

AUTOMATIC INTERNAL ASSESSMENT SYSTEM

A Project Report

*Submitted in Partial Fulfillment of the
requirements for the award of the Degree of
B.Sc. (Hons) Computer Application and Information Technology*

By

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2022

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Synopsis

➤ Introduction

This project is on Automatic Internal Assessment System (AIAS).

➤ Objective

The aim and objective of this project is to demonstrate Automatic Internal Assessment System as in the real time environment. Also, to know how AIAS works and being managed.

➤ Background Study

Software Engineering and its Approaches, Object Oriented Paradigm and Visual Modelling, UML Diagrams(Structural & Behavioural), Non-UML Diagrams(Data Flow Diagram, ER Diagram, Gantt Chart, PERT Chart), Rational Rose, DBMS & RDBMS with Data Dictionaries.

➤ Tool and Technology (to be used)

PC or Laptop, Good Data Connection(or Wi-Fi) with 4G networks.

➤ Hardware Requirements

4GB RAM, 1TB HDD or 256GB SSD, Intel 5 or AMD Ryzen 3 Quad Core Processor.

➤ Software Requirements

Windows 10 or Windows 11 must be installed in PC or Laptop, Rational Rose software.

Abstract

The goal of this project is to create a system that will capture Internal Assessment marks, calculate final marks.

Also, the purpose of Automatic Internal Assessment System is to automate the existing manual system by the help of computerized equipment's and full fledged computer software, fulfilling the requirements of all the educational institutions, so that their valuable data/information can be stored for a longer period with easy accessing of the same and it will save a lot of time in generation of result and will be errorless.

Principal and Head of Department also like to see these marks hence a multiuser system that will allow each faculty to enter marks from her/his room and others to view should be of value to college.

A faculty typically keeps records of marks of each internal assessment in this particular software file so it will be easy to manage with help of system.

The required software and hardware are easily available and easy to work with.

Acknowledgement

I, Sahana Ghosh, Student of St. Xavier's College Ranchi, Dept. of B.Sc. (Hons.) Computer Application, 4th Semester, would like to express my special thanks of gratitude to our faculty member Mr. Surya Narayan Prasad for his support, valuable time and guidance. This report would not have been possible without his motivation and contribution.

Also, I would like to thank Dr. Swarat Chaudhuri, HOD of Department of Computer Science for providing us great facilities, and environment and also gave such wonderful opportunity that enhanced my skills and knowledge.

I would also like to thank my parents and friends who helped me a lot in finalizing this project within the limited time frame.

(Sahana Ghosh)
(20VBCA044406)

Acknowledgement

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I am are overwhelmed in all humbleness and gratefulness to acknowledge my depth to all those who have helped me to put these ideas, well above the level of simplicity and into something concrete. Any attempt at any level can't be satisfactorily completed without the support and guidance of all the above mentioned people. I'm very thankful to all of you.

(Kumar Siddhant)
(20VBCA044416)

Acknowledgement

In the accomplishment of completion of my project on Automatic Internal Assessment I would like to convey my special gratitude to Mr. Surya Narayan Prasad and as well as Dr. Swarat Chaudhuri ,HOD of Department of Computer Science. Your valuable guidance and suggestions helped me in various phases of the completion of this project. I will always be thankful to you in this regard.

I would like to thanks my parents , friends and my group members who helped me a lot.

(Abhishek Kumar Lohra)
(20VBCA044429)

Acknowledgement

I, Anjali Munda, Student of St. Xavier's College Ranchi of B.Sc.(Hons.) Computer Application, 4th Semester, would like to express my special thanks of gratitude to our faculty member Mr. Surya Narayan Prasad for his support, valuable time and guidance, this report would not have been possible without his motivation and contribution.

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Anjali Munda
(20VBCA044432)

Acknowledgement

I, Abhishek Kumar Gope, Student of St. Xavier's College Ranchi, Dept. of B.Sc. (Hons.) Computer Application, 4th Semester, would like to express my special thanks of gratitude to our faculty member Mr. Surya Narayan Prasad for his support, valuable time and guidance. This report would not have been possible without his motivation and contribution.

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(Abhishek Kumar Gope)
(20VBCA044442)

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I, Pallawi, Student of St. Xavier's College Ranchi, Dept. of B.Sc. (Hons.) Information Technology, 4th Semester, would like to express my special thanks of gratitude to our faculty member Mr. Surya Narayan Prasad for his support, valuable time and guidance. This report would not have been possible without his motivation and contribution.

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(Pallawi)
(20VBIT044503)

Acknowledgement

I, Rahul Mahato, would like to express my special thanks of gratitude to our faculty member Mr. Surya Narayan Prasad for his support, valuable time and guidance. This report would not have been possible without his motivation and contribution. I also would like to thank Dr. Swarat Chaudhuri, HOD of the Department of Computer Science for providing us great facilities, and environment and also gave such wonderful opportunity that enhanced my skills and knowledge.

My Sincere efforts have made me to accomplish the task of completing this project. I have taken effort in this project. However, it would not have been possible without the kind support and help of many individuals. Therefore my thanks and appreciation go to my classmates and team members in developing my project and to the people who have willingly helped me out with their abilities.

Finally, Words are not sufficient to express gratitude to my cherished family members for supporting me without their encouragement and support I would have not reached this stage.

(Rahul Mahato)
(20VBIT044509)

Acknowledgement

In the accomplishment of completion of my project on automatic internal assessment I would like to convey my special thanks to Mr. Surya Narayan Prasad as well as Dr. Swarat Chaudhari , HOD of department of computer science. Your valuable guidance and suggestions helped me in various phases of completion of this project. I will always be grateful and thankful to you in this regard.

I would like to thank my parents, friends and my group members who helped me a lot in this project.

(Pallavi Verma)
(20VBIT044522)

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(Smirti Ranjan)
(20VBIT044533)

Acknowledgement

I, Ayush Kumar, Student of St. Xavier's College Ranchi, Dept. of B.Sc. (Hons.) Information Technology, 4th Semester, would like to express my special thanks of gratitude to our faculty member Mr. Surya Narayan Prasad for his support, valuable time and guidance. This report would not have been possible without his motivation and contribution.

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(Ayush Kumar)
(20VBCA044456)

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(Sumit Kumar)
(20VBCA044460)

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(Prince Alok)
(20VBCA044470)

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(Srikant Kumar)
(20VBCA044484)

Declaration by Candidate

I the undersigned declare that the project report entitled “**Automatic Internal Assessment System**” is based on my own work carried out during the course of our study under the supervision of Mr. Surya Narayan Prasad.

This project work has been submitted for partial fulfillment of the requirement of academic session 2021 – 2022 to St. Xavier’s College Ranchi, Dept. B.Sc.(Hons.) Computer Application. The work done in the report is original and has been done by me under the general supervision of my supervisor.

Signature of Candidate

(Sahana Ghosh)
(20VBCA044406)

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(20VBCA044429)

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(20VBCA044432)

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(Pallavi Verma)
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(Sahana Ghosh)

(Surya Narayan Prasad)

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(Kumar Siddhant)

(Surya Narayan Prasad)

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(Anjali Munda)

(Surya Narayan Prasad)

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(Pallawi)

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(Rahul Mahato)

(Surya Narayan Prasad)

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(Pallavi Verma)

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Introduction to Software Engineering

Software Engineering is a branch of engineering that deals with the development of software products. It operates within a set of principles, best practices and methods that have been carefully honed throughout the years, changing as software and technology change.

Software Engineering leads to a product that is reliable, efficient and effective at what it does. While software engineering can lead to products that do not do this, the product will almost always go back into the production stage.

IEEE (Institute of Electrical and Electronic Engineers) defines Software Engineering as the application of

- Systematic
- Disciplined
- Quantifiable Approach
- Development Operations
- Maintenance of the software
- Development Operations

Software Engineering Approaches

Software Engineering approach has two components. They are

- Systems Engineering Approach
- Development Engineering Approach

Software Engineering Methods Process Models

System Engineering Methods

The system has broad meaning. Systems Engineering is a multidisciplinary approach that is intended to transform a set of stakeholder needs into a balanced system solution that meets those needs.

It includes

- The Business Systems
- Computer Software used in the business system
- The understanding of the system is done through the System Study and Analysis.
- The System Study and Analysis is done using System Engineering Methodology(SEM)
- The SEM steps are
 - Define the objective of the system
 - Define the boundaries of the system
 - Factorize the system into different components for understanding the system functions and features.
 - Understand the relationships between various components.
 - Define the relationship in terms of input, output and processes.
 - Understand and ascertain the role of hardware and software.
 - Understand the role of the databases and any other software products used in the system.
 - Identify key operational and functional requirements of the system to be addressed.
 - Model the system for analysis and development through modeling software.
 - Discuss the systems with the customer, the users and the stakeholders affected by the system.

Development Engineering Methods

Development Engineering Methodology has the goal of translating the system requirements as software system goal and proceeds to achieve it through following steps:

- Requirement definition and specifications
- Design solution to deliver the requirement
- Software development planning
- Software testing by components
- Integration of system components
- Integration testing for confirmation and conformance of delivery of requirements

- Determination of implementation strategy
- Implementation
- Change management process
- Maintenance of installed product

Comparison Between System Engineering and Development Engineering

S.No.	System Engineering	Development Engineering
1.	A System Engineering deals with the overall management of engineering projects during their life cycle (focusing more on physical aspects).	A development Engineering deals with the designing and developing good quality of software applications/software products.
2.	System Engineering follows an interdisciplinary approach governing the total technical and managerial effort required to transform requirements into solutions.	Development Engineering follows a systematic and disciplined approach for software design, development, deployment and maintenance of software applications.
3.	In general, it is concerned with all aspects of computer-based system development including hardware, software and process engineering.	In general, it is concerned with all aspects of software development, infrastructure, control, applications and databases in the system.
4.	One thing software engineering can learn from system engineering i.e., consideration of trade-offs and use of framework methods.	One thing system engineering can learn from development engineering i.e., Disciplined approach to cost estimation.
5.	System engineers mostly focus on users and domains.	Software engineers mostly focus on developing good software.
6.	Systems Engineering Methods are Stakeholder Analysis, Interface Specification, Design Trade-offs, Configuration Management, Systematic Verification and Validation, Requirements Engineering etc.	Development Engineering Methods are Modelling, Incremental Verification and Validation, Process Improvement, Model-Driven Development, Agile Methods, Continuous Integration etc.
7.	It ensures correct external interfaces, interfaces among subsystems and software.	It makes interfaces among software module, data and communication path work.
8.	System Engineering requires a broader education background like Engineering, Mathematics and Computer science etc.	While development engineering requires Computer Science or Computer Engineering background.

But these two disciplines are interconnected to each other and there are no such hard and fast rules for these titles at IT industries and we can see also how these two disciplines are cooperating to each other.

Introduction to Object Oriented Paradigm

- Object oriented paradigm is a different way of viewing applications.
- With the object oriented approach, we divide an application into small objects that are independent to each other.
- One of the primary advantage of object oriented paradigm is the ability to build components once and reuse them.
- Now the question comes, how object oriented paradigm is different from traditional approach?
- Traditionally the approach to the development has been to concern with the information that the system will maintain.
- With this approach the user is asked what information they will need, design databases to hold the information, provide screens to input the information and print the reports to display the information.
- In other words we can say that the focus is on “Information” and less attention is paid on what is done with the information or the behavior of the system.
- This approach is called “Data Centric” approach.
- Data Centric approach is good for database design and information gathering but this approach when used in designing business application presents some problems. They are
 - The requirement for the system will change with time.
 - A data centric system is suited to handle the changes in database but a change to business rule or behaviour of the system is not easy to implement.

- The object oriented paradigm is developed with main stress on information and behaviour.

Visual Modelling

- Visual Modelling is the process of taking the information from the model and displaying it graphically using standard set of graphical elements.
- Benefits of Visual Modelling is basically the communication.
- Communication between users, developers, analysts, testers, managers and other stakeholders is the primary purpose of Visual Modelling.
- This communication can be accomplished using visual as well as non-visual i.e. textual information.
- When a system is visually modelled, following benefits can be reaped.
 - Complexity of the system can be better displayed and expressed.
 - Actual functionality of the system can be exhibited on different levels.
 - The interaction of objects within the system can also be modelled.
 - The interaction between the systems can also be modelled.
 - User can visualize the interaction they will make with the system.
 - Analysts can visualize the interactions between the objects
from the models.
 - Developers can visualize the objects that is to be developed and what are the requirements to be accomplished.

- Testers can visualize the interactions between objects and prepare test cases based on these interactions.
- Project managers can visualize the whole system and how the parts interact.

Modelling Tools

- One of the most important consideration in visual modelling is what graphical notation to use to represent the various aspects of the system.
- This notations need to be conveyed the interested parties.
- Some of the common notations are
 - Booch Method
 - Object Modelling Technology (OMT)
 - Unified Modelling Language (UML)

Object Modelling

- Proposed by James Rumbaugh.
- Rumbaugh discussed the importance of modelling systems in real world components.
- The OMT notation proposed by him uses simpler graphics as compared to BOOCH.
- A sampling of the objects and relationships in OMT notation is given below.

Introduction to UML

UML Diagrams

UML allows to develop different types of visual diagrams that represent various aspects of the system. Rational Rose supports the development of majority of these models. They are

- Class diagram
- Object diagram
- Component diagram
- Deployment diagram
- Use case diagram
- Sequence diagram
- Collaboration diagram
- State chart diagram
- Activity diagram

Basically there are two types of UML Diagrams. They are: –

- Structural Diagrams
- Behavioural Diagrams

Structural Diagram

- The structural diagrams represent the static aspect of the system.
- These static aspects represent those parts of a diagram, which are stable and forms the main structure.
- These static parts are represented by classes, interfaces, objects, components, and nodes.

Types of Structural Diagram

- There are four types of structural diagrams in UML. They are :-
 - Class diagram
 - Object diagram
 - Component diagram
 - Deployment diagram

Behavioural Diagram

- The behavioural diagrams represent the dynamic aspect of the system.
- These dynamic aspects represent those parts of the system that are changing.

Types of Behavioural Diagram

- There are five types of behavioural diagrams in UML. They are :-
 - Use case diagram
 - Sequence diagram
 - Collaboration diagram
 - State chart diagram
 - Activity diagram

Class Diagram

- Most common diagrams used in UML.
- Class diagram consists of classes, interfaces, associations, and collaboration.
- Represent the Object – Oriented view of a system, which is static in nature.
- Active class is used in a class diagram to represent the concurrency of the system.
- As class diagram represents the object orientation of a system, it is used for development purpose. This is the most widely used diagram at the time of system construction.

Object Diagram

- Object diagram is nothing but the instance of class diagram.
- These diagrams are closest to real-life scenarios where we implement a system.
- Object diagrams are a set of objects and their relationship is just like class diagrams.
- They represent the static view of the system.
- The usage of object diagrams is similar to class diagrams but they are used to build prototype of a system from a practical perspective.

Component Diagram

- Component diagrams represent a set of components and the relationships among them.
- These components consist of classes, interfaces, or collaborations.

- Component diagrams represent the implementation view of a system.
- In the design phase, system components like classes, interfaces, etc. are placed in different groups depending upon their relationship.
- These groups are known as components.
- Component diagrams are used to visualize the implementation.

Use Case Diagram

- Use case diagrams are a set of use cases, actors, and their relationships.
- They represent the use case view of a system.
- A use case represents a particular functionality of a system.
- It means that, use case diagram is used to describe the relationships among the functionalities and their internal / external controllers.
- These controllers are known as actors.

Sequence Diagram

- A sequence diagram is an interaction diagram.
- The name itself suggests that, the diagram deals with some sequences, which are the sequence of messages flowing from one object to another.
- Interaction among the components of a system is very important from implementation and execution perspective.
- Sequence diagram is used to visualize the sequence of calls in a system to perform a specific functionality

Collaboration Diagram

- Collaboration diagram is a type of interaction diagram.
- It represents the structural organization of a system and the messages sent / received.
- Structural organization consists of objects and links.
- The purpose of collaboration diagram is very much similar to that of sequence diagram.
- Although, the specific purpose of collaboration diagram is to visualize the organization of objects and their interaction.

State Chart Diagram

- Any real – time system is expected to be reacted by some kind of internal / external events.
- These events are responsible for state change of the system.
- State chart diagram is used to represent the event driven state change of a system.
- It basically describes the state change of a class, interface, etc.
- State chart diagram is used to visualize the reaction of a system by internal / external factors.

Activity Diagram

- Activity diagram describes the flow of control in a system.
- It consists of activities and links.
- The flow can be sequential, concurrent, or branched.

- Activities are nothing but the functions of a system.
- We have to prepare numbers of activity diagrams to capture the entire flow in a system.
- Activity diagrams are used to visualize the flow of controls in a system.
- Activity diagram helps to have an idea of how the system will work when executed.

Deployment Diagram

- The deployment diagram is concerned with the physical deployment of the application.
- A deployment diagram shows all of the nodes on the network, the connections between them and the processes that will run on each other.
- One module has only one deployment diagram.
- Elements of deployment diagram are processor, devices, connections and processes.

Entity Relationship Diagram

- The ER model defines the conceptual view of a database.
- It works around real – world entities and the associations among them.
- At view level, the ER model is considered a good option for designing databases.
- The ER Model is represented by means of an ER diagram. Objects, like entities, attributes of an entity, relationship sets, and attributes of relationship sets, can be represented with the help of an ER diagram.

Data Flow Diagram

- Visual Representation of the information flows within a system.

- With the help of a neat and clear DFD, we can depict the system requirement graphically.
- Shows how data enters and leaves the system, what changes the information, and where data is stored.
- Also termed as a Data Flow Graph or Bubble Chart.

Flow Chart (Diagram)

- Diagram that represents a workflow or process.
- Diagrammatic representation of an algorithm.
- Step – by – Step approach to solve a task.
- Flow Chart illustrates a solution model to a given problem.
- The flowchart is a means of visually presenting the flow of data through an information processing systems, the operations performed within the system and the sequence in which they are performed.

Gantt Chart

- A Gantt Chart is a chart that shows all of the different sub – tasks of a project and how they relate to each other over time.
- A Gantt chart shows all of the tasks that need to be done, the amount of time each task is expected to take, the time frames in which individual tasks are to be completed, and the relationship between various tasks.
- Thus, Gantt Chart helps us to, get everything done on schedule, and you never waste time waiting for a task to be completed that should have been done already.

PERT Chart

- Stands for Program Evaluation and Review Technique.
- A PERT chart is a project management tool that provides a graphical representation of a project's timeline.
- The Program Evaluation Review Technique (PERT) breaks down the individual tasks of a project for analysis.
- PERT charts are considered preferable to Gantt charts because they identify task dependencies.

Introduction to Rational Rose

- ROSE stands for Rational Object-oriented Software Engineering.
- Rational Rose is developed by Rational Corporation which is under IBM.
- Rational Rose is a tool for modelling software systems.
- Rational Rose supports UML.
- Rational Rose is a tool that supports round – trip engineering means a tool that supports conversion of a model to code and from code to a model.

Introduction to AIAS (Automatic Internal Assessment System)

In the current scenario, evaluating internal grade of students in the campus is time consuming as well as requires more human effort. Proposed system is an application program that provides a comprehensive solution to manage and enhance the internal mark evaluation.

Our project “AUTOMATIC INTERNAL ASSESSMENT SYSTEM” is developed based on information collected from the various references and sources.

This project mainly includes the maintains of admission details and internal details of each student in the department. Internal grade are evaluated from the grade obtained by the students for internal exams, seminars, assignment and attendance.

The biggest challenge of a school office authority is to manage each and every student detail and their marks effectively and efficiently, often cases occur of changes in marks, pass list, name changes, data losses etc. In the existing scenario each student's marks are separately entered by their teachers first in a sheet of paper and then later an office staff copies the mark into a register. It is extremely tedious to search data from this registers and usually mark registers are kept separate from student registers, moreover there are every chance of entering wrong marks of the student. To overcome all the cons and disadvantages of the existing system, the proposed software is developed to make the entry and the retrieval of student data much easier.

Class diagram

The components of a class diagram are class name, attributes and methods.

1. Class name- **Student**

Attributes- The variables used in this class are username and password of a particular student.

Methods- The functions included are register (), login (), select course paper(), check paper schedule(), Attempt paper(),Submit response() and view result().

2. Class name- **AIAS**

Attributes- The variables used in AIAS class are Username, password, course paper and paper schedule.

Methods- The functions included are send login credentials to database and validate (), get submitted responses()

3. Class name- **Database**

Attributes- The variables used in this class are username, password and marks.

Methods- The functions are save login credentials (), Validate login credentials (), Save marks obtained by examinee (), Store result ().

4. Class name- **Teacher**

Attributes- the variables are username and password.

Methods-The functions are register(), Login(), set question paper and make answer key(), upload question paper and answer key to AIAS() and view result().

Structural Diagrams

- **Class Diagram:**

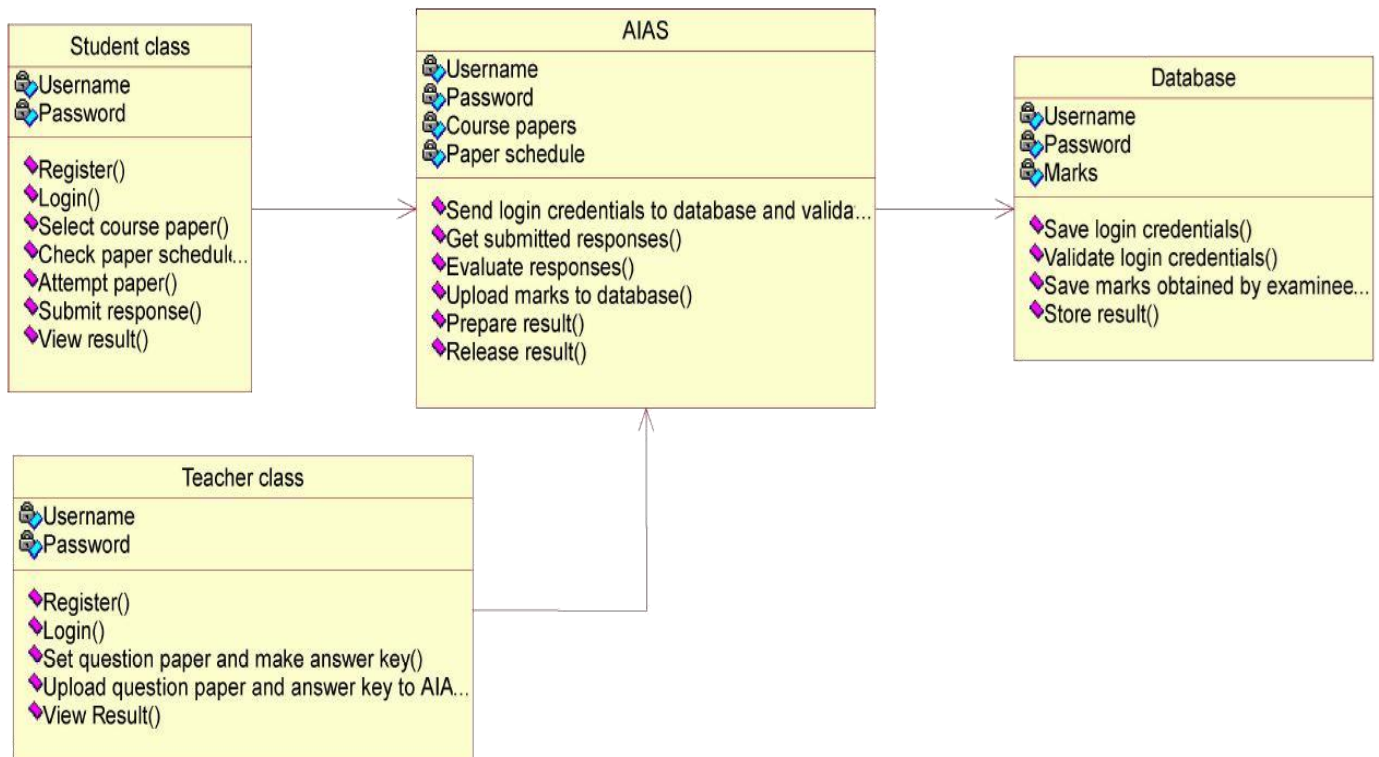


Fig: Class Diagram for Automatic Internal Assessment System

Object diagram

The components of an object diagram are

- 1) Objects- The model elements that represent the instances of a class or classes. Here in AIAS system the classes are **Teacher, Student, AIAS, and Database.**
- 2) Class Titles- The class titles are Teacher, Student, AIAS, Database and Result.
- 3) Class Attributes- register (), login (), select course paper(), check paper schedule(), Attempt paper(),Submit response() and view result() for **Student** class , validate(), get submitted responses() for **AIAS** class, login credentials (), Validate login credentials (), Save marks obtained by examinee(), Store result () for **Database** class and register(), Login(), set question paper and make answer key(), upload question paper and answer key to AIAS() and view result() for **Teacher** class.

Links- We use links to represent relationship between two or more objects. We use the term association for a relationship between two classifiers.

- **Object Diagram:**

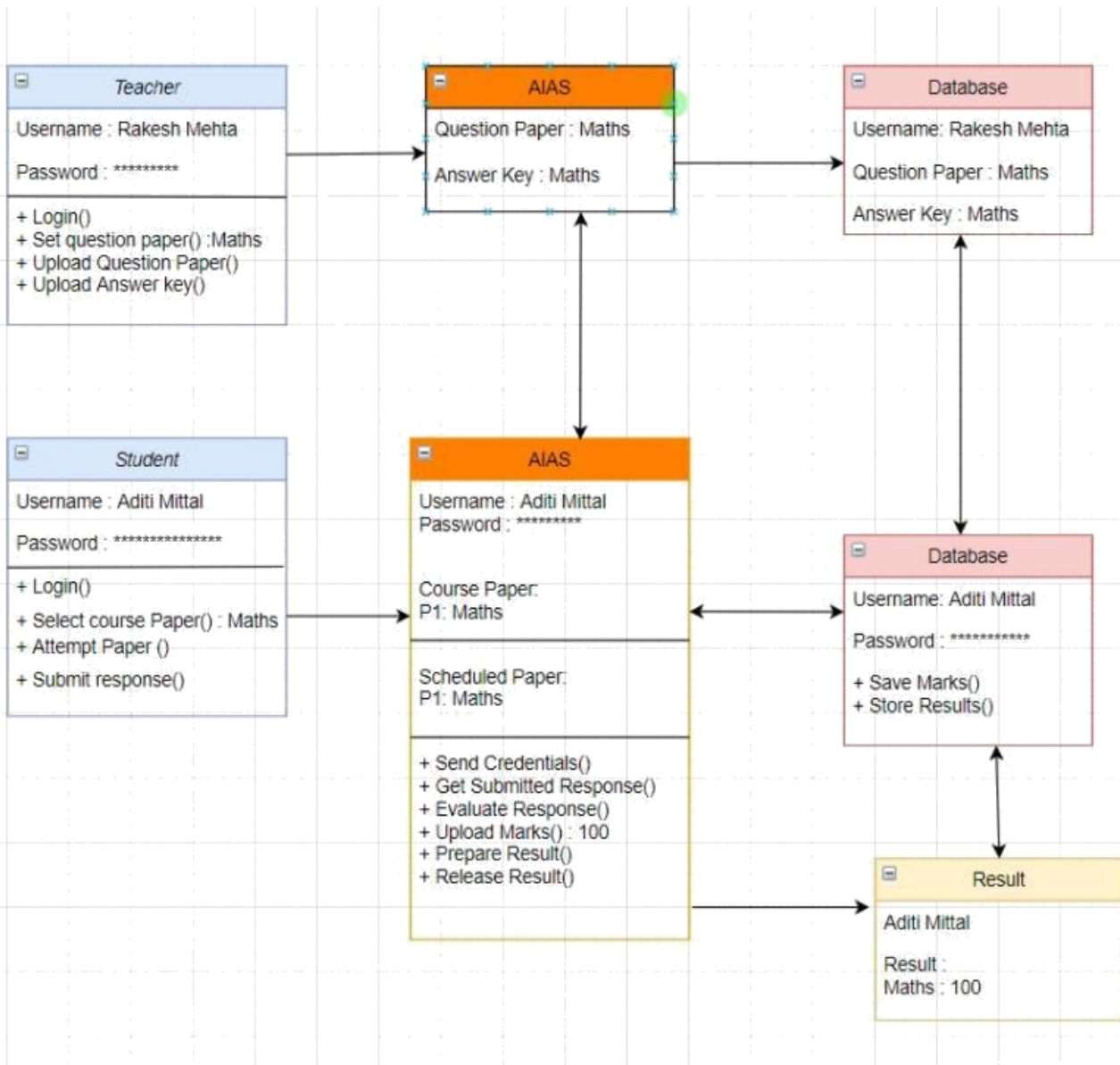


Fig: Object Diagram for Automatic Internal Assessment System

Component diagram

- 1) Components- The components used in the component diagram in AIAS are Student, Teacher, Database, Candidate login, Response database, Schedule course, Question paper, Submit Response and Response Uploaded.
- 2) Interfaces- These are of two types provided interface and required interface. Provided interface symbols with a complete circle at their end. Required interface are represented with only half a circle at their end. The name of the interface is placed near the interface itself.
- 3) Subsystems- It is a specialized version of a component classifier. The subsystem used in the following component diagram is Database.
- 4) Ports- Ports are represented using a square along the edge of a system or component. It helps expose required and provided interfaces of a component.
- 5) Notes- These are used to define notes related to a single object. The note included with **Database** component is Attempt, **Response database** component is Evaluate response and **Result uploaded** component is Result released.

- **Component Diagram:**

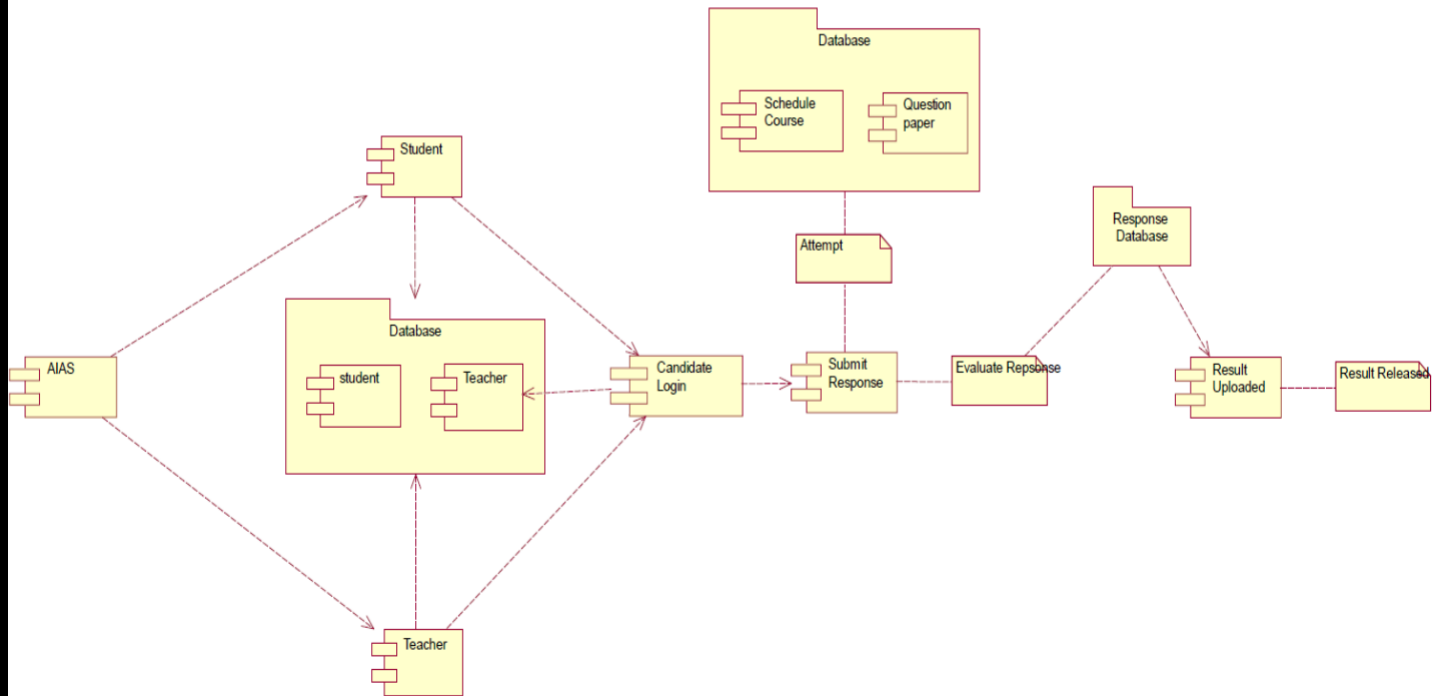


Fig: Component Diagram for Automatic Internal Assessment System

Deployment Diagram

- 1) **Nodes-** There are two types of nodes in a deployment diagram: device nodes and execution environment nodes. The nodes used in our AIAS system are **User, Student Attempted, Evaluation and Result.**
- 2) **Database-** Databases represent any data stored by the deployed system. In some instances, you'll see a database represented as just another node, but sometimes you will see this shape as a database. The databases used are database server, application server and web server.
- 3) **Artifacts-** A box with the header ">" and then the name of the file.
- 4) **Package-** A file-shaped box that groups together all the device nodes to encapsulate the entire deployment. The packages used in the AIAS system are **Student/Teacher , Candidate login, MySQL DB, AIAS, Examiner Verify, Total marks Obtained, Course paper and Schedule.**

Component- An entity required to execute a stereotype function.

- **Deployment Diagram:**

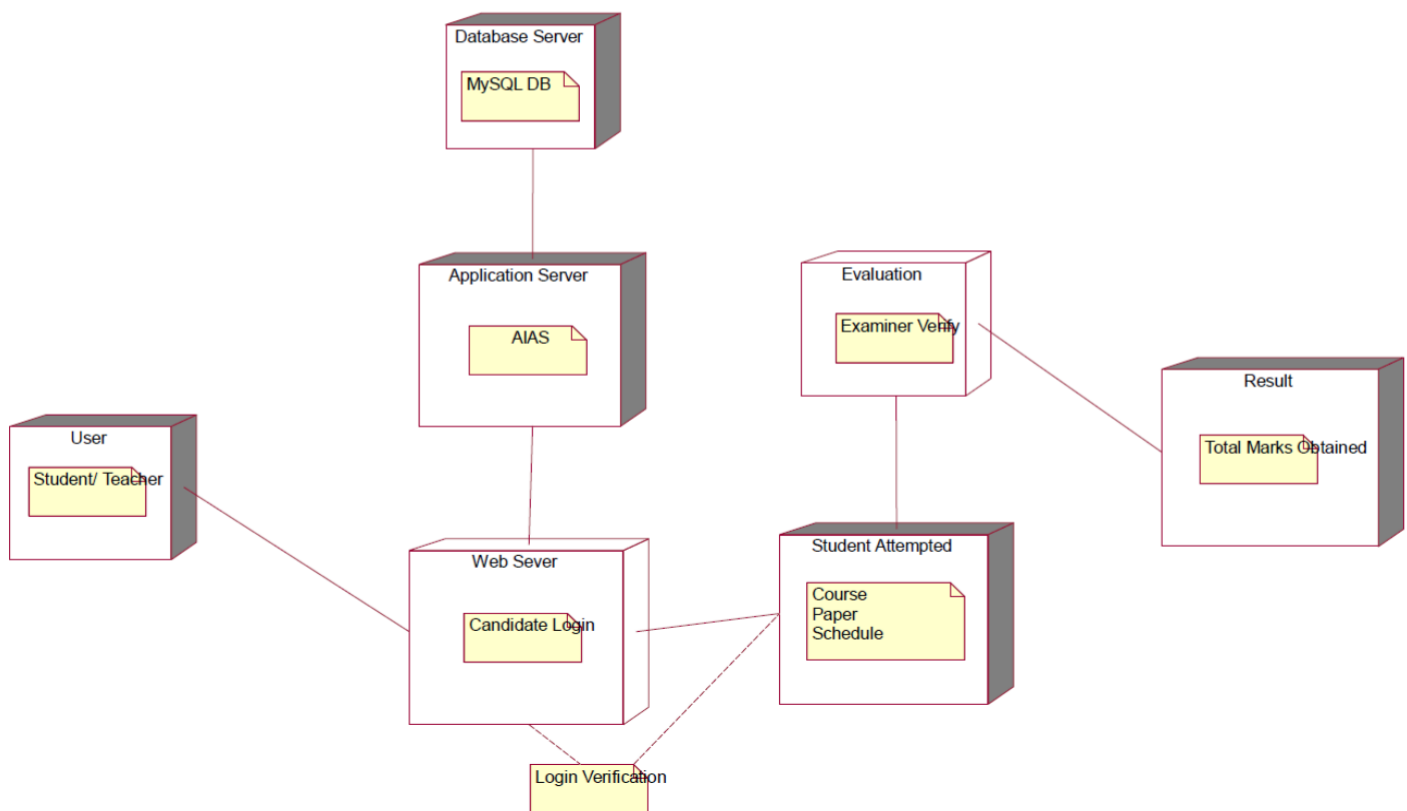


Fig: Deployment Diagram for Automatic Internal Assessment System

Use Case Diagram

- 1) Actors- The users that interact with a system. An actor can be a person, an organization, or an outside system that interacts with your application or system. They must be external objects that produce or consume data. The actors used in the AIAS system are **Student, New student, Existing Student, Teacher, New teacher, and Existing teacher.**
- 2) Use cases- Used to represent the functionalities of the system. A **use case** is a description of how a person who actually uses that process or system will accomplish goal. It's typically associated with software systems, but can be used in reference to any process. The use cases used in the AIAS system are register, login, view result. following login, the use cases are select course paper, check paper schedule, if scheduled, first attempt, submit response. Following evaluation, store marks in a database then prepare the result. If the score is full in the first attempt itself, student cannot reappear else student can reappear in the test. For the teachers, they can register or login, design paper question paper and answer key upload the same.
- 3) System- A specific sequence of actions and interactions between actors and the use cases within the system.

Behavioural Diagrams

- Use-Case Diagram:

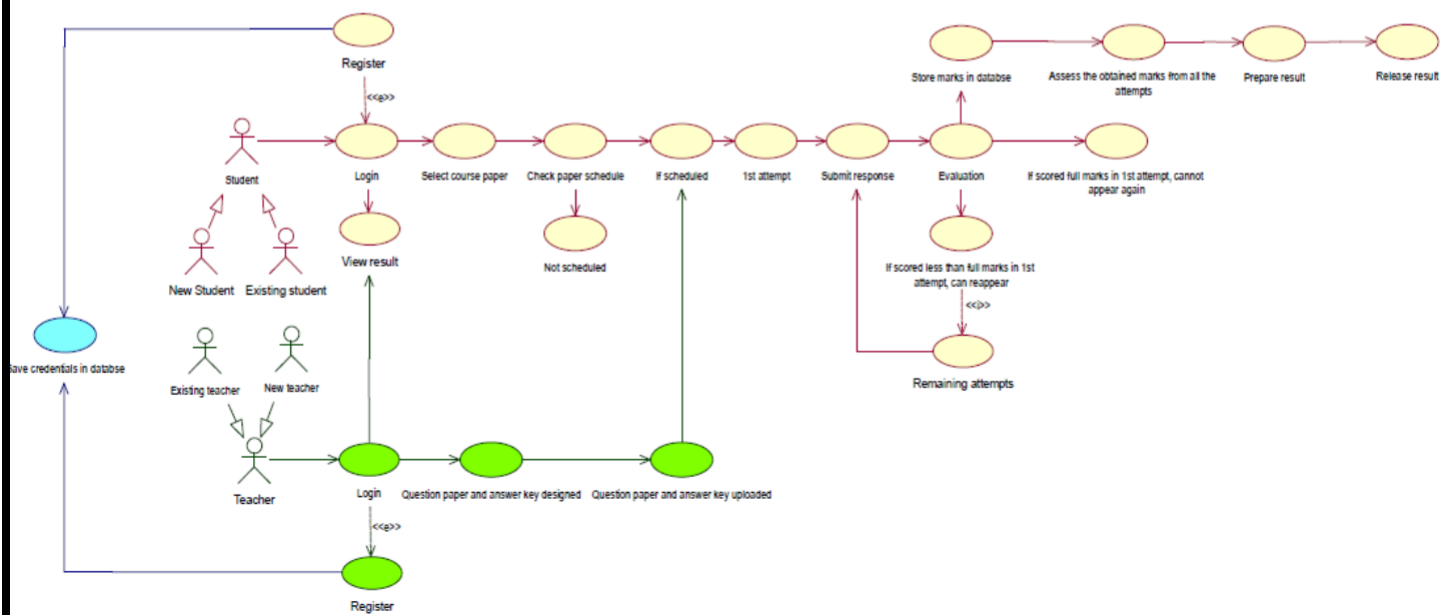


Fig: System Use-Case Diagram for Automatic Internal Assessment System

Sequence diagram

Components of a sequence diagram are as follows:

- 1) **Actors-** They are external to the system and always outside the scope of the system. Represented by stick figures. The actors in the sequence diagram of AIAS are Teacher and Student.
- 2) **Objects-** The model elements that represent the instances of a class or classes. Represented by rectangular boxes. The objects in AIAS sequence diagram are **AIAS** and **Database**.
- 3) **Lifelines-** Lifelines are vertical dashed lines that indicate the object's presence over time.
- 4) **Messages-** Messages are arrows that represent communication between objects. They are of two types- call message and return message (when an object sends a message back).
The call messages in the AIAS are login, followed by send details to the database. the database sends a return message validating the credentials. The next message is send verification report by the database to the AIAS. The AIAS in turn, sends another verification report to the teacher. The teacher designs question paper and answer key and upload documents to the AIAS. The student selects course paper, check papers schedule, attempt exam and submit the response. The response is evaluated by the AIAS and the marks are stored in the database. The marks are accessed by the database result is prepared and released. The teacher and the student can view the result.

- Sequence Diagram:

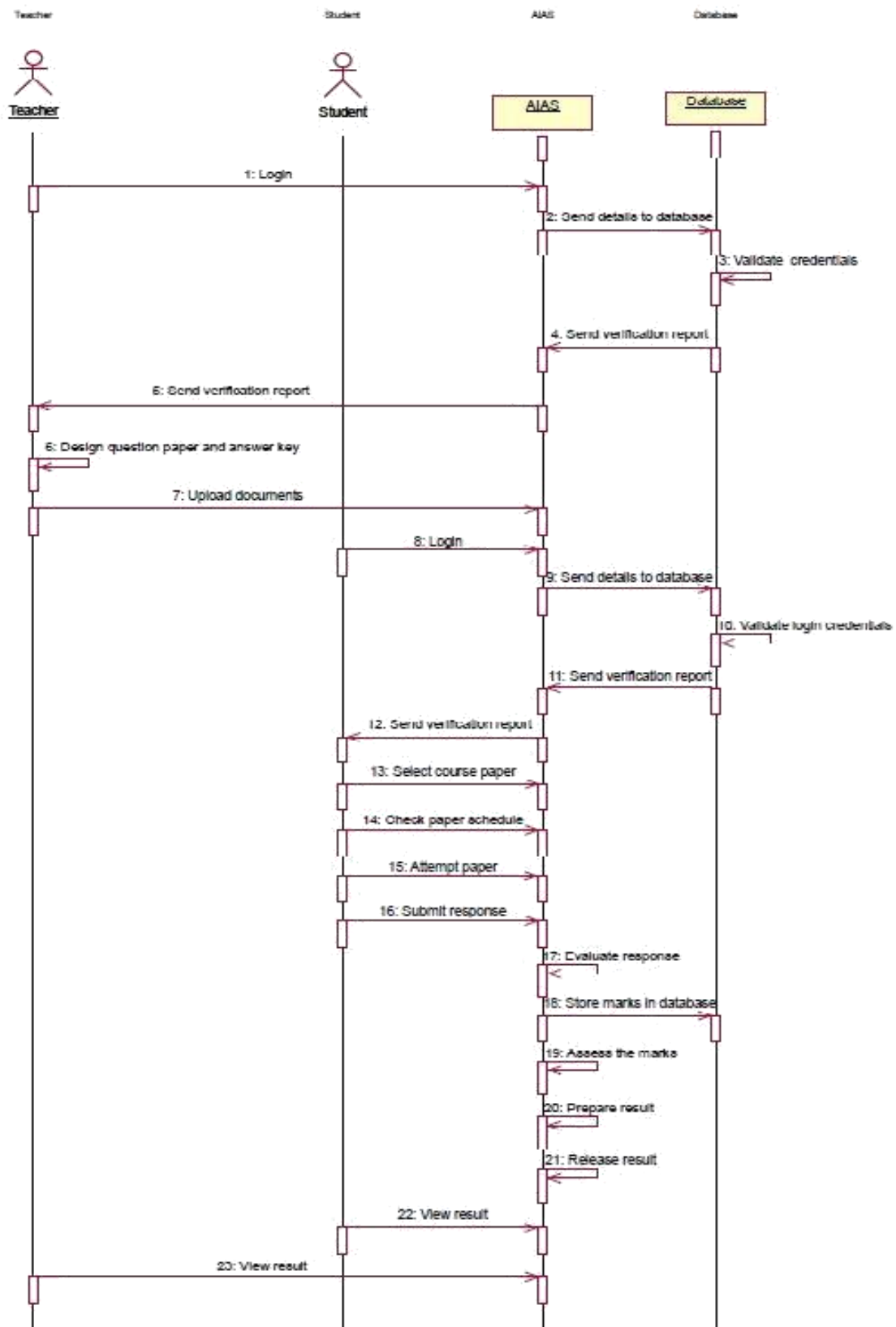


Fig: Sequence Diagram for Automatic Internal Assessment System

Collaboration diagram

- 1) Actors- The actors in the collaboration diagram for AIAS are **Teacher** and **Student**.
- 2) Objects- Objects participating in a collaboration come in two types- supplier and client. Supplier objects are the objects that supply the method that is being called, and therefore receive the message. Client objects call methods on supplier objects, and therefore send messages. The objects are **AIAS** and **Database**.
- 3) Links/ Association- The connecting lines drawn between objects in a collaboration diagram are links. The visual representation of a link is a straight line between two objects. If an object sends messages to itself, the link carrying these messages is represented as a loop icon.
- 4) Messages- Messages in collaboration diagrams are shown as arrows pointing from the Client object to the Supplier object. Typically, messages represent a client invoking an operation on a supplier object. The messages are login, send details to database, validate the credentials, sending the verification reports, upload documents the teacher to the AIAS, select course paper, check paper schedule, attempt paper, submit the response. Following this, send details to database, prepare result by AIAS and store marks in the database. Finally, view result by student.

- **Collaboration Diagram:**

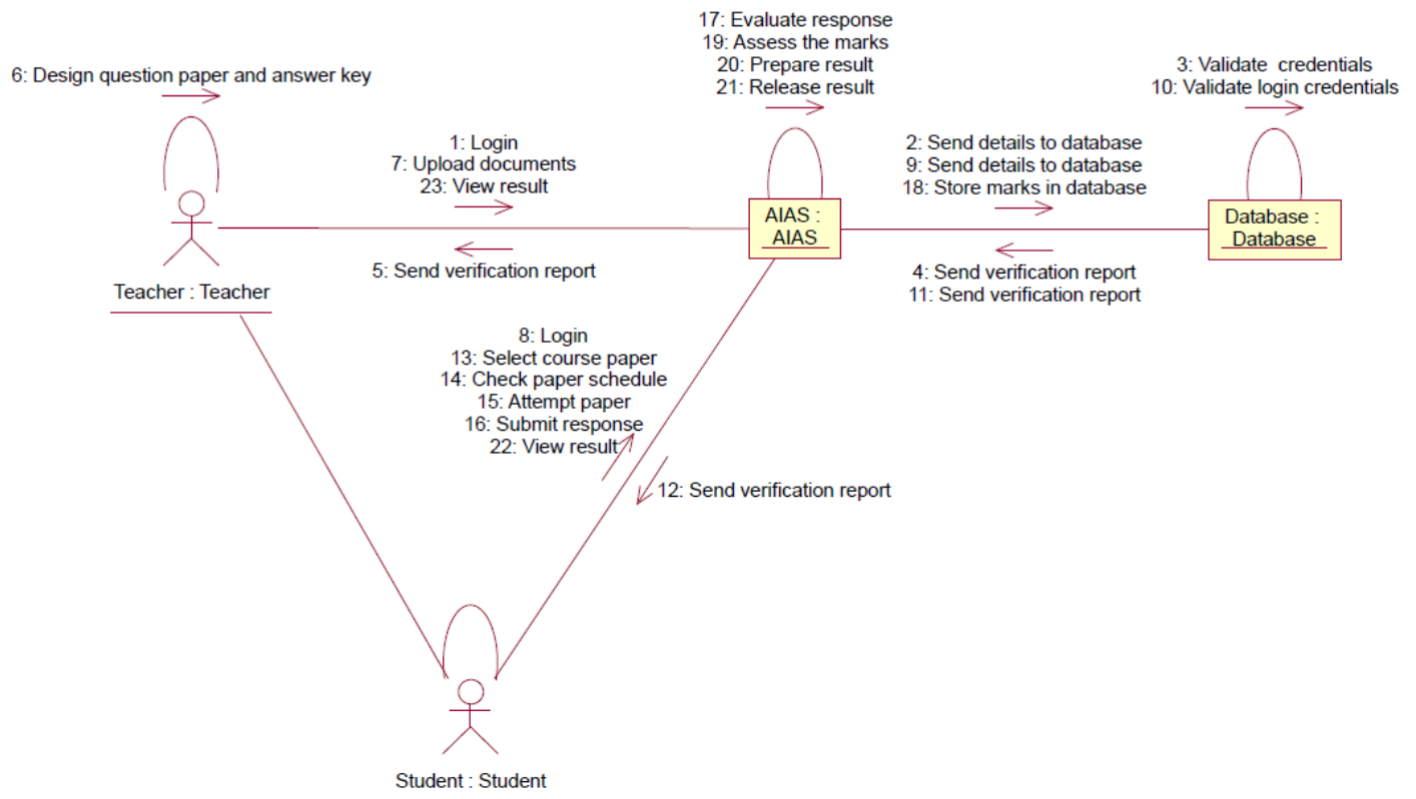


Fig: Collaboration Diagram for Automatic Internal Assessment System

State Chart Diagram

- 1) State- State chart diagram starts with the initial or pseudo state and ends with the final state. Each state is represented with a rectangular box. The states in the state chart diagram of AIAS are login, validate, course paper selection, check paper schedule, evaluate, scored marks, store marks in a database. After validation, there is designing and uploading the question paper and answer key. After logging in, student can view the result.
- 2) Event or trigger- each transition is labelled with event name which is causing a transition to happen followed by a '/'. It may also contain the guard condition in square brackets. If the guard condition is true then only transition will take place. The events are open application/ web page, submission, of the login or an entry form, then it is checked if the user is student or if the user is a teacher.
- 3) Transition- Represented using straight arrow pointing it from source state to destination state.

- State-Chart Diagram:

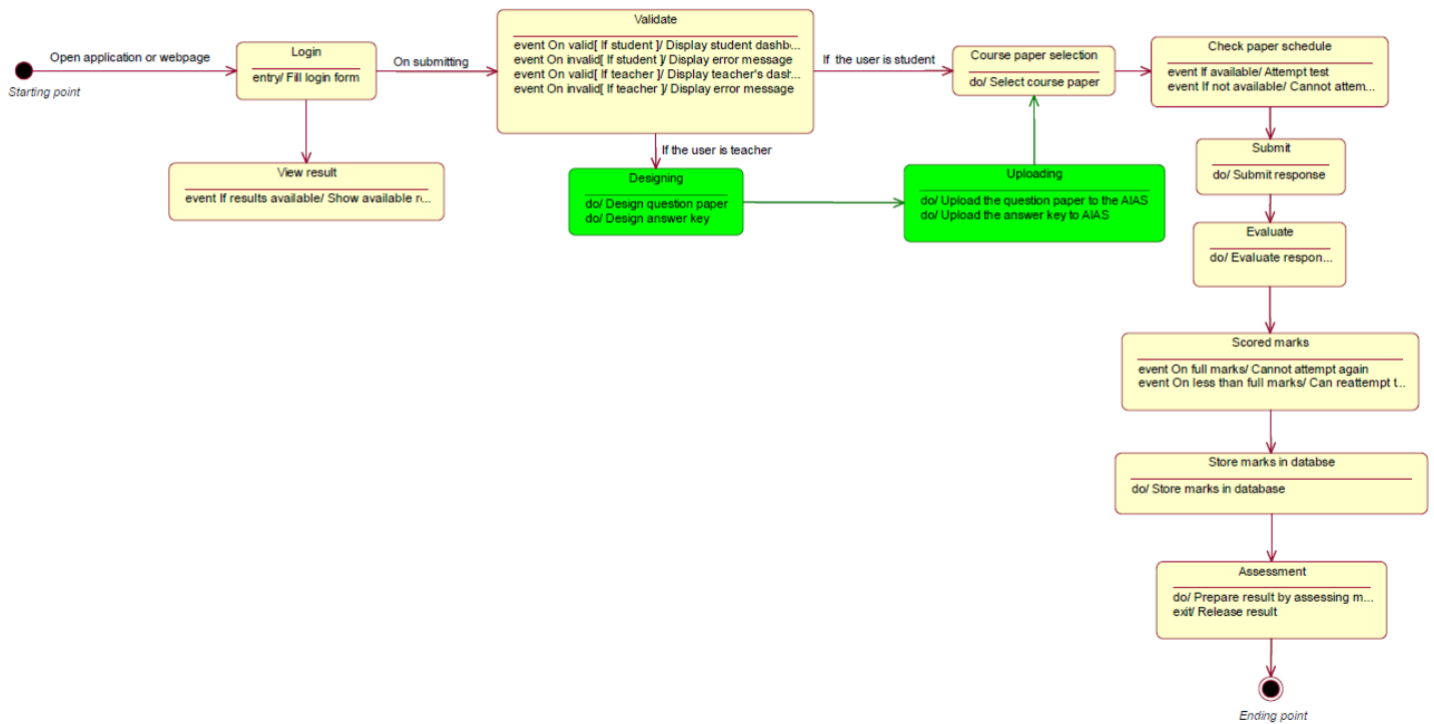


Fig: State-Chart Diagram for Automatic Internal Assessment System

Activity Diagram

1. Activities- The categorization of behaviour into one or more actions is termed as an activity. In other words, it can be said that an activity is a network of nodes that are connected by edges. The edges depict the flow of execution. It may contain action nodes, control nodes, or object nodes. The activities are initiated at the initial node and are terminated at the final node.
2. Decision node- A conditional branch in the flow that is represented by a diamond. It includes a single input and two or more outputs.
3. Activity Swimlane- The swimlane is used to cluster all the related activities in one column or one row. It can be either vertical or horizontal. It used to add modularity to the activity diagram. It is not necessary to incorporate swimlane in the activity diagram. But it is used to add more transparency to the activity diagram
4. Forks- A fork node consists of one inward edge and several outward edges. It is the same as that of various decision parameters. Whenever a data is received at an inward edge, it gets copied and split crossways various outward edges. It split a single inward flow into multiple parallel flows
5. Join nodes are the opposite of fork nodes. A Logical AND operation is performed on all of the inward edges as it synchronizes the flow of input across one single output (outward) edge.
6. Pins-It is a small rectangle, which is attached to the action rectangle. It clears out all the messy and complicated thing to manage the execution flow of activities.

- Activity Diagram:

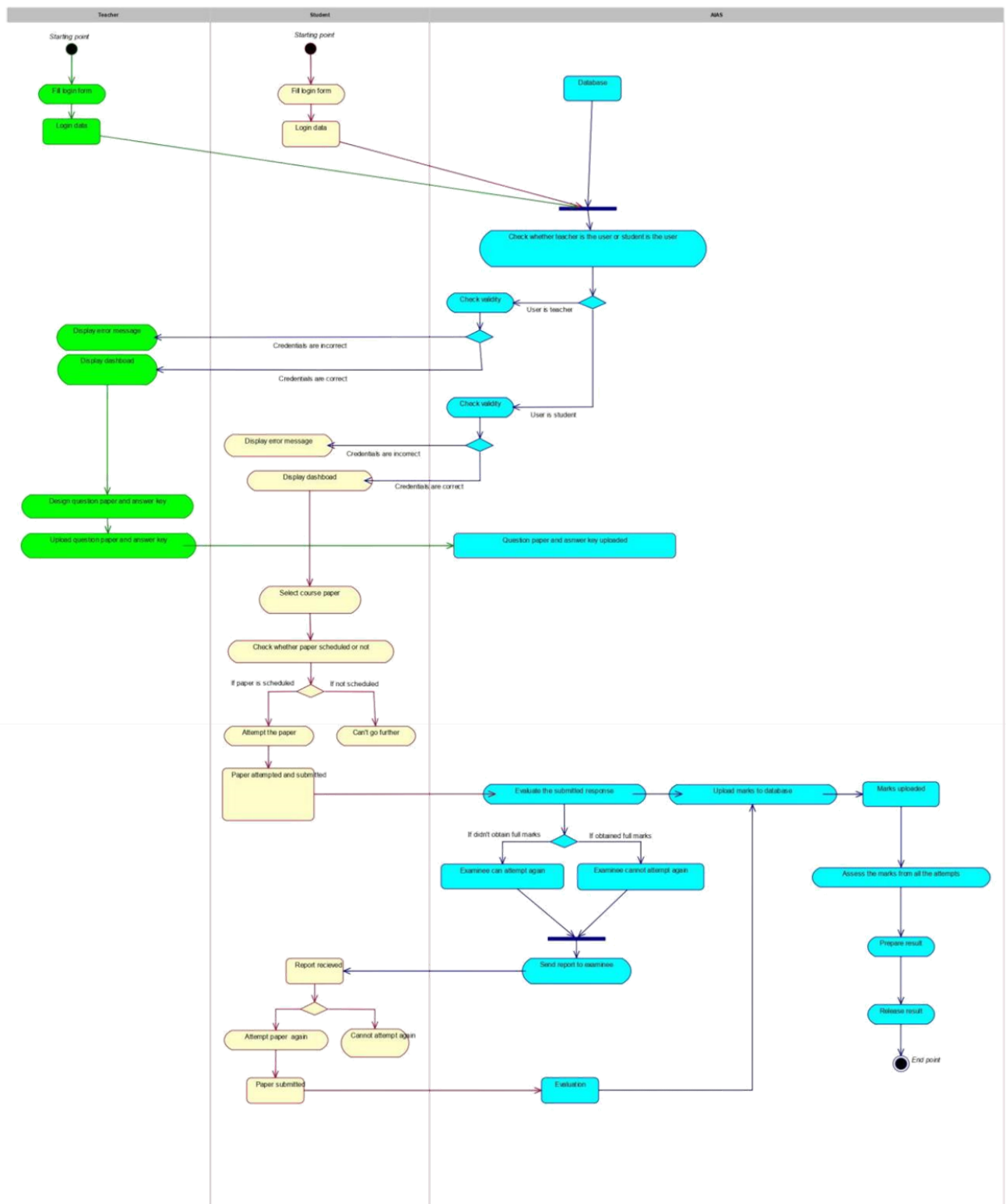


Fig: Activity Diagram for Automatic Internal Assessment System

DATA FLOW DIAGRAM

- Processing students records and generate report of all Students.
- Processing Examinations records and generate report of all Examinations.
- Processing Marks records and generate reports of all marks.
- Processing Courses records and generate reports of all Courses.
- Processing Paper records and generate reports of all Papers.
- Processing Faculties records and generate reports of all Faculties.
- Processing Login records and generate reports of all Login.
- Admin logs to the system and manage all the functionalities of the evaluation system.
- Admin can add, edit, delete and view the records of students, Marks, Papers, Login.
- Admin can manage all the details of Examinations, Courses, Faculties.
- Admin can also generate reports of students, Examinations, Marks Courses, papers, Faculties.
- Admin can search the details of Examination, paper, Faculties.
- Admin can apply different levels of filters on reports of students, Courses, Papers.
- Admin can track the detailed information of Examinations, Marks, Courses, Papers

Data Flow Diagram

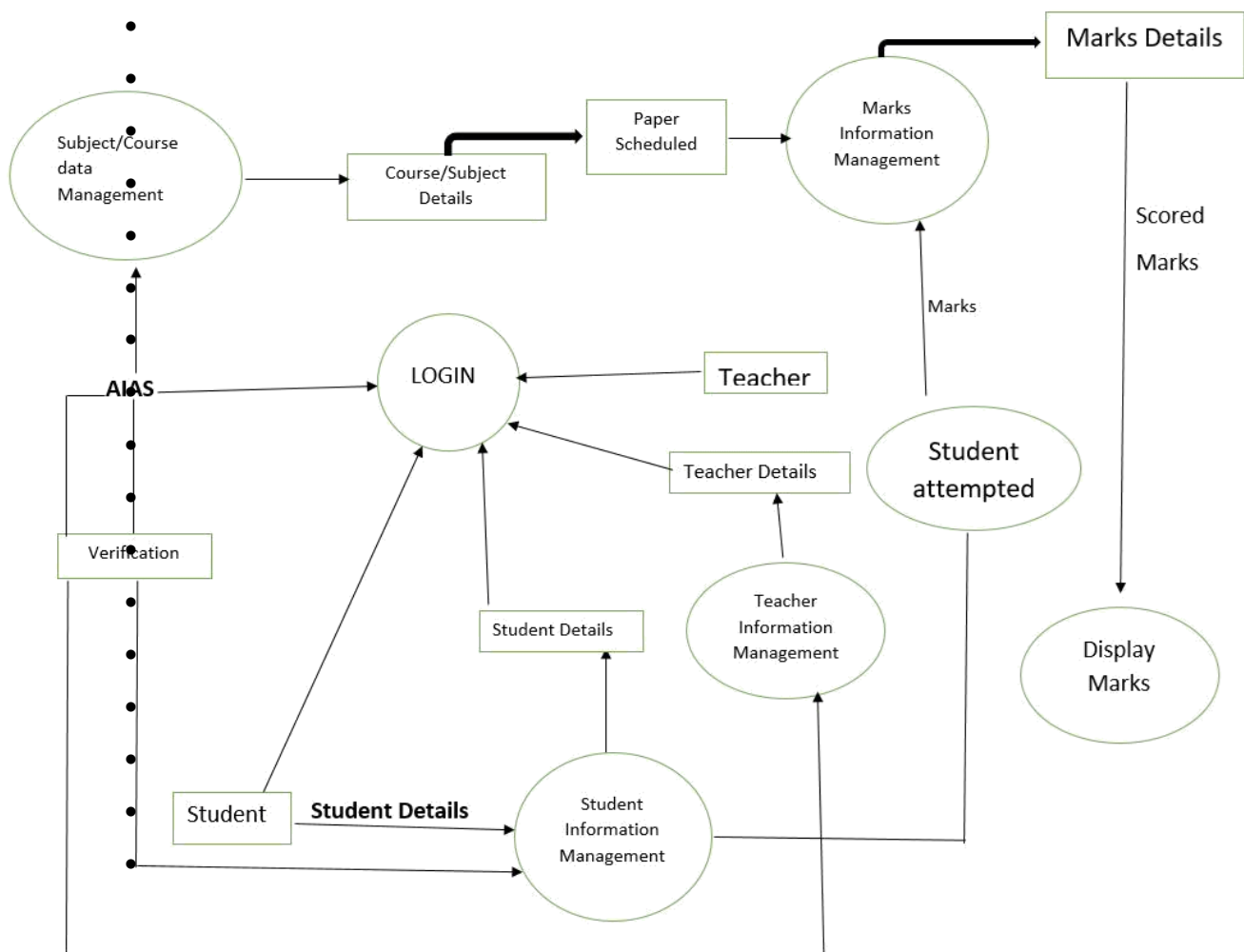


Fig: Data Flow Diagram for Automatic Internal Assessment System

FLOW CHART

- The starting point shows the registration of the users.
- After registration, the user will move to the login part.
- If the login ID and password is invalid then it will again return to login part for the correct password and ID.
- If login is successful, then we have two options (STUDENT and TEACHER).
- Both sections have different steps to follow.
- In student section, the steps are Paper choice, answer key, Attempt, Submit Response.
- In teacher section, the steps are choose course, Schedule, evaluation, marks upload.
- But, there is an intermediate step in between student and teacher that is after the submission process from student section, it goes for evaluation in teacher section.
- Marks upload after the evaluation.
- Result released in the end step.

Flow Chart

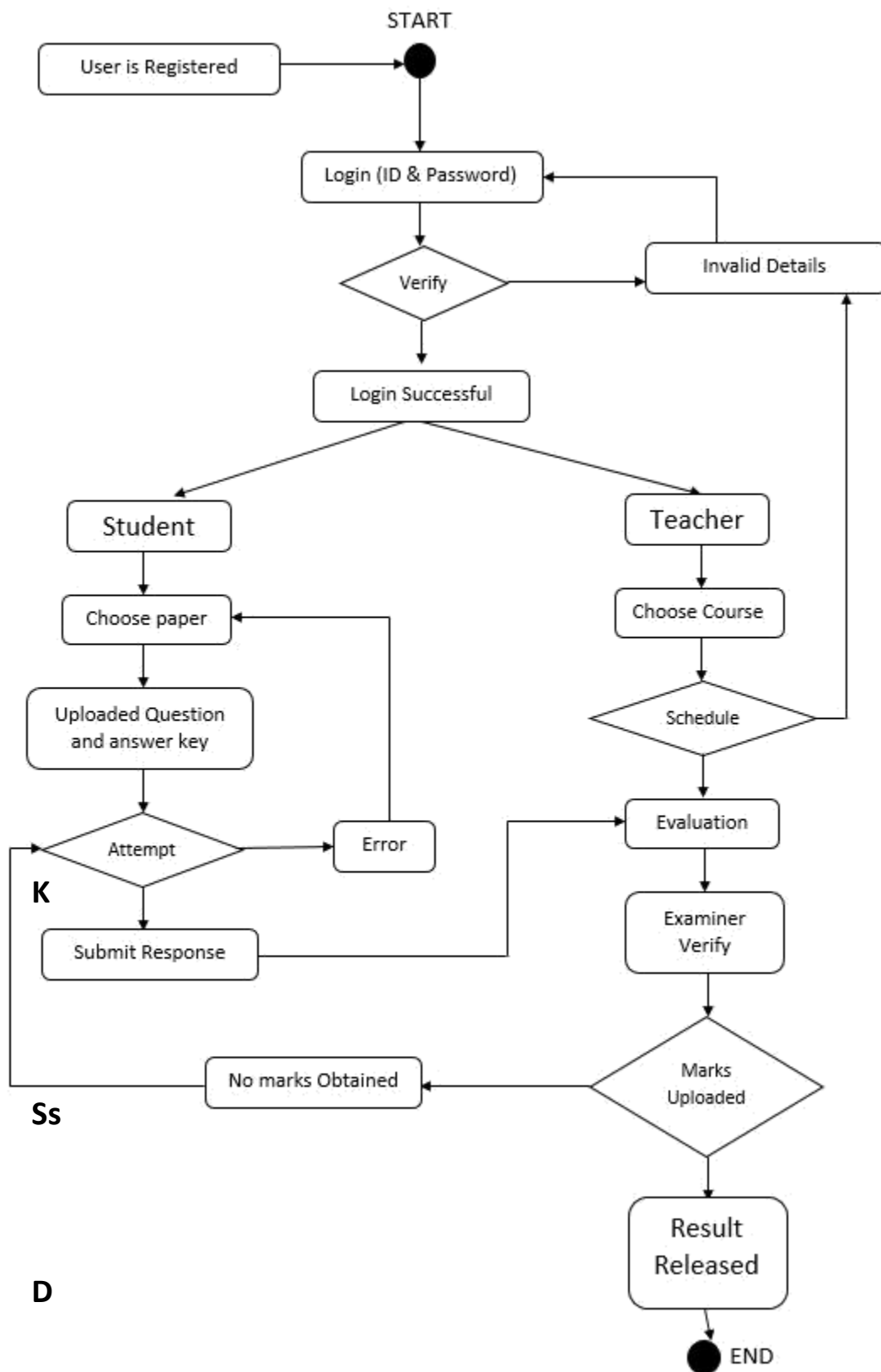


Fig: Flow Chart for Automatic Internal Assessment System

Entity Relationship(ER) Diagram

- The ER Model of the AIAS gives the conceptual view of the AIAS database.
- It works around the real world entities and the associations among them.
- At view label, the ER model is considered a good option for designing databases.
- The ER Model is represented by means of an ER Diagram.
- Objects, like entities, attributes of an entity, relationship sets, and attributes of relationship sets, can be represented with the help of an ER Diagram.

ER (Entity Relationship) Diagram

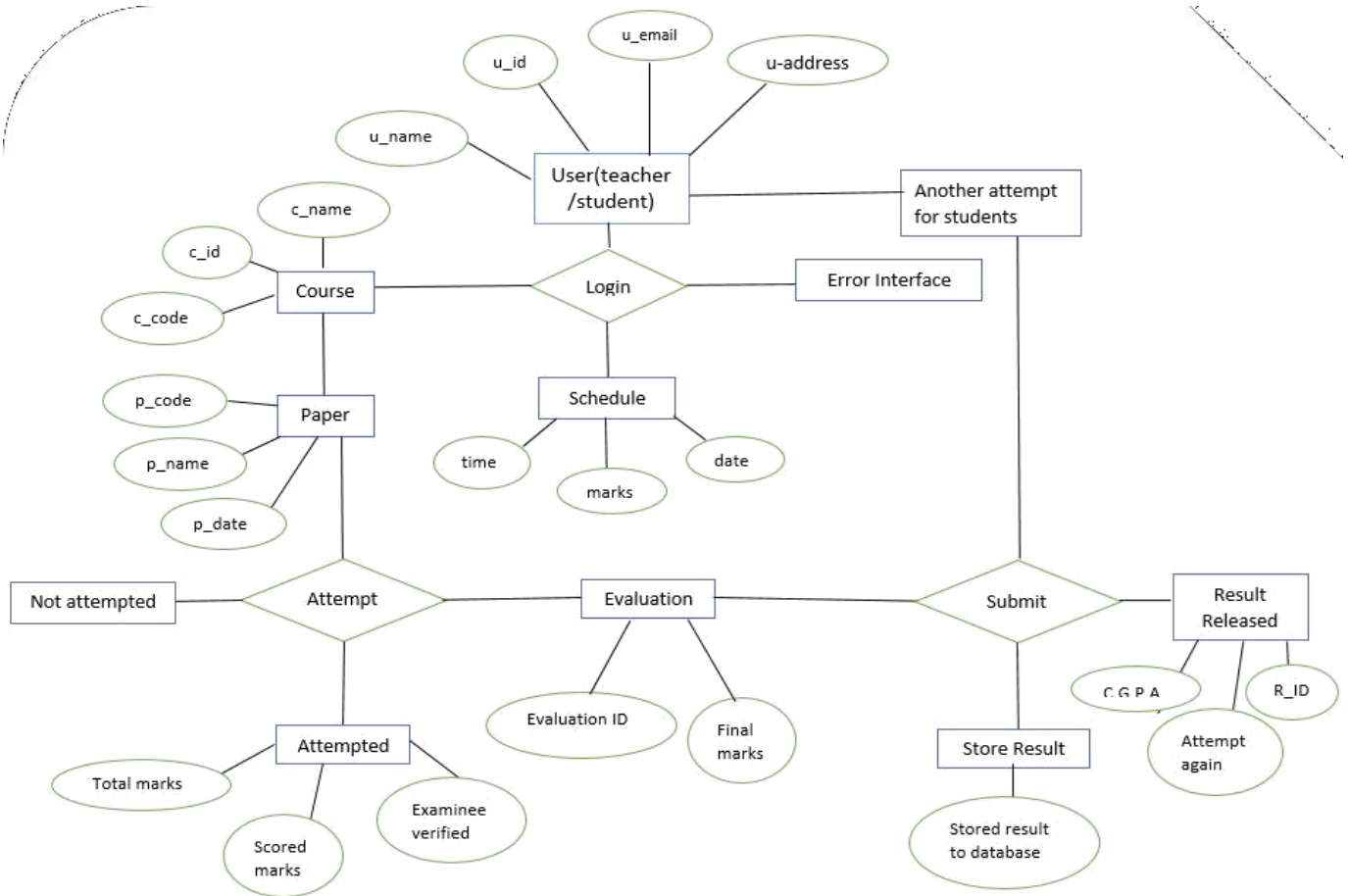


Fig. Entity Relationship Diagram of Automatic Internal Assessment System

GANTT Chart

- A Gantt chart is a chart that shows all of the different sub – tasks of a project and how they relate to each other over time.
- A Gantt chart shows all of the tasks that need to be done, the amount of time each task is expected to take, the time frames in which individual tasks are to be completed, and the relationship between various tasks.
- Thus, Gantt Chart helps us to, get everything done on schedule, and you never waste time waiting for a task to be completed that should have been done already.
- Components of Gantt Chart are dates, task, bars, milestones, arrows, taskbars, vertical line maker, task ID and resources.
- A Gantt chart helps project managers keep track of all of the sub – tasks in a project, so nothing is forgotten or delayed.
- Tasks are listed down the left side.
- Milestones are those tasks that are instrumental to a project's completion and success.
- Unlike the minor details, which also have to be done, completing a milestone offers a sense of satisfaction and forward motion.
- While some of your tasks can be done at any time, others must be completed before or after another sub – task can begin or end.
- Progress is shown by shading the taskbars to represent the portion of each task that has already been completed.

GANTT Chart

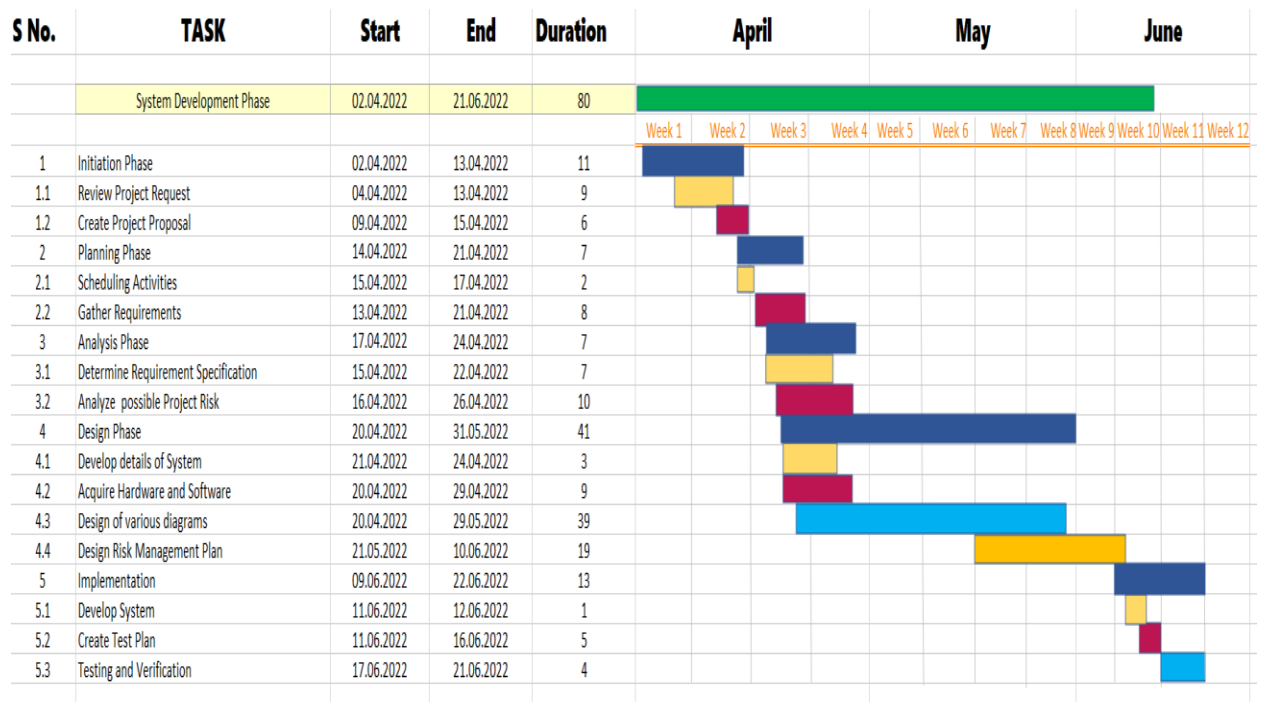


Fig. Gantt Chart of Automatic Internal Assessment System

PERT Chart

- Stands for Program Evaluation and Review Technique.
- A PERT chart is a project management tool that provides a graphical representation of a project's timeline.
- The Program Evaluation Review Technique (PERT) breaks down the individual tasks of a project for analysis.
- PERT charts are considered preferable to Gantt charts because they identify task dependencies.
- PERT Chart is difficult to interpret.
- Event or Milestone are the specific accomplishments in a project and represented using numbered circle or rectangle.
- Activities are the time consuming aspects of the project. Represented using arrows.
- Critical Path is the sequence of events in a project that requires most / maximum time to complete.

PERT Chart

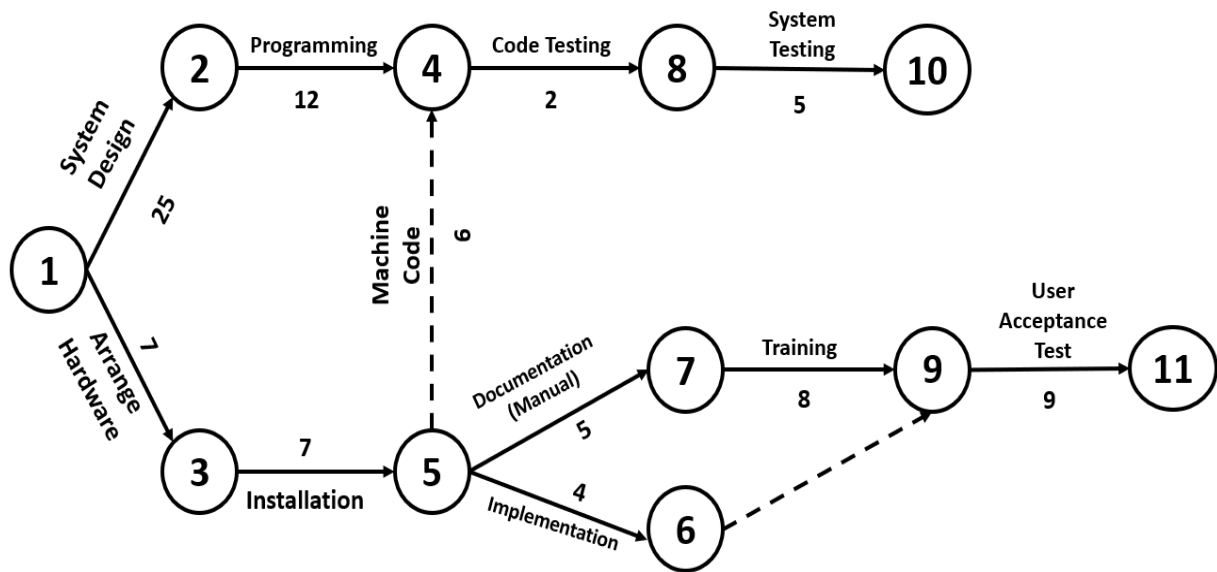


Fig. PERT Chart of the Automatic Internal Assessment System

DBMS

- The database is a collection of inter-related data which is used to retrieve, insert and delete the data efficiently. It is also used to organize the data in the form of a table, schema, views, and reports, etc.
- Database management system is a software which is used to manage the database. For example: MySQL, Oracle, etc are a very popular commercial database which is used in different applications.
- DBMS provides an interface to perform various operations like database creation, storing data in it, updating data, creating a table in the database and a lot more.
- It provides protection and security to the database. In the case of multiple users, it also maintains data consistency.
- **DBMS allows users the following tasks:**
 - Data Definition
 - Data Updation
 - Data Retrieval
 - User Administration

RDBMS

- RDBMS stands for Relational Database Management System.
- All modern database management systems like SQL, MS SQL Server, IBM DB2, ORACLE, My-SQL, and Microsoft Access are based on RDBMS.
- It is called Relational Database Management System (RDBMS) because it is based on the relational model introduced by E.F. Codd.
- Data is represented in terms of tuples (rows) in RDBMS.
- A relational database is the most commonly used database. It contains several tables, and each table has its primary key.

- Due to a collection of an organized set of tables, data can be accessed easily in RDBMS.

DATA DICTIONARIES

Schema: User(U_ID, U_Name, U_Email, U_Address)

The table “User” is designed and created to keep the information of teachers and students.

Table: User				
Attribute Name	Datatype (Size)	NULL??	Constraint	Description
U_ID	varchar2(10)	NOT	P.K	User Id of teachers and students
U_Name	varchar2(30)	NOT		Name of the users (teachers and students)
U_Email	varcahar2(20)	NOT		Email Id's of the users (teachers and students)
U_Address	varchar2(40)	NOT		Address of the users(students and teachers)

Schema: Paper(P_Code, P_Name, P_Date)

The table “Paper” is designed and created to store the details about the different subjects

Table: Paper				
Attribute Name	Datatype (Size)	Null??	Constraint	Description
P_Code	varchar2(10)	NOT	P.K	Paper code of the different subjects
P_Name	varchar2(25)	NOT		Paper name of the different subjects
P_Date	date	NOT		Paper date of the subject scheduled for examinations

Schema: Course(C_ID, C_Code, C_name)

The table “Course” is designed and created to store the course details.

Table: Course				
Attribute Name	Datatype (Size)	Null??	Constraint	Description
C_ID	varchar2(10)	NOT	P.K	Course Id of the different courses
C_Code	varchar2(10)	NOT		Course Code of the different courses
C_Name	varchar2(30)	NOT		Course name of the different courses

Schema: Evaluation(Evaluation_Id, Final_Marks)

The table “Evaluation” is designed and created to store the details of the evaluation being done.

Table: Evaluation				
Attribute Name	Datatype (Size)	Null??	Constraint	Description
Evaluation_ID	varchar2(10)	NOT	P.K	Evaluation ID of the paper
Final_Marks	number	NOT		Marks scored in the paper

Schema: Result(ResultID, CGPA, AttemptAgain)

The table “Result” is designed and created to store the details of result of the students.

Table: Result				
Attribute Name	Datatype (Size)	Null??	Constraint	Description
ResultID	varchar2(10)	NOT	P.K	Result ID of the students
CGPA	float			CGPA of the result
AttemptAgain	varchar2(3)			Details whether student need to attempt again

Database

DATABASE: AIAS(Automatic Internal Assessment System)

The database “AIAS” is designed and created to store the each every details of the AIAS System.

Database: AIAS	
Table Name	Description
User	It stores the details of the user i.e. students and teachers.
Course	It stores the details about the different courses available.
Paper	It stores the details of the different subjects available under the different courses.
Evaluation	It stores the details about the paper being evaluated and marks being awarded.
Result	It stores the details about the performance i.e. result of the students.

Conclusion

The project has been developed for the successful management of the Internal Assessment, this various information of each student mainly internal grade details has been maintained efficiently. The system has been thoroughly tested with sample of data and the performance of the system proved to be efficient and extremely user-friendly.

The system is flexible and changes if any can be made without much difficulty. Every step has been taken to make the working of the project comfortable as possible for the users. Also reports have been created and can be called according to the requirements. The Major Advantages Are:

- Easy retrieval of data available in database
- Quick implementation of results
- Very user friendly
- Does not require large amount of memory
- Very less manual work is needed
- Very cost effective

Future Scope

The system titled “AUTOMATIC INTERNAL ASSESSMENT SYSTEM” has been developed to computerize all the functional activities of Internal Assessment at any level. It makes comprehensive coverage of the most of the activities undertaken in this section. Proper consideration has been given for enhancements in future throughout the development of the software. But the system can be extended, as the software is constantly evolving and always has a scope for future enhancement.

The current system was mainly designed to support the management of the organization. In the future the system can be enhanced to include details of students who are failed. Present system has not included such a provision.

All the functions have been done carefully and successfully in the software, and if any development is necessary in future. it can be done without affecting the design by adding additional modules to the system.

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Books:

- [The Unified Modelling Language Reference Manual](#) - Rumbaugh, Jacobson, and Booch
- [The Unified Modelling Language User Guide](#) - Booch, Rumbaugh, and Jacobson
- [UML Distilled](#) - Martin Fowler