EXAMINATION AND RESULT COMPUTATION SYSTEM

A PROJECT REPORT
SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

BACHELOR OF SCIENCE (HONOURS)
COMPUTER APPLICATION

AND

INFORMATION TECHNOLOGY

BY

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DEPARTMENT OF COMPUTER SCENCE
ST. XAVIER'S COLLEGE, RANCHI

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ABSTRACT

The primary goal of the Examination and Result Computation System (ECRS) is to replace the current manual system with a computerised one, utilising high-end hardware and comprehensive software to meet the needs of all educational institutions. It will aid them in the automation of exams and all related activities.

This will allow educational institutions to keep their valuable data and information for longer periods of time while still having easy access to it, as well as reduce processing time while also ensuring accuracy in the results generated.

There will be an increase in productivity as well as well as a decrease in manual work due to this project.

The necessary hardware and software are readily available and simple to use.

ACKNOWLEDGEMENT

I, **Amit Tigga**, thank God for providing us with the fortitude and perseverance to complete the project. This project is an acknowledgement of all those individuals who have provided us with their wholehearted cooperation to make this project a resounding success.

I would like to thank **Fr. Dr. Nabor Lakra**, the principal of our college, for providing such excellent faculty and a tranquil environment for us to complete our coursework.

A special thanks to our department head, **Dr. Swarat Chaudhuri**, for his support, insightful project suggestions, and constant encouragement.

Mr. Surya Narayan Prasad, Professor in the Department of Computer Science, has provided invaluable guidance at every stage of this project's development. We are extremely grateful for the unmatched services he has provided.

Last but not least, I would like to express my sincere appreciation to my parents, family members, friends, and team members from both CA and IT who helped me a lot in finalizing this project within a limited time frame.

ACKNOWLEDGEMENT

I, **Aryanshu Kumar**, thank God for providing us with the fortitude and perseverance to complete the project. This project is an acknowledgement of all those individuals who have provided us with their wholehearted cooperation to make this project a resounding success.

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ACKNOWLEDGEMENT

I, **Gitanjali Kumari Verma**, thank God for providing us with the fortitude and perseverance to complete the project. This project is an acknowledgement of all those individuals who have provided us with their wholehearted cooperation to make this project a resounding success.

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ACKNOWLEDGEMENT

I, **Saurabh Kumar**, thank God for providing us with the fortitude and perseverance to complete the project. This project is an acknowledgement of all those individuals who have provided us with their wholehearted cooperation to make this project a resounding success.

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ACKNOWLEDGEMENT

I, **Gaurav Kumar Mandal**, thank God for providing us with the fortitude and perseverance to complete the project. This project is an acknowledgement of all those individuals who have provided us with their wholehearted cooperation to make this project a resounding success.

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ACKNOWLEDGEMENT

I, **Saurav Kumar**, thank God for providing us with the fortitude and perseverance to complete the project. This project is an acknowledgement of all those individuals who have provided us with their wholehearted cooperation to make this project a resounding success.

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ACKNOWLEDGEMENT

I, **Ritesh Kumar Yadav**, thank God for providing us with the fortitude and perseverance to complete the project. This project is an acknowledgement of all those individuals who have provided us with their wholehearted cooperation to make this project a resounding success.

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ACKNOWLEDGEMENT

I, **Udit Prasad**, thank God for providing us with the fortitude and perseverance to complete the project. This project is an acknowledgement of all those individuals who have provided us with their wholehearted cooperation to make this project a resounding success.

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ACKNOWLEDGEMENT

I, **Soni Kumari**, thank God for providing us with the fortitude and perseverance to complete the project. This project is an acknowledgement of all those individuals who have provided us with their wholehearted cooperation to make this project a resounding success.

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ACKNOWLEDGEMENT

I, **Kundan Gupta**, thank God for providing us with the fortitude and perseverance to complete the project. This project is an acknowledgement of all those individuals who have provided us with their wholehearted cooperation to make this project a resounding success.

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ACKNOWLEDGEMENT

I, **Shivanshu Ranjan Thakur**, thank God for providing us with the fortitude and perseverance to complete the project. This project is an acknowledgement of all those individuals who have provided us with their wholehearted cooperation to make this project a resounding success.

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ACKNOWLEDGEMENT

I, **Sonam Kachhap**, thank God for providing us with the fortitude and perseverance to complete the project. This project is an acknowledgement of all those individuals who have provided us with their wholehearted cooperation to make this project a resounding success.

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DECLARATION BY THE CANDIDATE

I, the undersigned declare that the project report on "**EXAMINATION AND RESULT COMPUTATION SYSTEM**" is based on my own work carried out during the course of our study under the supervision of **Prof. Surya Narayan Prasad**.

I assert that the statements made and conclusions drawn are an outcome of my research work. I further certify that

1. The work contained in the report is original and has been done by me under the general supervision of our supervisor.
2. The work has not been submitted to any other institutions for any other degree in this college or any other college of India or abroad.
3. I have followed the guidelines provided by the college in writing the report.
4. Whenever I have used materials (data, theoretical analysis and text) from other resources, I have given due credit to them in the text of the report, giving their details in the reference.

Amit Tigga

20VBCA044405

DECLARATION BY THE CANDIDATE

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Aryanshu Kumar

20VBCA044415

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Gitanjali Kumari Verma

20VBCA044427

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Saurabh Kumar

20VBCA044441

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Gaurav Kumar Mandal

20VBCA047283

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Saurav Kumar

20VBIT044507

DECLARATION BY THE CANDIDATE

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Gaurav Kumar

20VBIT044521

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Ritesh Kumar Yadav

20VBIT044532

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Udit Prasad

20VBIT047300

DECLARATION BY THE CANDIDATE

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Soni Kumari

20VBCA044459

DECLARATION BY THE CANDIDATE

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Kundan Gupta

20VBCA047261

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Shivanshu Ranjan Thakur

20VBCA044483

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Sonam Kachhap

20VBCA044495

CERTIFICATE OF ORIGINALITY

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It is understood that by this approval, the undersigned do not necessarily endorse any conclusion drawn or opinion expressed therein, but approve the Project Report for the purpose for which it is submitted.

AMIT TIGGA

SURYANARAYAN PRASAD
Assistant Professor
Department of Computer Science
St. Xavier's College, Ranchi

Examiner 1

Examiner 2

DR. SWARAT CHAUDHURI
Head of the Department of Computer Science
St. Xavier's College, Ranchi

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ARYANSHU KUMAR

SURYANARAYAN PRASAD
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GITANJALI KUMARI VERMA

SURYANARAYAN PRASAD
Assistant Professor
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SAURABH KUMAR

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GAURAV KUMAR MANDAL

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SAURAV KUMAR

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RITESH KUMAR YADAV

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UDIT PRASAD

SURYANARAYAN PRASAD
Assistant Professor
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St. Xavier's College, Ranchi

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Examiner 2

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Head of the Department of Computer Science
St. Xavier's College, Ranchi

CERTIFICATE OF ORIGINALITY

The foregoing Project Report entitled **"EXAMINATION AND RESULT COMPUTATION",** is hereby approved as a creditable work and has been presented in satisfactory manner to warrant its acceptance as prerequisite to the degree for which it has been submitted.

It is understood that by this approval, the undersigned do not necessarily endorse any conclusion drawn or opinion expressed therein, but approve the Project Report for the purpose for which it is submitted.

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Examiner 2

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INTRODUCTION TO SOFTWARE ENGINEERING

Software Engineering (SE) is a profession dedicated to designing, implementing, and modifying software so that it is of higher quality, more affordable, maintainable, and faster to build.

The IEEE Computer Society's Software Engineering Body of Knowledge defines "software engineering" as the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software, and the study of these approaches; that is, the application of engineering to software.

Software Engineering Approaches

Software Engineering approach has two components. They are -:

- System Engineering Approach
- Development Engineering Approach

a) System Engineering Methods

The system has broad meaning. It includes -:

- The Business Systems
- Computer Software used in the Business System
- The understanding of the system is done through the System Study 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.
- Understands the relationship between various components
- Defines the relationship in terms of input, output and processes.
- Understands and a certain the role of hardware and software.
- Understands the role of the database and any other software products used in the system.
- Identity key operational and functional requirement of the system to be addressed.
- Model the system for analysis and development through modelling software.
- Discuss the system's requirements with the customer, the users and the stakeholders affected by the system.

b) Development Engineering Methods

The development has broad meaning. It includes -:

- The Requirements Analysis and its Definition.
- Software requirements and specifications.
- Software system and design.
- The Development (Study and Analysis) is done using GDEM (Goal of Development Engineering Methodology).
    - 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 Requirements
        - Determine the architecture for delivery of the Solution
        - Software development planning.
        - Software testing by components.

- Integration of system components Goals of Development Engineering Methodology.
- Integration testing for confirmation and conformance of delivery of requirements.
- Determination of implementation strategy and Implementation.
- Change management process and Maintenance of installed product.

Software Engineering Methods

Software Engineering has two methods. They are -:

- Structured Analysis Paradigm
- Object Oriented Paradigm

Introduction to Structured Analysis paradigm

Structured Analysis is a software engineering technique that employs graphical diagrams to create and depict user-friendly system specifications. These diagrams describe the steps that must be taken and the data that must be collected in order to meet the design function of the specific software.

Structured analysis is a method of development that helps the analyst understand the system and how it works in a logical way. It is more logical than physical, which means that the parts of the system don't depend on the hardware or vendor. It is a way of doing things that goes from big-picture views to more specific details.

Introduction to Object Oriented Paradigm

- The object-oriented paradigm is a new way of looking at applications.
- We divide an application into small objects that are independent of one another using the object-oriented approach.
- The ability to build components once and reuse them is one of the primary benefits of the object-oriented paradigm.
- With this approach, the user is asked what information they will require (Requirement Analysis), a database is designed to hold the information, screens are provided to input the information, and reports are printed to display the information.
- In other words, the emphasis is on **"INFORMATION"** with less emphasis on what is done with the information and the system's behaviour.
- This method is known as the **"DATA CENTRIC"** method.
- The data-centric approach is useful for database design and information gathering, but it has some drawbacks when used to design business applications. They are listed below.
    - **a.** The system's requirements will evolve over time
    - **b.** A data-centric system is well-suited to handle database changes, but changes to business rules or system behaviour are difficult to implement and execute.
    - **c.** The object-oriented paradigm was created with a focus on information and behaviour in mind.
    - **d.** Thus, we can create resilient and adaptable information and/or behavior systems.

Visual Modeling

- Visual modelling is the process of displaying information from a model graphically using a standard set of graphical design elements.
- Communication is one of the advantages of visual modelling.
- The goal of Visual Modelling is to facilitate communication among users, developers, analysts, testers, managers, and other stakeholders.
- This communication can take place using both visual and non-visual information, such as text.
- When a system is visually modelled, the following advantages can be realized:
  - **a.** The system's complexity can be better displayed and expressed.
  - **b.** The system's actual functionality can be demonstrated at various levels.
  - **c.** Object interactions within the system can also be modelled
  - **d.** The interaction between the systems can be modelled as well
  - **e.** The user can visualize their interaction with the system
  - **f.** Analysts can see how the objects in the models interact with one another.
  - **g.** Developers can visualize the object and its requirements.
  - **h.** Visualizing object interactions helps test cases
  - **i.** Project managers can see how the whole system works

Modeling Tools

- In visual modelling, one of the most important things to think about is what kind of graphic notation to use to show the different parts of the system.
- These notations must be communicated to those who are interested.
- The following are some examples of common notations:
  - **a.** Booch Method
  - **b.** Object Modeling Technology (OMT)
  - **c.** Unified Modeling Language (UML)

Object Modeling

- Proposed by James Rumbaugh.
- Rumbaugh spoke about the significance of modelling systems in real-world components.
- The following page contains a selection of objects and relationships in OMT notations

DIFFERENCE BETWEEN SYSTEM ENGINEERING AND DEVELOPMENT ENGINEERING

System engineering methods	Development engineering methods
1.Follows Interdisciplinary approach.	Follows Systematic approach.
2.Focus more on physical aspects.	Focuses on software products/applications.
3.Defines objective and boundaries.	Requirement definition and specification.
4.Factorize system in components.	Design solution to deliver requirement.
5.Understands hardware	Understands software.
6.Understands databases.	Determines architecture.
7.Identifies operational and functional requirement.	Software development and testing.
8.Models the system for analysis and development.	Integration testing and confirmation.

Data Base Management System (DBMS)

- A DBMS consists of a collection of interrelated data and a set of programs to access those data. Users of the system are given facilities to perform several kinds of operations on such a system for either manipulation of the data in the database or the management of the database structure itself.

Relational Data Base Management System (RDBMS)

- A relational database is a type of database that stores and provides access to data points that are related to one another. Relational databases are based on the relational model, an intuitive, straightforward way of representing data in tables. In a relational database, each row in the table is a record with a unique ID called the key. The columns of the table hold attributes of the data, and each record usually has a value for each attribute, making it easy to establish the relationships among data points.

INTRODUCTION TO UML

UML Diagrams (UML - Unified Modeling Language)

UML enables the creation of various types of visual diagrams that represent various aspects of the system. Rational Rose is committed to the advancement of these models.

They are listed below -:

- Class Diagram
- Object Diagram
- Component Diagram
- Deployment Diagram
- Use Case Diagram
- Sequence diagram
- Collaboration Diagram
- Component Diagram
- State Chart Diagram
- Activity Diagram

UML Diagrams are classified into two types. They are listed below -:

- **Structural Diagram**
- **Behavioral Diagram**

1. **Structural Diagram**

   - The structural diagrams represent the static aspect of the system.
   - These static aspects of a diagram represent the parts of the diagram that are stable and form the main structure.
   - Classes, interfaces, objects, components, and nodes represent these static parts.

Types of Structural Diagrams

In UML, there are four types of structural diagrams. They are listed below -:

a. Class Diagram

b. Object Diagram

c. Component Diagram

d. Deployment Diagram

2. **Behavioral Diagram**

   - The Behavioral Diagram represents the dynamic aspects of the system.
   - This dynamic aspect represents those parts of the system that are changing.

Types of Behavioral Diagram

In UML, there are five types of behavioral diagrams. They are listed below -:

a. Use Case Diagram

b. Sequence Diagram

c. Collaboration Diagram

d. State Chart Diagram

e. Activity Diagram

Class Diagram

- Most common diagrams used in UML.
- Class diagrams consist of classes, interfaces, associations and collaborations.
- Represents 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.
- A class diagram represents the object orientations of a system. It is used for development purpose. This is the most widely used diagram at the time of systemconstruction.

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 state view of the system.
- The usage of object diagrams is similar to class diagrams but they are used to build prototypes of a system from a practical perspective.

Component Diagram

- Component diagram represents a set of components and the relationship among them.
- These diagrams consist of classes, interfaces or collaborations.
- Component diagram represents 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.

Deployment Diagram

- Deployment diagram is used to visualize the hardware topology of the system.
- It describes the hardware components used to deploy software components.
- It also describes the runtime processing of nodes.
- It is used to model the hardware details for client /server details and embeddedsystems.
- Used for **Forward and Reverse Engineering**.
- Deployment diagram is used for controlling following parameters that includes
    a. Performance
    b. Scalability
    c. Maintainability
    d. Portability
    e. Reach ability

Use Case Diagram (UC Diagram)

- Use case diagrams are a collection of use cases, actors (specifies a role played by a user or any other system interacting with the subject), and their relationships.
- They represent the user case view of a system.
- A user case represents a particular functionality of a system.
- A use case diagram, in other words, is used to describe the relationships between functionalities and their internal/external controllers.
- These controllers are referred to as "ACTORS".

Sequence Diagram

- A sequence diagram is an interaction diagram.
- The name itself suggests that, the diagram deals with some sequences, which arethe sequences 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 performa specific functionality.

Collaboration Diagram

- Sequence Collaboration diagram is a type of interaction diagram.
- It represents a system's structural organization as well as the messages sent and 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 intersections.

State Chart Diagram (SC Diagram)

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

Activity Diagram

- The flow of control in a system is depicted using an activity diagram.
- It manages the internal/external activities and connections on a system.

- The flow of information can be sequential, concurrent, or branched.
- Activities are nothing more than system functions.
- We have to prepare numbers of activity diagram to capture the entire flow in a system.
- Activity diagrams are used to visualize the flow of controls in the system.
- An activity diagram helps us to have an idea of how the system will work and when it will be executed.

Entity Relationship Diagram (ER Diagram)

- The ER model defines the conceptual view of database.
- It works around real-world entities and the association 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 berepresented with the help of an ER Diagram.

Data Flow Diagram (DF Diagram)

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

Flow Chart Diagram (FC Diagram)

- Diagrammatically representation of an algorithm**.**
- Diagrammatically representation of an algorithm.

- Step by step approach to solve a given 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 system, the operations performed within the system and the sequence in which they are executed in a system

Gantt Chart

- A Gantt chart is a chart that shows all of the different sub tasks of project and how are they relate to each other.
- A Gantt chart of all 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 been 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 (Program Evaluation and Review Technique)

- It stands for Program Evaluation and Review Technique.
- A PERT Chart is a project management tool that provides a graphical representation of project timelines.
- The PERT Chart breaks down the individual tasks of project for analysis.
- The PERT Chart is considered preferable to Gantt chart because they identify task dependencies.

INTRODUCTION TO RATIONAL ROSE

(Rational Object-Oriented Software Engineering)

- 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 EXAMINATION
AND
RESULT COMPUTATION SYSTEM

Introduction:

The results of any student are used to measure global student ability.

This shows students' academic potential. At the elementary level, where students are trained to take on more academic responsibilities in high school, how their results are processed is important. The result, which builds from an earlier stage to a final stage and certifies a student's progress, must be clear. This also means that an inadequate examination and result processing system must not be tolerated, or the result may not be met. Proper student result processing requires an effective, efficient, and error-free system. Most elementary school administrators believe computers are only suitable for

producing letters, memos, and other desktop applications. Computers in schools can't be overstated. It can help with admissions, exams, registration, staff scheduling, and storing official and student records. These administrators don't realise the computer's potential.

Manual preparation of the results statement, broadsheet, and summary is common in results processing. Creating these formats is time-consuming. If there was an up-and-running computer system, the time spent manually recording student results could have been used for data entry. This has wasted man hours that could have been used elsewhere.

Second, after manual result compilation, checking a student's performance in all subjects requires additional man hours because the teacher must check name by name, class subject by subject, and grades by grades.

This time-consuming search can be avoided.

Problem statement: Exams are an important part of education and the student lifecycle. They are the instruments used to assess the success and efficacy of teaching processes and methodologies. Exams are equally stressful for teachers and administrators as they are for the student body, for various reasons.

Students only need to be concerned with preparation and performance, whereas teachers and administrators have a lot to do. Some of the most important aspects of effective exam administration are registration, test creation, security, evaluations, candidate verification, and result tabulation. Exam management on a larger scale can be even more difficult.

Traditional examination and result computation systems involve massive volumes of answer-paper scripts, which are difficult to manage and are vulnerable to risks such as damaged and misplaced answer scripts. The result system also necessitates manual sorting, evaluation, and safeguarding, which increases the risk of errors and biases, raises security concerns, and may ultimately delay the announcement of the results.

The solution is to replace the current manual result processing system with a digital and automated student result processing system. Educational institutions and testing bodies benefit greatly from automated digital student mark analysis systems. From planning and preparation to evaluating, the student examination result processing system frees up administrators and teachers to focus on other important tasks.

Objective:

It is the goal of this project to model the current manual method of processing and managing students' results in order to reduce the difficulties associated with the current manual method's stringent steps There are three specific goals for this paper: to present possible designs for an outcome processing system, to implement the models presented, and to test the developed outcome processing system.

Using this system, we hope to better understand and eliminate the errors that can occur during the administration of exams and the generation of exam results for students. Speeding things up is also a factor. As a final step, the school must ensure that all students' records are complete and up-to-date

Requirements Analysis :

A requirement is simply a statement of what the system must do or what characteristic it must have. The system requirements are often classified as functional (FR) and non-functional requirements (NFR).

The following are the functional requirements of the current system: a requirement is simply a statement of what the system must do or what characteristic it must have.

- The system will have three types of users: Administrator, Professor and Student. The system will allow access to users account after authentication
- The system will prepare the students result report.
- The system will allow the Administrators to create accounts for professors and students.
- The system will allow the Administrators to register new subjects.
- The system will allow the Administrators to register new subjects.
- The system will allow the Administrators to manage all the professors', students' and subject's records.
- The system will allow the Administrators to manage all the professors', students' and subject's records.
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- The system will allow the Administrators to manage all the professors', students' and subject's records.
- The system will allow the Administrators to manage all the professors', students' and subject's records.
- The system will allow the Administrators to assign and update students' grades.
- The system will allow the Administrators to assign and update students' grades.

- The system will allow the Administrators, professors and students to modify their passwords.
- The system will allow the Administrators to assign subjects to professors.
- The system will allow the Administrators to enrol students in a particular subject.
- The system will allow the Administrators to generate results.
- The system will enable the students to check their results.
- The system will enable the students to print their results reports
- The system will enable the professors to assign grades to students.

The system will allow the professors to generate result

System Development :

System Development System development is a set of activities used to build an information system.

System development activities often are grouped into larger categories called phases. This collection of phases sometimes is called the system development life cycle (SDLC), each system development phase consists of a series of activities .

In the current research, to develop the Web-Based Student Result Management System, the incremental model was employed, which is now the most common approach for the development of application systems and software products.

Incremental development is based on the idea of developing an initial implementation, getting feedback from users and others, and evolving the software through several versions until the required system has been developed.

Rarely a complete problem solution is worked out in advance but it moves toward a solution in a series of steps, backtracking when realized that some mistake have been made. By developing the software incrementally, it is cheaper and easier to make changes in the software as it is being developed .

Project Type

The ERCS project is based on both Web and console-based applications.

The user can either access ERCS system through website or with application.

Tools and Technologies:

The most important step in finalising the approved web system is system implementation. We must justify some basic requirements (software and hardware) in order for the system to function without obligation or customer dissatisfaction.

Operating System

- Windows 7 and above or Mac OS

Hardware Requirements

- **Processor:** Pentium 5 gen+
- **RAM:** 1 GB or above
- **HDD:** Minimum 1 GB and above
- **Graphics Card Capacity:** 2 GB or above

Software Requirements

- **Operating System:** Windows XP, Windows 8, Windows 10 or above
- **Database Management**: My SQL, Oracle
- **Web Development**: Visual Studios 2010 or later, Adobe Dreamweaver, Notepadand Notepad++, Net Framework

Diagrams in context to Examination and Result Computation System

1.CLASS DIAGRAM

List of Class and their methods of Examination and Result Computation System

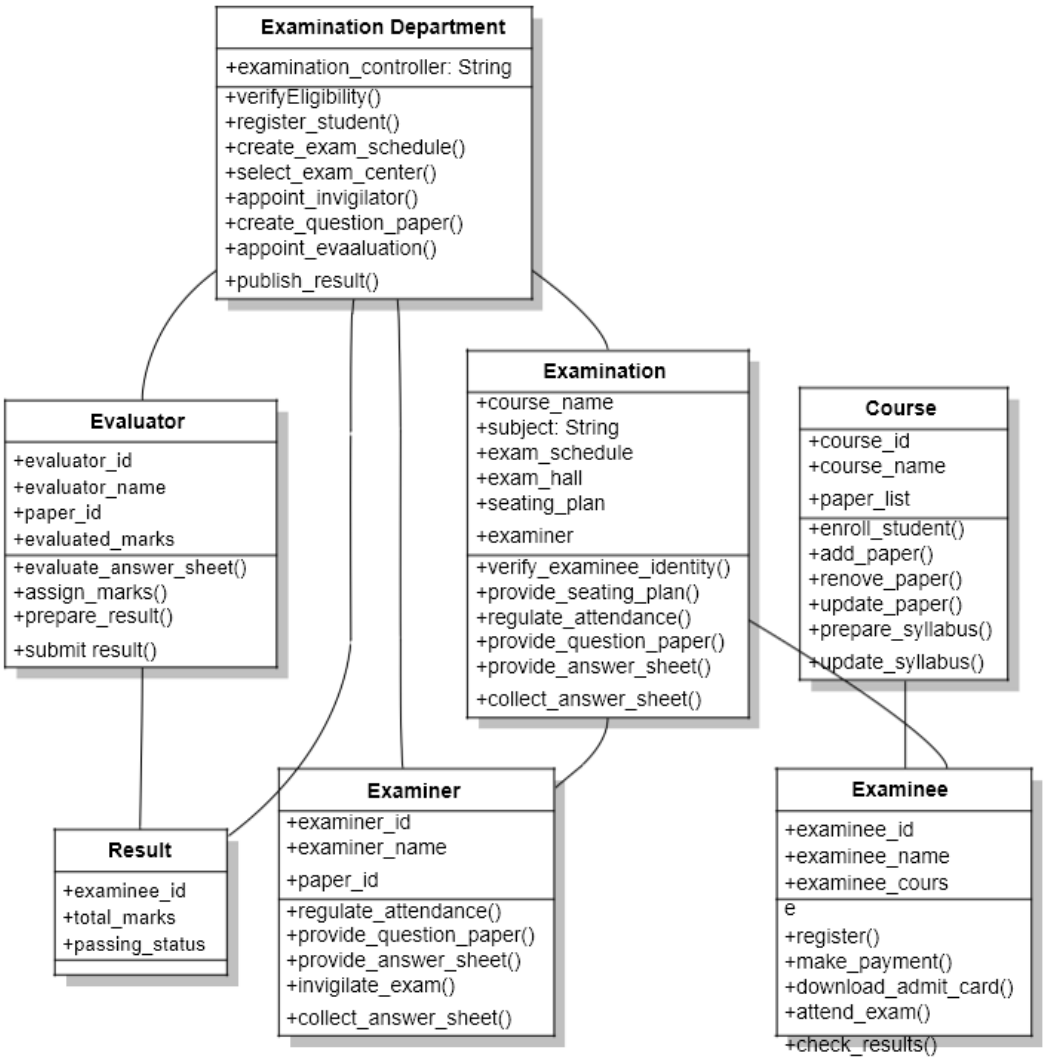
- **EXAMINATION:** Course id (), Paper id (), exam schedule (), exam hall (), seating plan (), examiner id ().
    - Course id: A unique id is assigned to each course.
    - Paper id: A unique id is assigned to subject paper of a course.
    - Exam Schedule: It contains schedule of the examination.
    - Exam Hall no.: Shows Hall in which exam will be conducted.
    - Seating Plan: It contains plans of seating arrangement.
    - Examiner Id: It shows details of invigilator.

- **EXAMINATION DEPT.:** examination controller ().
- Examination Controller: He/she can control and coordinate the examination process.
- **COURSE:** course id (), course name (), paper list ().
    - Course id: It will identify a specific course uniquely.
    - Course name: It will show the name of the course.
    - Paper list: It will show the list of paper to be studied.

- **EXAMINER: examiner id (), examiner name (), paper id ().**
    - **Examiner id**: It will identify invigilator uniquely.
    - Examiner name: It shows the name of the invigilator.
    - Paper id: It shows the paper to be taught by the examiner.
- **EXAMINEE**: examiner id, examiner name (), paper id ().
    - Examine id: A unique number is assigned to each and every examinee.

- Examinee Name: It shows name of the examinee.
- Course id: It shows the course in which examinee is studying.
- Session: It shows the year/session of the examinee.

- **EVALUATOR**: evaluator id, evaluator name, paper id, evaluator marks ().
  - Evaluator Id: A unique id is assigned to each and every evaluator.
  - Evaluator Name: It shows the name of the evaluator.
  - Paper id: It show the paper code which is evaluated by the evaluator.
- **RESULT**: examinee id (), total marks (), passing status ()
  - Examinee Id: It shows the examinee uniquely by unique code.
  - Total marks: It contains the total marks obtained by the examinee.
  - Passing Status: It shows the result of the examination.



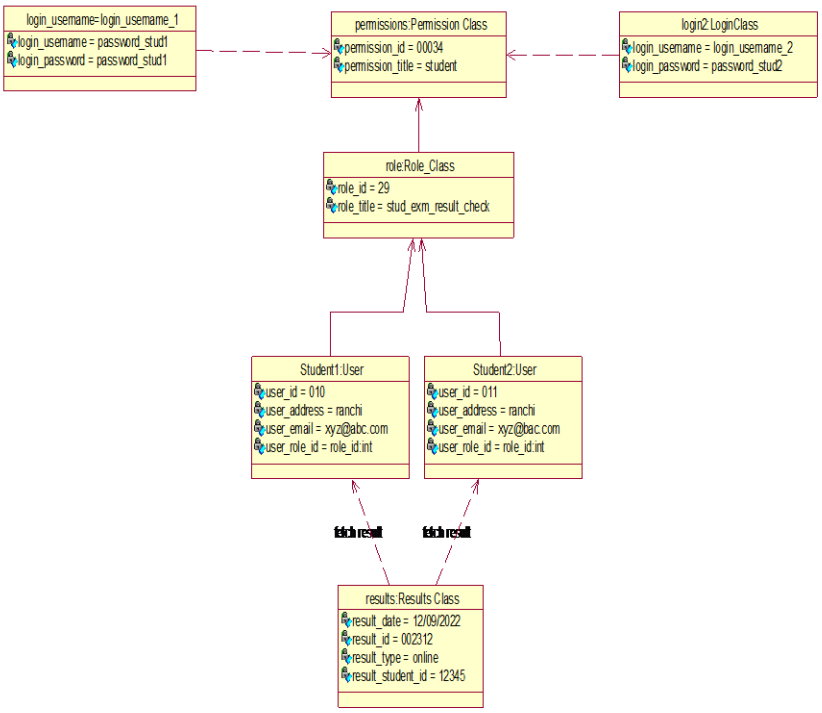
Class Diagram

2.OBJECT DIAGRAM

This is an Object diagram of Examination and Result Computation System which shows instances during the result time, A user (student needs) login to the portal and then it seeks from the permission instance to check and validate the user. After the validation it accesses the role of the login class and then gets the student details from the student instance, and finally gets the user result from the database.

- Login Username: Username (), Password ()
  - Username: It will assign a unique name to new user.
  - Password: A unique password is generated to identify new user uniquely.
- Permission: Permission id (), Permission title ()
  - Permission id: A unique code is generated to identify a specific permission.
  - Permission title: It contains type of permission to be assigned.
- Role class: Role id (), Role title ()
  - Role id: A unique id is assigned to the role class.
  - Role title: It will show the title of the type of role that is assigned.
- User ; User id (), User address (), User email (), User role id ()
  - User id: A unique id is assigned to new user.
  - User address: It contains the current address of the user.
  - User email: It stores the email address of the user.
  - User role id: It will assign the type of the role to the user.
- Result date: It shows the date of the result declaration.

- Result id: It will show the result of each and every student uniquely.
- Result type: It will show the type of the result.
- Result student Id: It will match student id with its result is uniquely.



Object Diagram

3. COMPONENT DIAGRAM

This is a Component diagram of the Examination Management System, which illustrates the components, provided and required interfaces, ports, and relationships between the Courses, Papers, Result, and Exam. Also shown are the faculties. Component-Based Development (CBD), also known as Component-Oriented Development, employs these particular diagrams to describe the systems that are built using SOA (SOA). UML component diagrams, such as the one for the Examination Management System, describe the organization and wiring of the physical components that make up a system.

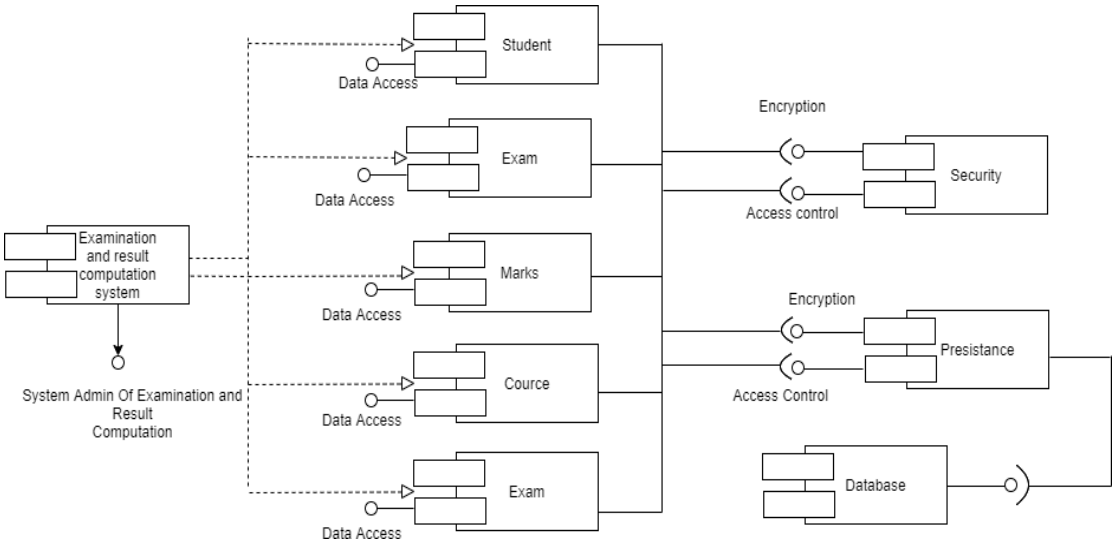
Components of UML Component Diagram of Examination and Result Computation System:

- **Courses Component –** It will contain the components and their attributes of various courses of an institution.
- **Papers Component –** It will contain the details of the paper to be taken by student or user in their respective courses.
- **Result Component –** It will contain the marks obtained by a student their examination.
- **Exam Component –** It will contain the details of examination schedules and their implementation process.
- **Faculties Component –** It will contain the details of the faculty member who are working for the institution.

Features of Examination and Result computation System Component Diagram:

- You can show the models the components of Examination and Result Computation System.
- Model the database schema of Examination and Result Computation System

- Model the system's source code of Examination and Result Computation System



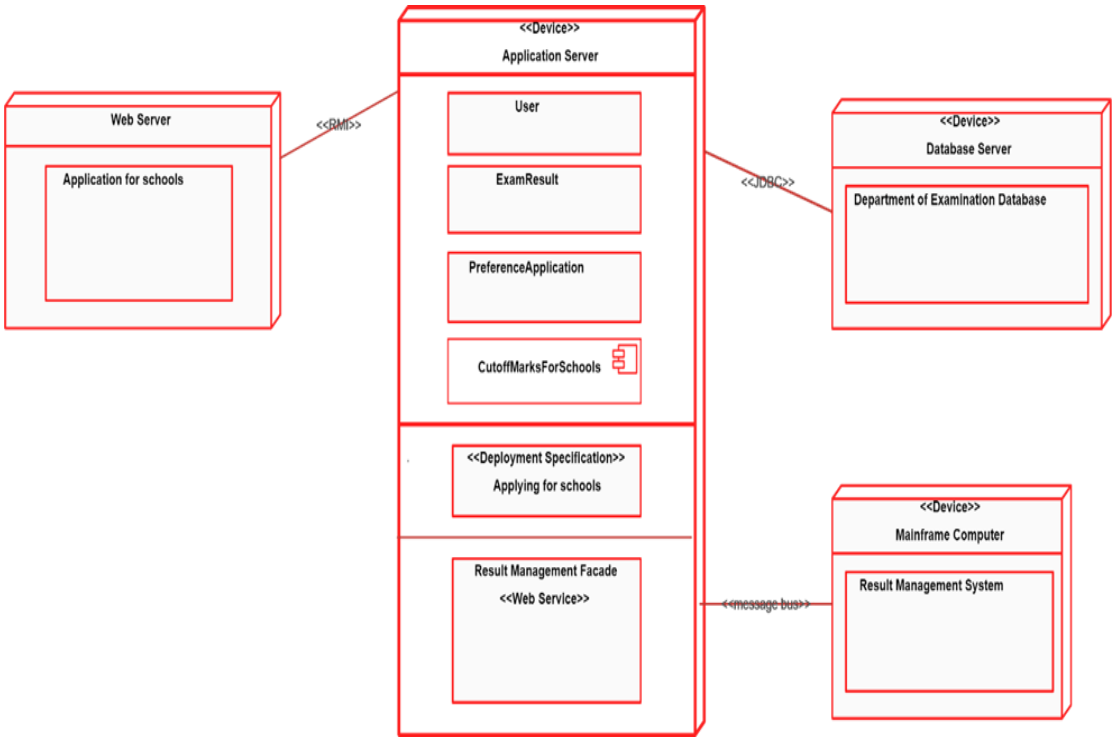
Component Diagram

4. DEPLOYMENT DIAGRAM

This is a deployment diagram that outlines all of the necessary steps for installing the application and setting up the server to host it. A Mainframe Computer will be available for us to use in order to install and operate the software necessary for our application.

Server for the database that will hold all of the tables and records. Web server that will display each and every webpage

Infrastructure networking that will connect all of the underlying components.



Deployment Diagram

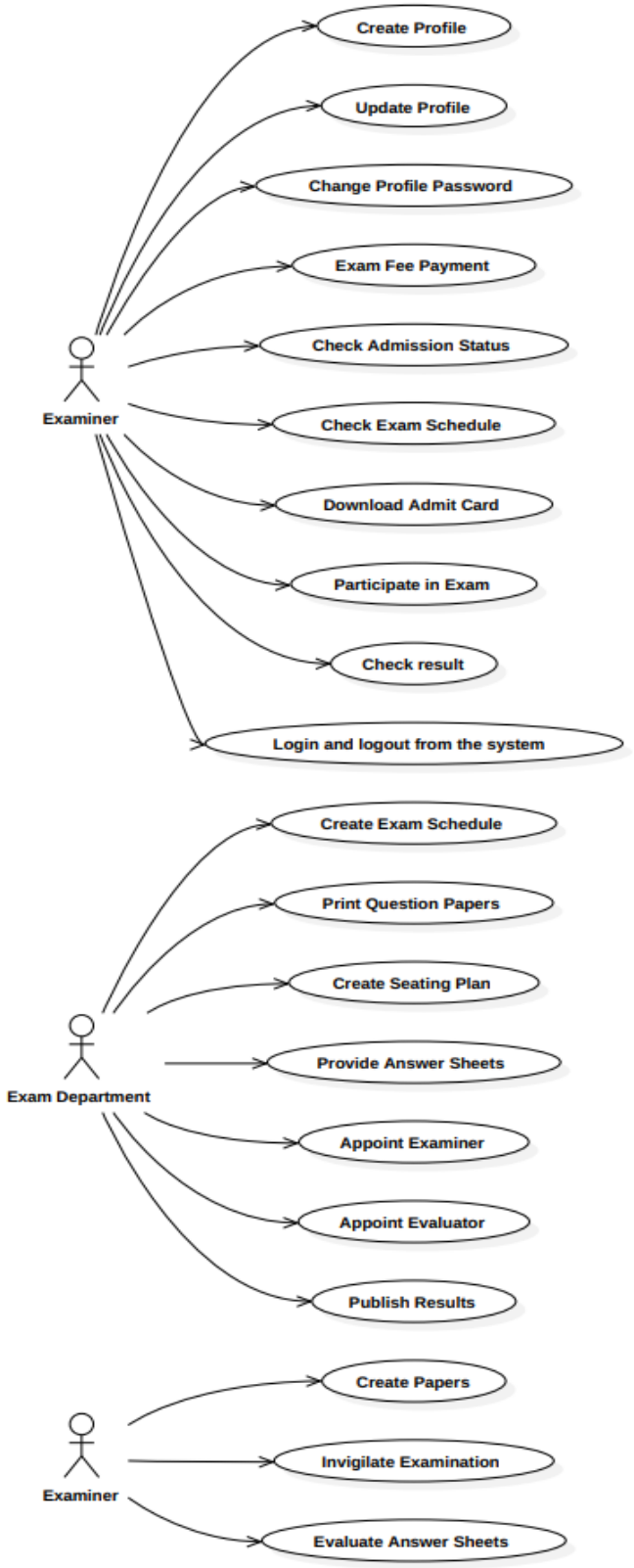
5. USE CASE DIAGRAM

The interactions that take place between the various components of the Examination and Result Computation System are graphically represented in this Use Case Diagram. It is the examination and result computation system's methodology that is used in system analysis to identify, clarify, and organise the system requirements.

Examinees, examiners, and the examination department are the primary actors of this system in this Use Case Diagram. These actors are responsible for carrying out the various use cases.

List of actors with their use cases:

- **Examinee:** Create profile, Update Profile, Change Profile Password, Exam Fee Payment, Check Admission Status, Check Exam Schedule, Download Admit Card, Participate in Exam, check result.
- **Examiner:** Create Papers, Invigilate Examination, Evaluate Answer Sheets.
- **Exam Department:** Create Exam Schedule, Print Question Papers, Prepare Seating Plan, Appoint Examiner, Provide Answer Sheets, Appoint Evaluator, Publish Results.



Use Case Diagram

6. SEQUENCE DIAGRAM

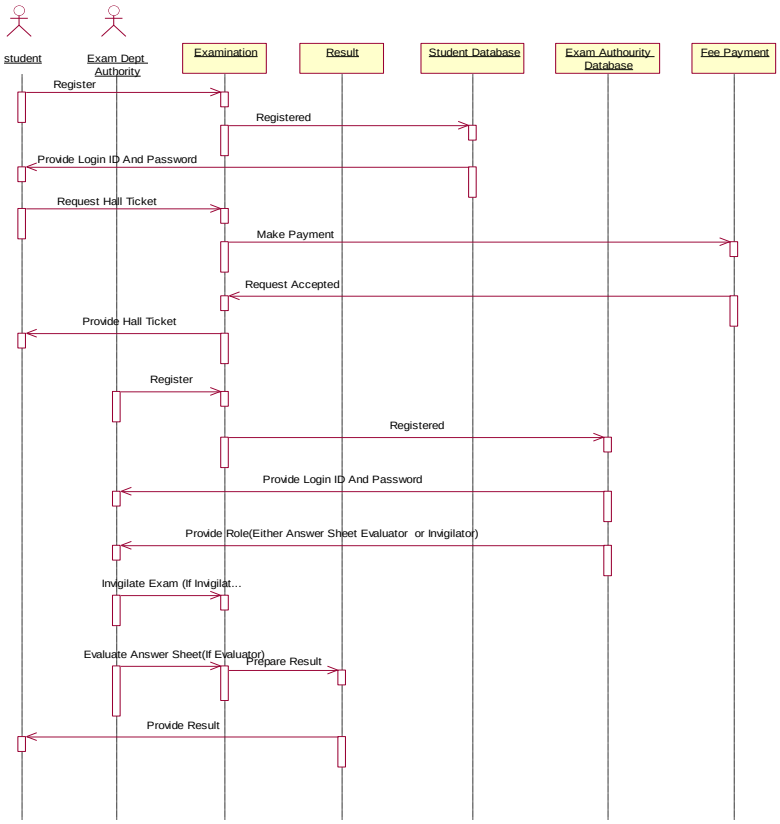
The Sequence Diagram of the Examination and Result Computation System can be found here. This is where admins will be able to log in to their accounts using the credentials they have been given. After successfully logging in, the user has the ability to manage all aspects of Students, Courses, Papers, Exams, and Marks. After successfully logging in, users are granted access to all of the protected pages, which include Papers, Exams, and Marks. The login page for the Examination and Result Computation System is broken down into its component parts in the diagram that can be found below. Users will not be able to access the page containing Exam, Students, Courses, Papers, and Marks without first proving their identity. This is because the various objects on the page interact with one another throughout the course of the sequence.

The instance of class objects involved in this UML Sequence Diagram of Examination and Result Computation System are as follows:

- Examination
- Result
- Student Database
- Exam Authority Database
- Fee Payment

List of Actors-

- **Student** – Examinee who will use the system to get information about examination
- **Exam Department Authority** – Authorities who will access the system to make arrangements for the examination.



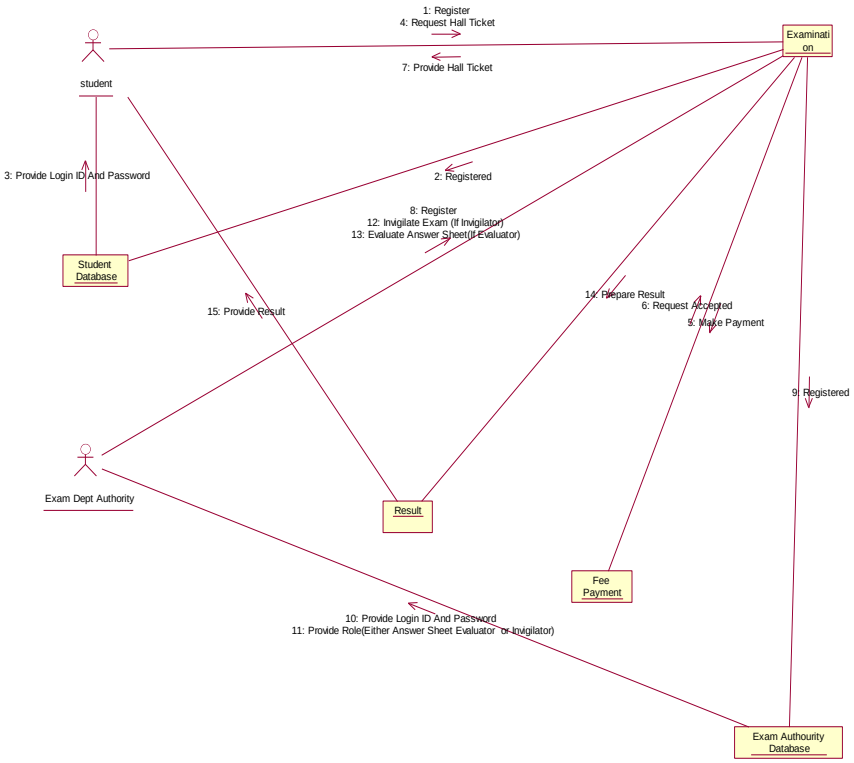
Sequence Diagram

7. COLLABORATION DIAGRAM

This is the representation of complete system inform of collaboration diagram for examination and result computation system.

Working:

- First student registers in the ERCS system.
- Once successfully registered, the student details will be stored in the student database and student will be provided with the unique ID and password.
- Exam Authorities (Invigilator/Evaluator) will be registered by the Exam Department. Their details will be stored in the exam authority database and they will be provided with the unique ID and password along with their roles in the examination.
- Using the provided ID and password, students can access the exam hall ticket and can get access to their results.



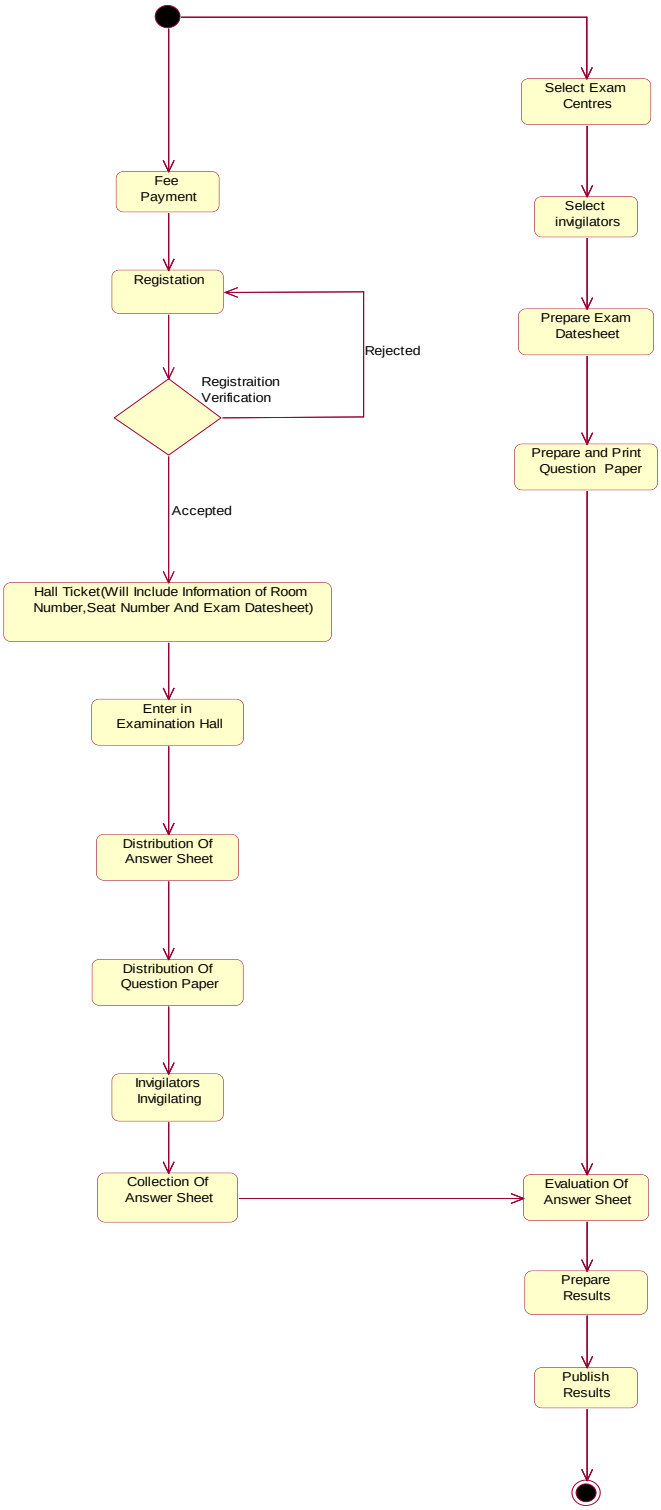
Collaboration Diagram

8. STATE CHART DIAGRAM

A state chart diagram for examination and result is utilised to depict the state of the examination and result at discrete points in time. It is a behavioural diagram that depicts behaviour through discrete state transitions. Different terms are frequently used interchangeably. A state diagram is used to model the dynamic behaviour of a class in response to changing external stimuli and the passage of time.

Working of the state diagram:

- Firstly, the student needs to register for the examination
- If the registration is successfully registered then it goes for hall ticket otherwise, back to registration.
- In hall ticket the exam roll no., subject and date of exam etc. are mention on the hall ticket.
- After that it goes to the exam hall to give exam on particular date and time.
- And as they get question student writes the exam and after submission of answer, the answer goes for the preparation of result.
- At last, as the result is prepared it is display on the particular date and time for all student who have given exam.



State Chart Diagram

9. ACTIVITY DIAGRAM

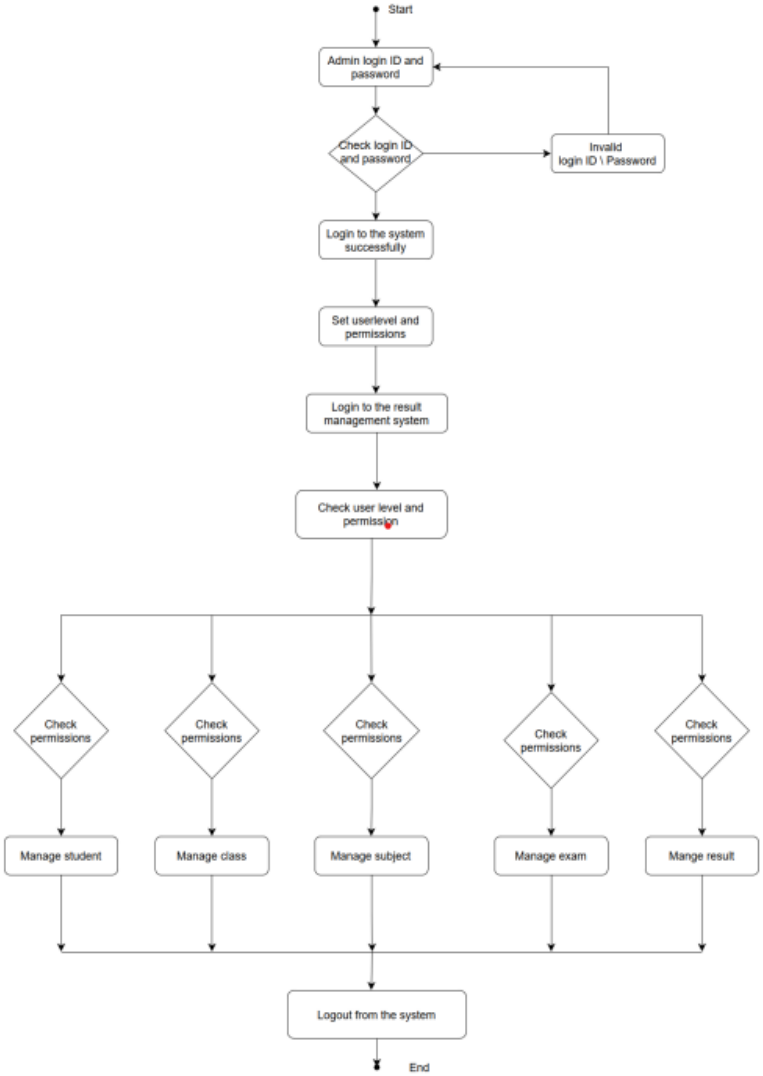
This is the Activity UML diagram of the Examination and Result Computation System, illustrating the activity flows between Subject, Class, Result, Student, and Semester.

The main activity involved in this UML Activity Diagram of Examination and Result Computation System are as

- Subject Activity
- Class Activity
- Result Activity
- Student Activity
- Semester Activity

Features Of the Activity UML Diagram of Examination and Result Computation System

- Admin User can search Subject, view description of a selected Subject, add Subject, update Subject and delete Subject.
- Its shows the activity flow of editing, adding and updating of Class
- Teacher will be able to search and generate report of Result, Student, Semester
- All objects such as (Subject, Class, Semester) are interlinked
- Its shows the full description and flow of Subject, Student, Semester, Result, Class.



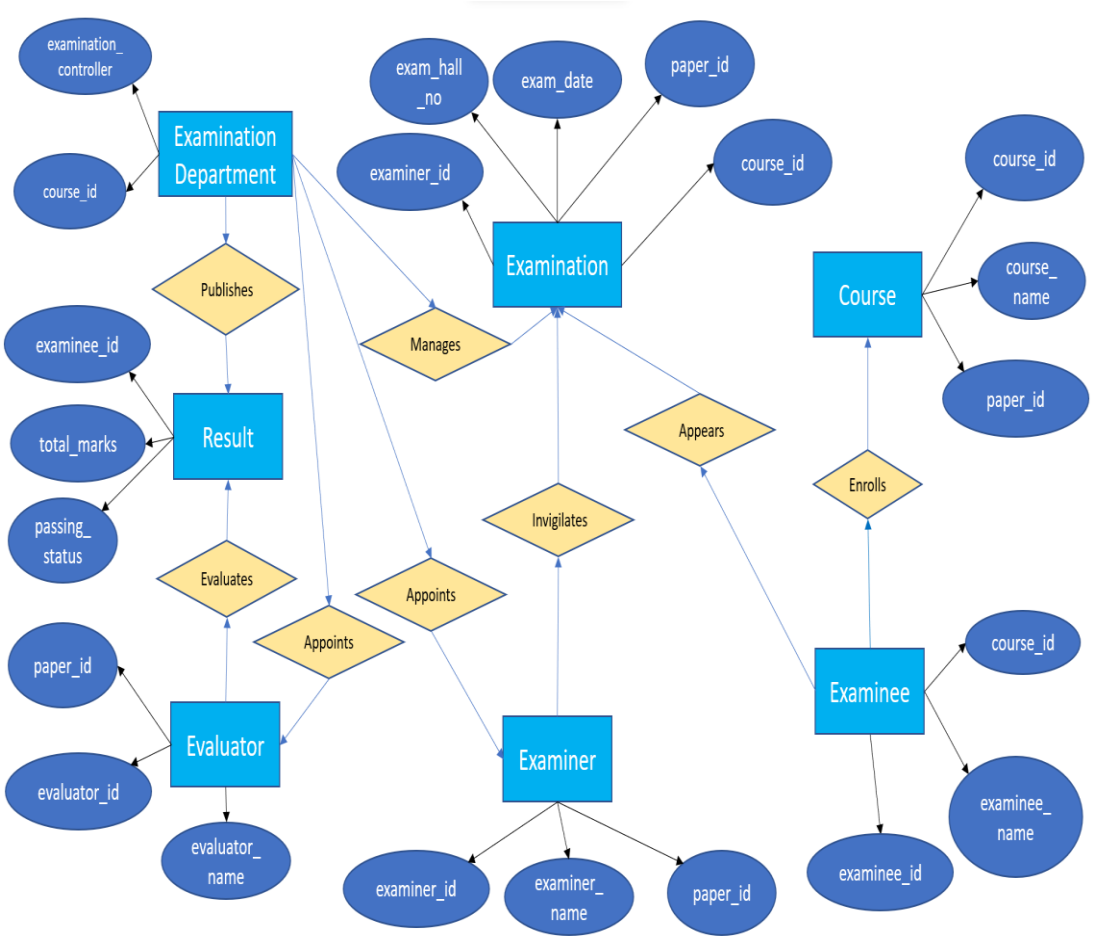
Activity Diagram

10. ENTITY RELATIONSHIP DIAGRAM

This Entity Relationship (ER) Diagram depicts the Examination and Result Computation System Entity model. Examination and Result Computation System's entity-relationship diagram illustrates all database tables and the relationships between Examinations, Courses, Examinees, Examiners, etc. It utilized structure data and defined the relationships between the structured data groups of Examination and Result Computation System capabilities. The Examination and Result Computation System's primary entities are Students, Examinations, Marks, Courses, Papers, and Faculties.

Examination and Result Computation System entities and their attributes:

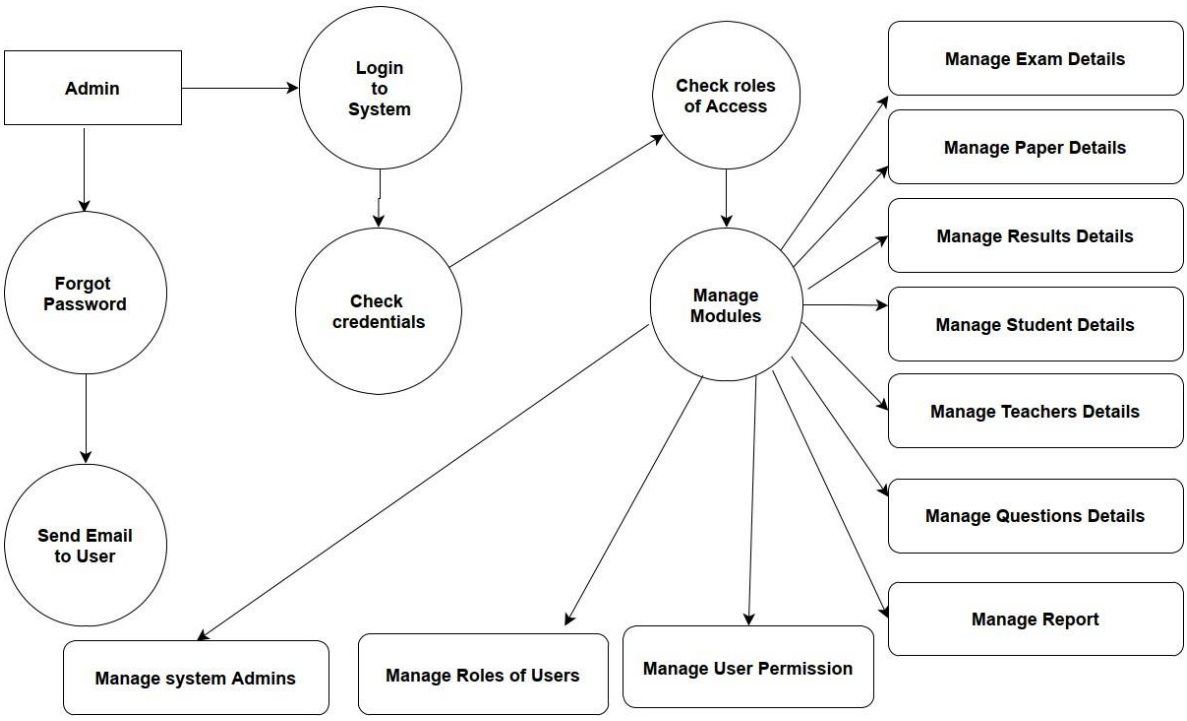
- **Examination :** examiner_id, exam_hall_no, exam_date, paper_id, course_id.
- **Course:** course_id, course_name, paper_id
- **Examinee:** examinee_id, examinee_name, course_id
- **Examiner:** examiner_id, examiner_name, paper_id
- **Evaluator:** evaluator_id, evaluator_name, paper_id
- **Result:** examinee_id, total_marks, passing_marks
- **Examination Department:** examination_controller, course_id



Entity Relationship Diagram

11. DATA FLOW DIAGRAM

- Admin logins to the system and manage all the functionalities of Computerized Examination System
- Admin can add, edit, delete and view the records of Exams, Students, Teachers
- Admin can manage all the details of Papers, Results, Questions
- Admin can also generate reports of Exams, Papers, Students, Results, Teachers, Questions
- Admin can search the details of Papers, Teachers, Questions
- Admin can apply different level of filters on report of Exams, Results, Teachers
- Admin can track the detailed information of Papers, Students, Results, Teachers



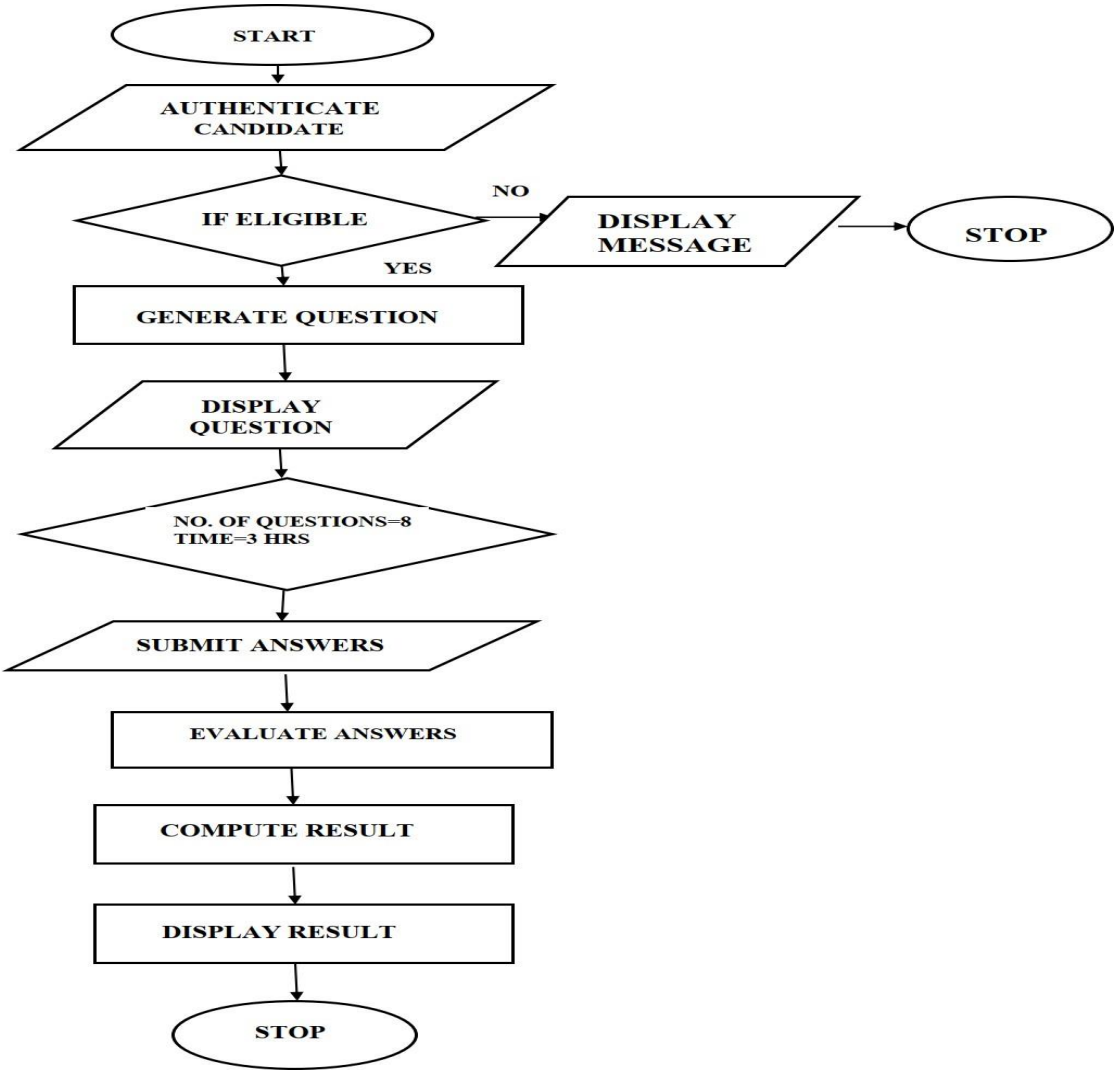
Data Flow Diagram

12. SYSTEM FLOW CHART DIAGRAM

The following flow chart is a graphical representation of the workflow of an online Examination and Result Computation System. Every step is organized in a sequential manner as per the property of a Flowchart. Working of the flowchart is as follows:

- As the examination starts, student logs in.
- Then student's identification is authorized by the Examiner.
- During the authentication if it shows some error, the student must log in again or else the student is allowed to appear for exam.
- The questions are loaded and displayed on the screen of the device student is using.
- The student must answer mandatory number of questions before the expiration of time limit. After the given time limit, answers will be automatically submitted.
- Answers are then evaluated, computed and then finally the results are updated on student portal.

  Results are now available to accessed by students.



System Flow Chart Diagram

13. DATA DICTIONARY

A Data Dictionary is a collection of names, definitions, and attributes about data elements that are being used or captured in a database, information system, or part of a research project.

Examinee (examinee_id, examinee_name, course_id, session)

The table "Examinee" is defined and created to keep the information of the examinees.

Table: Examinee				
Attribute Name	Datatype(size)	NULL(?)	Constraints	Description
examinee_id	varchar2(20)	NOT	Primary Key	Unique registration ID for Examinee
examinee_name	varchar2(30)	NOT		Examinee name
course_id	varchar2(15)	NOT		Enrolled Course Code

Course (course_id, course_name,paper_id)

The table "Course" is defined and created to keep the information of the courses and papers associated with the course.

Table: Course				
Attribute Name	Datatype(size)	NULL(?)	Constraints	Description
course_id	varchar2(15)	NOT	Primary Key	Course Code
course_name	varchar2(30)	NOT		Course name
paper_id	varchar2(15)	NOT		List of paper IDs

Examiner (examiner_id, examiner_name, paper_id)

The table "Examiner" is defined and created to keep the information of the examiners.

Table: Examiner				
Attribute Name	Datatype(size)	NULL(?)	Constraints	Description
examiner_id	varchar2(20)	NOT	Primary Key	Unique registration ID for Examiner
examiner_name	varchar2(30)	NOT		Examiner's name
paper_id	varchar2(15)	NOT		Paper the examiner will invigilate

Examination (course_id, paper_id, exam_date, exam_hall_no ,examiner_id)

The table "Examination" is defined and created to keep the information of the examination.

Table: Examination				
Attribute Name	Datatype(size)	NULL(?)	Constraints	Description
course_id	varchar2(20)	NOT		Course Code
paper_id	varchar2(30)	NOT	Primary Key	Paper code
exam_date	date	NOT		Date of the examination
exam_hall_no	number(2)	NOT		Venue of the examination
examiner_id	varchar2(20)	NOT		List of examiners who will invigilate the exam

Evaluator (evaluator_id, evaluator_name, paper_id)

The table "Evaluator" is defined and created to keep the information of the evaluators.

Table: Examiner				
Attribute Name	Datatype(size)	NULL(?)	Constraints	Description
evaluator_id	varchar2(20)	NOT	Primary Key	Unique registration ID for Evaluator
evaluator_name	varchar2(30)	NOT		Evaluator's name
paper_id	varchar2(15)	NOT		Paper the evaluator will evaluate and calculate marks obtained by the examinee

Result (examinee_id, total_marks, passing_status)

The table "Result" is defined and created to keep the information of the marks obtained by the examinees and their passing status.

Table: Result				
Attribute Name	Datatype(size)	NULL(?)	Constraints	Description
examinee_id	varchar2(20)	NOT	Primary Key	Unique registration ID for Examinee
total_marks	number(3)	NOT		Total marks (sum of all papers) obtained by Examinee

passing_status	varchar2(4)	NOT		Whether the examinee passed the exam or not

Examination Department (examination_controller, course_id)

The table "Examination Department" is defined and created to keep the information related to the management of the examination of various courses.

Table: Result				
Attribute Name	Datatype(size)	NULL(?)	Constraints	Description
examination_controller	varchar2(20)	NOT	Primary Key	Examination controller authority
course_id	varchar2(20)	NOT		Course which will be managed by the Exam Department

14. RISK MANAGEMENT DIAGRAM OF EXAMINATION AND RESULT COMPUTATION SYSTEM

In ERCS there are some risks which need to be tackled appropriately with right knowledge. Some of the main risks of ERCS are server crash, human error, registration error, unskilled employee, delivery deadline, loss of data.

- **Server Crash –** It is a situation when the link between the user and the server gets disconnected due to technical error. This causes a problem for a student to access server for its work.
- **Human Error –** A human can accidentally alter the information which causes operational risk for the system.
- **Registration Error –** Some time a user doesn't get access to login and registration process.
- **Employee Resignation:** This is a situation when an employee leaves the project in between its development process. This causes loss of manpower and results in delay in completing the project
- **Delivery Deadline –** This is the situation when the time frame to finalize the project has been expired but it has not yet been completed.
- **Loss of data –** This is a situation when the data of the users of get lost which causes problems in accessing database.

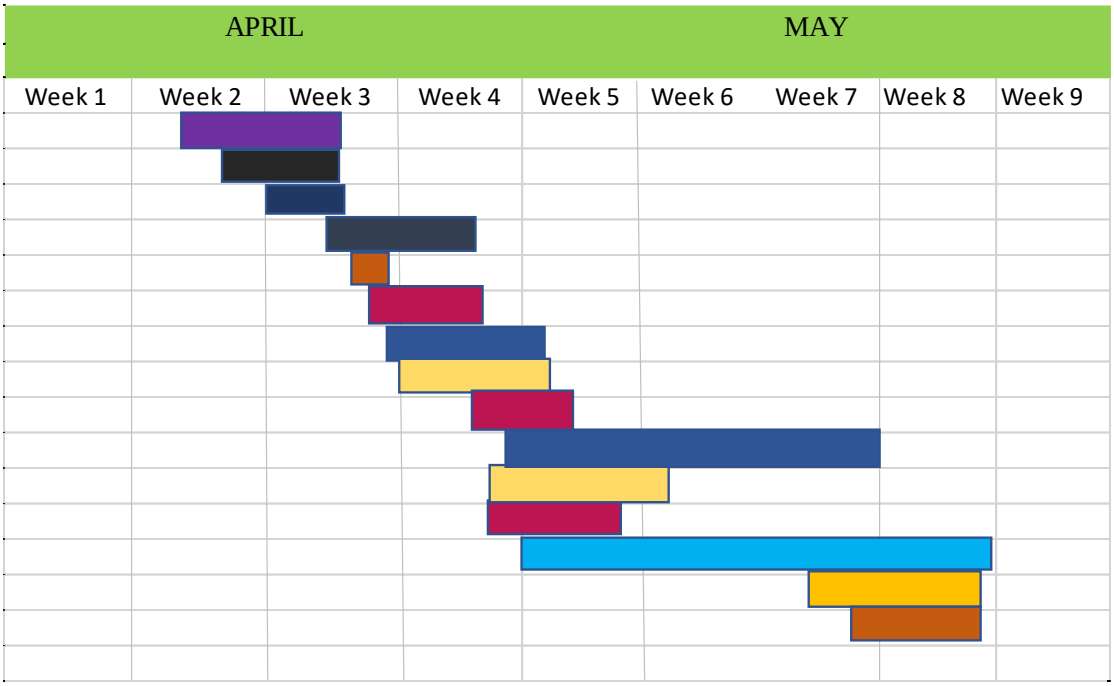
Sr no.	RISK	CATEGORY	PROBABILITY	IMPACT	RMMM PLAN
1	Server crash	Technical risk	high	1	Immediately allow
2	Human error	Operational Risk	low	6	Hiring skilled employee
3	Registration error	Technical Risk	moderate	3	Deploy technician to repair the error
4	Employee Resignation	Technical risk	moderate	2	Outsource the required employees.
5	Delivery deadline process.	Project risk	moderate	5	Team may use extra members to complete the task on schedule time.
6	Loss of data. (Hard disk Corrupted)	Project risk	low	4	Use cloud storage services.

15. GANTT CHART

Gantt Chart

- A Gantt chart is a chart that shows all of the different sub tasks of project and how are they relate to each other.
- A Gantt chart of all 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 been 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.

S No.	ACTIVITIES System Development Stages	STARTING 05.04.2022	ENDING 30.05.2022	DAYS 55
1	Initiation Stage	05.04.2022	13.04.2022	8
1.1	Analyse Project Request	08.04.2022	13.04.2022	6
1.2	Build Project Proposal	11.04.2022	13.04.2022	2
2	Planning Stage	13.04.2022	19.04.2022	6
2.1	Scheduled Activities	14.04.2022	16.04.2022	2
2.2	Collect Requirements	15.04.2022	19.04.2022	4
3	Analysis Stage	16.04.2022	24.04.2022	8
3.1	Find Project Requirement Specification	18.04.2022	25.04.2022	7
3.2	Searching Project Risk factors	20.04.2022	26.04.2022	6
4	Design Stage Start	22.04.2022	21.05.2022	29
4.1	Development of System Begin	28.04.2022	08.05.2022	10
4.2	Gather Hardware and Software details	28.04.2022	07.05.2022	9
4.3	Design of various project UML diagrams	02.05.2022	29.05.2022	27
4.4	Design Risk Management Plan	20.05.2022	27.05.2022	7
5	Project Implementation	21.05.2022	27.05.2022	6
5.1	Develop System software	27.05.2022	29.05.2022	2


APRIL
MAY
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9

16. Pert Chart

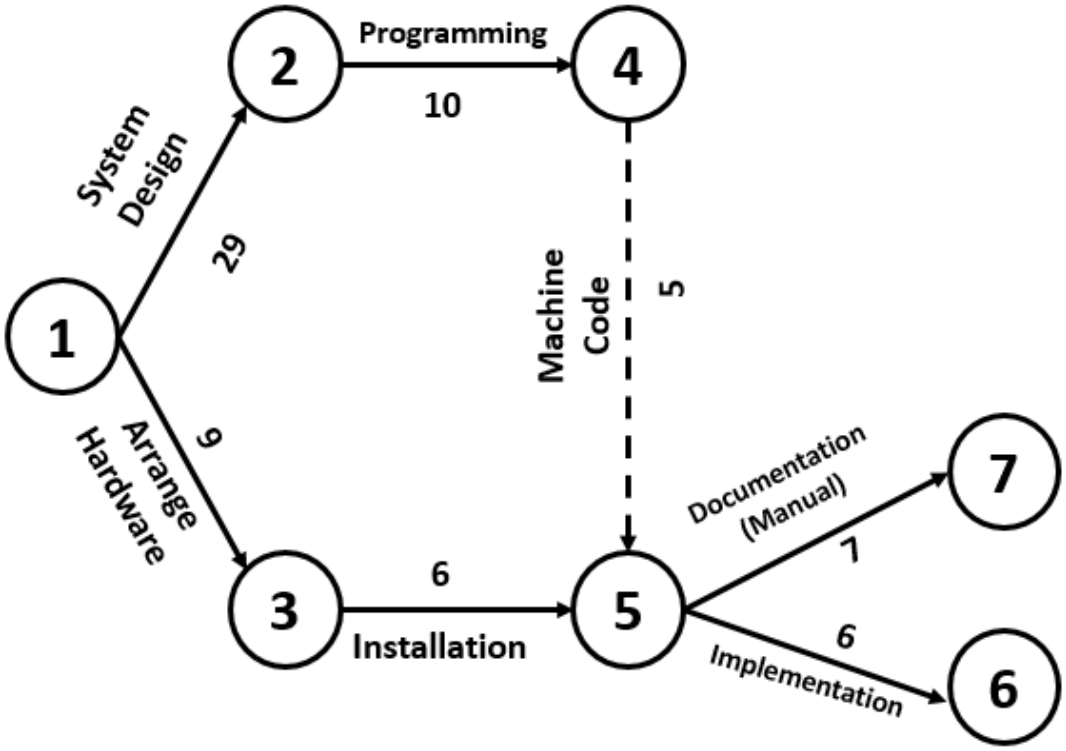
A PERT chart is a project management tool that provides a graphical representation of a project's timeline.

The diagram below shows all the stages of timeline in completing the ERCS project

Starting from system design to documentation.

In ERCS there are 7 stages of timelines. They are as follows -:

1. System Design: The first stage is designing the ERCS system. It includes all the UML and non-UML diagrams.
2. Programming: After designing is finished, programming part is implemented. The programmer will code according to the ERCS design.
3. Hardware: They are the resources you take into consideration while designing the system. The developer must acquire correct knowledge of hardware resources so that the system will run compatibly with hardware resources.
4. Implementation: The developer will implement the software to desired system to running functioning.
5. Installation: Now the ERCS software will be given to the client /end-user to test the software.
6. Documentation: It contains the details of ERCS software like user manual, system manual, installation manual, implementation manual and its limitations.


1
2
3
4
5
6
7
Programming
10
System
Design
29
Arrange
Hardware
9
Machine
Code
5
6
Installation
Documentation
(Manual)
7
6
Implementation

Pert Chart

17.Database for ERCS

The database “ERCS” is created and designed to keep the information of the examinees.

Database: ERCS	
Table Name	**Description**
Examinee	Keeps the information of the examinees.
Course	Keep the information of the courses and papers associated with the course.
Examiner	Keeps the information of the examiners
Examination	Keeps the information of the examination
Evaluator	Keeps the information of the evaluators
Result	Keep the information of the marks obtained by the examinees and their passing status
Examination Department	Keeps the information related to the management of the examination of various courses

CONCLUSION

The ERCS project that has been described above is a generic software which can be customized easily according to user requirements.

It will be possible to carry out examinations in an efficient manner, and it will also help to stop a significant number of human errors that occur during the process of evaluating answer sheets.

It will also make the process of result declaration easier and time efficient, and both students and teachers will be able to monitor each other's progress. In the end, the authorities will get accurate analytics of the institution's performance, at which point they will be able to take the appropriate steps to improve the resources' overall productivity.

The goal of this project is building a time and cost-efficient software which will increase the performance of the end-user/client.

FUTURE SCOPE

The system interface could be improved in the near future, with more appealing, interactive, and meaningful images available.

Email and text message functionality will be added to the system.

Almost all of the institution's services (online exams, online payment system, enrolment, library, and so on) will be computerised, making it a complete LMS.

A large future scope for the proposed project is warranted if it is successfully implemented.

People will benefit from it, and service providers will benefit as well, as their jobs will be more secure in the future.

We can strengthen academia by implementing more advanced analytic tools.

If a complete solution has not been found, it will evolve the system by developing multiple versions based on user feedback.

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    - Part 1: UML Class Diagram with solved example in Hindi || 1st part || MCS-032 || MCSL-036
    - Part 2: UML Class Diagram Solved Example(Hindi) || 2nd Part || MCS-032 || MCSL-036
13. Object diagram: UML Object Diagram with Example(HIndi) || MCS-032 || MCSL-036
14. Sequence diagram: UML Sequence Diagram for beginner with Solved Example in Hindi || MCS-032 || MCSL-036
15. Collaboration diagram: UML Collaboration Diagram with solved Example || MCS-032 || MCSL-036

16. Activity diagram: UML Activity Diagram with solved example and notes(HINDI) || IGNOU || MCS-032
17. State chart diagram: UML Activity Diagram with solved example and notes(HINDI) || IGNOU || MCS-032
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19. Deployment diagram: UML Deployment Diagram for beginner with Solved Example in Hindi | SOOAD Series