semester. The grade is calculated for each subject taught by a teacher in each semester for a respective branch.

Input for Teachers Marks (Subjectwise):

i. Marks Secured by students in respective tests - M
ii. Lectures conducted - L
iii. Feedback from Student - F
iv. Brownie Points (Marks given by HOD for organizing certification courses, research, etc.) - B

Schema for Marks Calculation:

T=a*M + b*L + c*F + d*B

where a,b,c,d are the weightages assigned to each input attribute:

7. Analysis:

Use Case diagram:

1) Student:

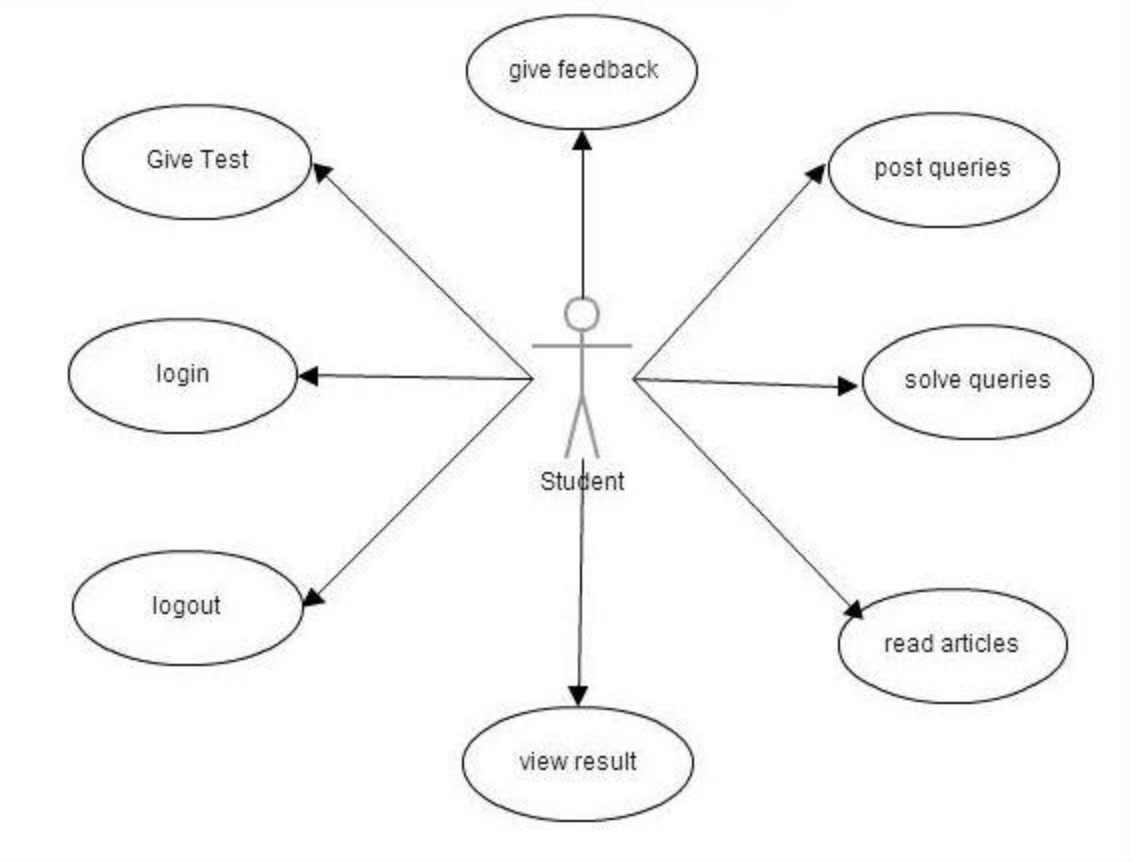

Fig 3.1: Use Case diagram: Student

Table 5.1: Use Case diagram: Student

Activity	**Description**
Login	Student can Log in the system with his user id.
Logout	Student can logout to end his session
Give Test	Student gives the test.
View result	Student Views his score card.
Read Articles	Student can read related articles/notes.
Post Queries	Student can out in doubts.
Solve Queries	Student can answer to the posted queries.
Give Feedback	Student gives feedback of the teacher.

2) Teacher:

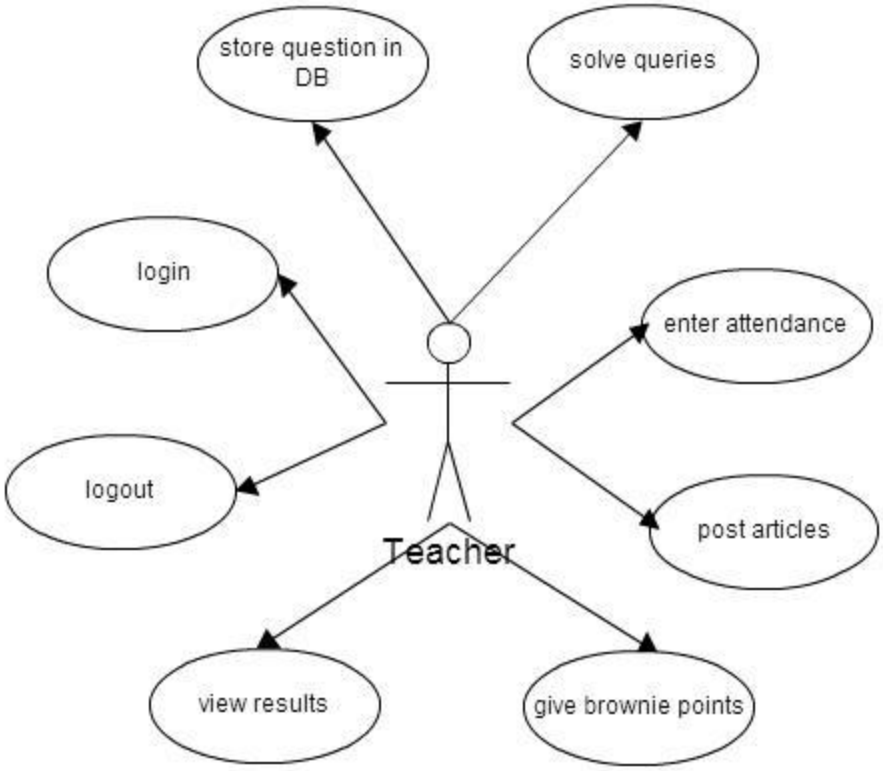

Fig 3.2: Use Case-Teacher

Table5.2: Use Case-Teacher

Activity	**Description**
Login	Teacher can Log in the system with his user id.
Logout	Teacher can logout to end his session
Enter Attendance	Teacher enters attendance of the student.
View result	Student Views his score card.
Post Articles	Teachers can post related articles/notes.
Store Question in DB	.Teacher enters questions for MCQ test.
Solve Queries	Student can answer to the posted queries.
Give Brownie points	Teacher gives brownie points for respective student.

3) H.O.D:

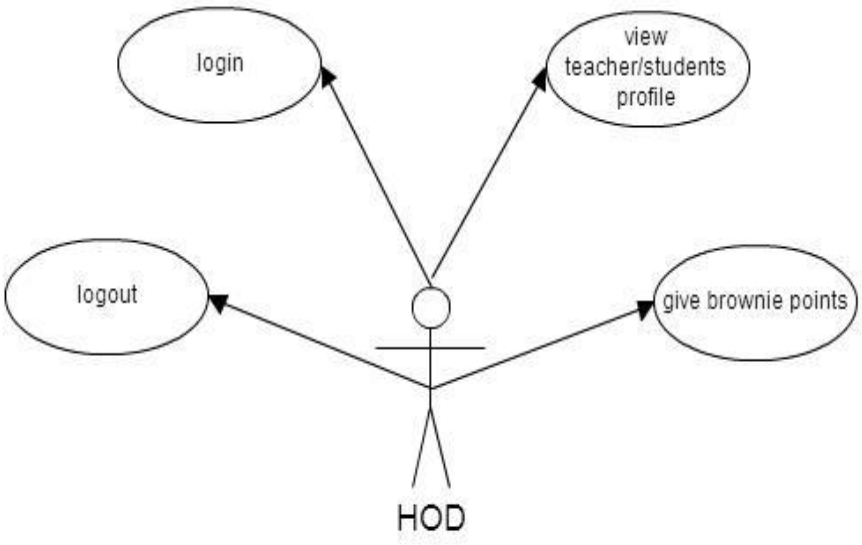

Fig 3.3:Use Case-H.O.D

Table 5.3: Use Case-H.O.D

Activity	**Description**
Login	HOD can Log in the system with his user id.
Logout	HOD can logout to end his session
Give Brownie Points	HOD gives brownie points for respective teachers.
View Details	HOD can view entire system details.

4) Admin:

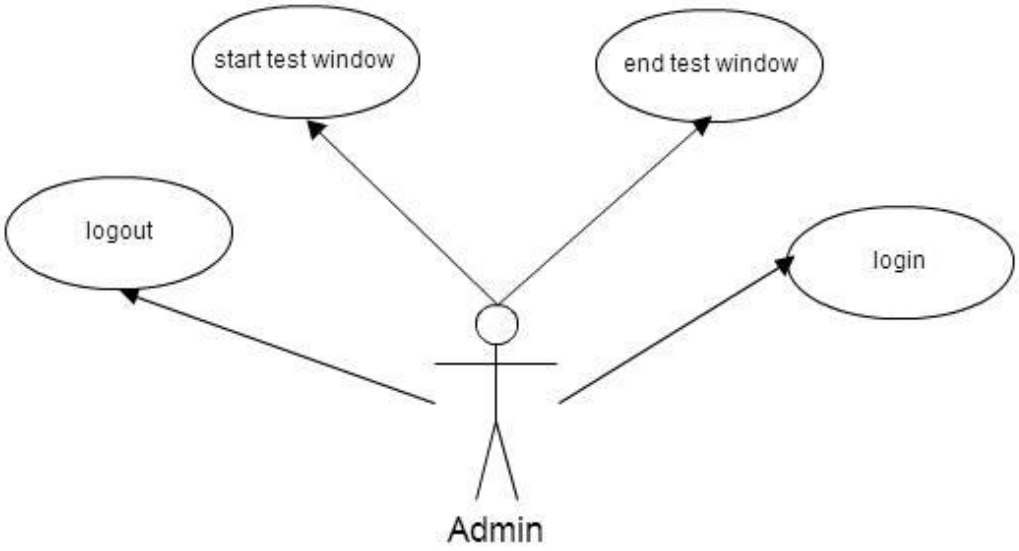

Fig 3.4: Use Case –Admin

Table 5.4: Use Case -Admin

Activity	Description
Login	Admin can Log in the system with his user id.
Logout	Admin can logout to end his session
Start Test Window	Admin Starts the test.
End Test Window	Admin ends the test after test duration is over.

Activity Diagram:

1. Login: It involves verification of the user id and password to allow entry into the system.

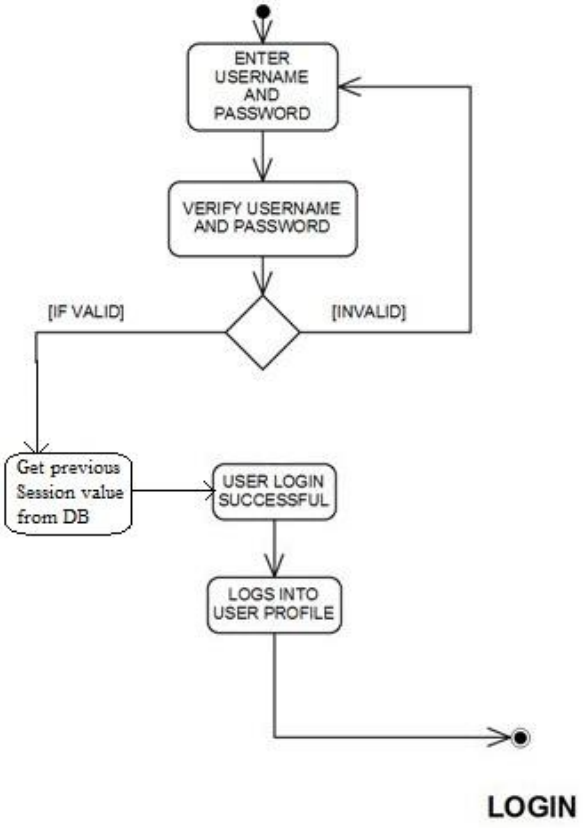

Fig 4.1: Activity diagram-Login

2 .Logout: The process used to end current users session to grant him an exit from the system.

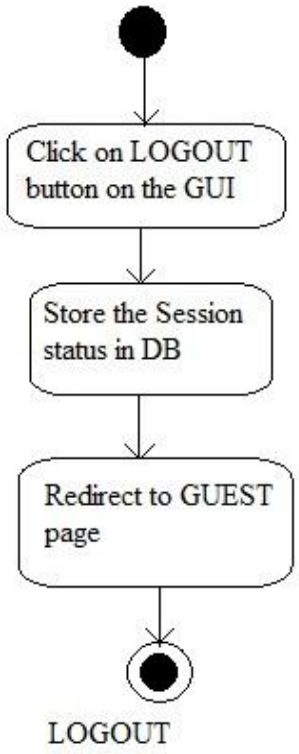

Fig 4.1.Activity Diagram-LogOut

3. Questions Generation : The promotion and demotion amongst various questions is based upon the number of question a candidates answer correctly.

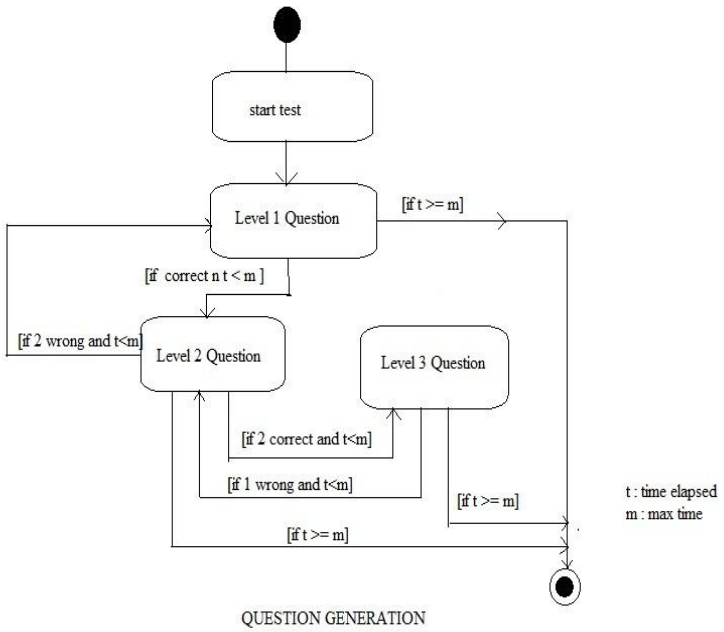

Fig 4.3: Question Generation

8. Design Details

Class Diagram:

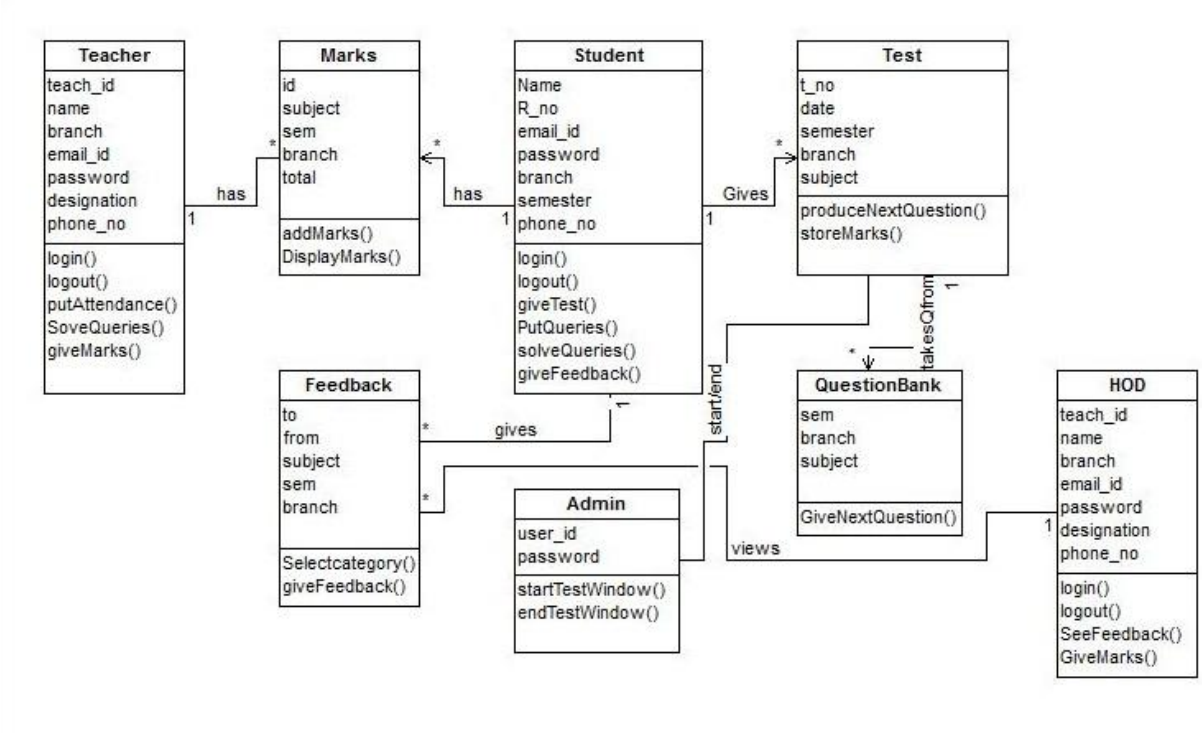

Fig 5 :Class Diagram

ER Diagram:

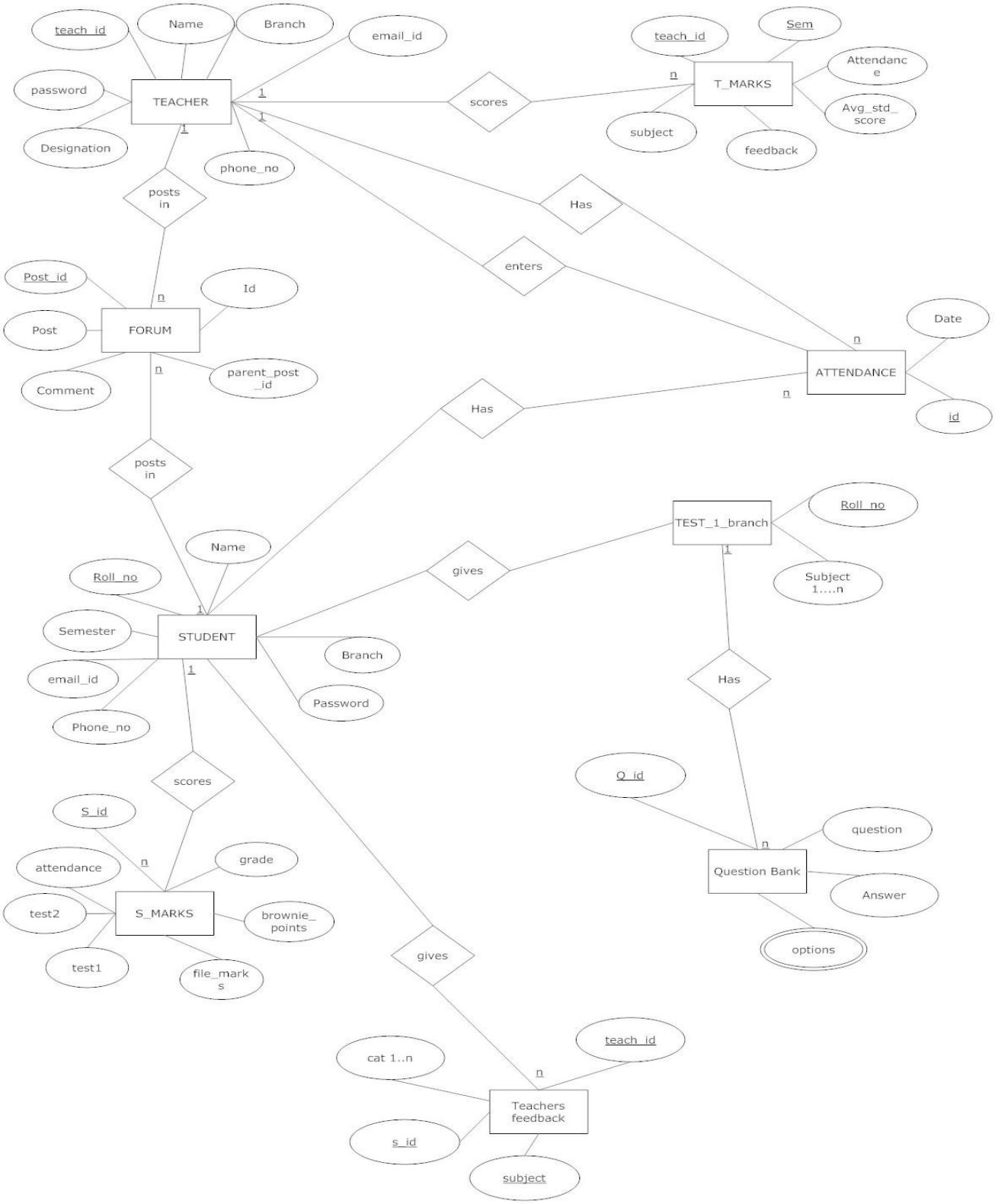

Fig 6 :Entity-Relations Diagram

9 .Hardware / Software Requirements:

Table 6: Hardware Software requirements

	Hardware requirement	**Software requirement**
Server	• Intel Pentium IV or AMD processor - 1GHz or above • 1 GB RAM or above • LAN interconnection	• MS SQL Server 2008 • Web Browser (Compatible)
Client	• Intel Pentium IV or AMD processor - 800 MHz or above • 512 RAM or above • LAN interconnection	• Web Browser (Compatible)

9. Implementation Plan:

Table 7: Implementation plan

Work	**Approximate Dates**
Database Design And Queries Testing	01-01-2013 to 10-01-2013
Work Flow Design	12-01-2013 to 20-01-2013
GUI Design	21-01-2013 to 31-01-2013
Database Connectivity	01-02-2013 to 20-02-2013
Testing	21-02-2013 to 10-03-2013
Documentation	11-03-2013 to 20-03-2013

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