



**INVERTIS**  
UNIVERSITY BAREILLY

# Online Examination and Smart Proctoring System

A Java-based platform for secure, automated, and efficient online assessments

**Institution:** Invertis University ,  
B.Tech CSE (SEC-A , SEM 5)

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# Overview

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Manage Exams

## Manage Exams

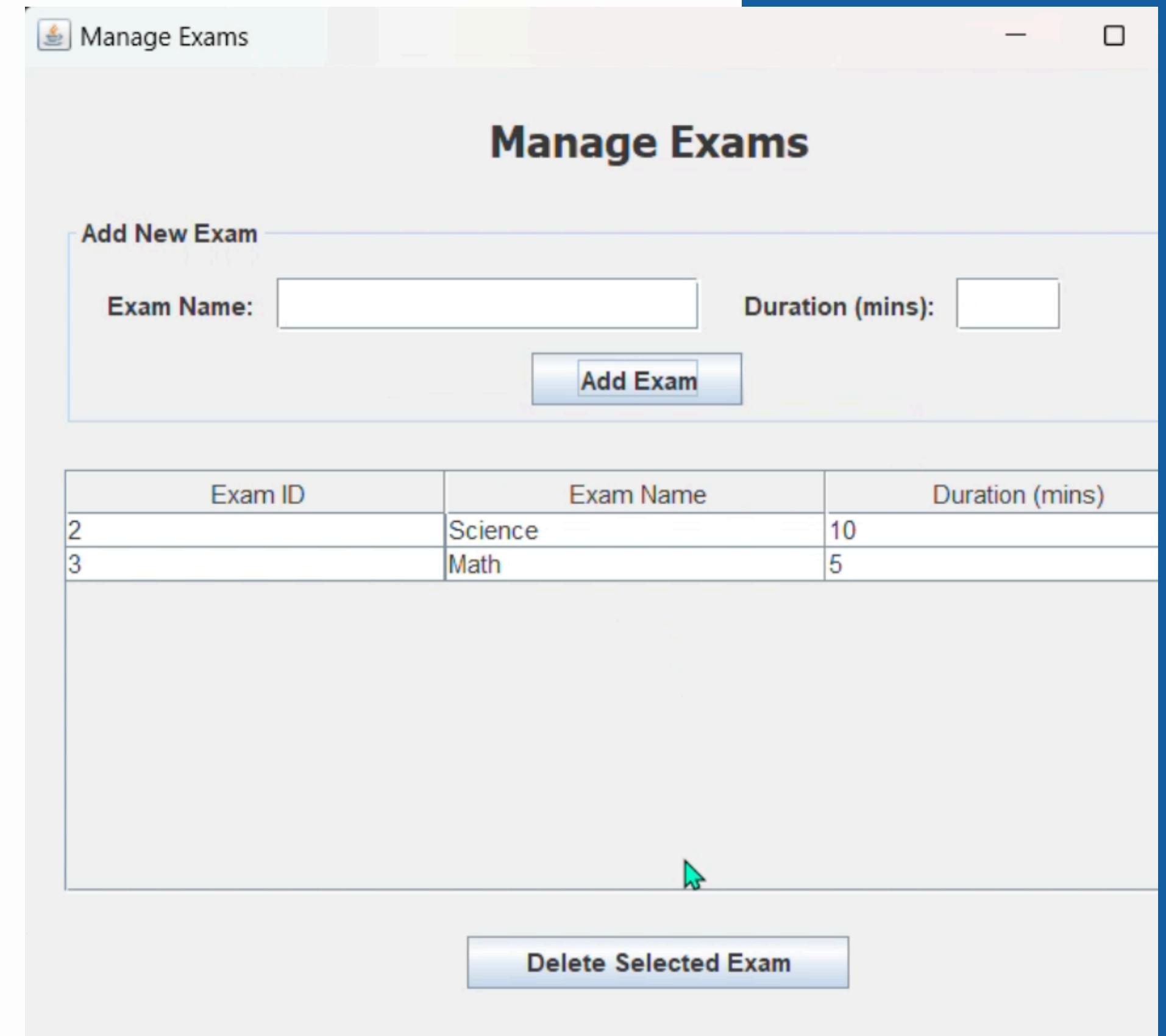
Add New Exam

Exam Name:  Duration (mins):

Add Exam

Exam ID	Exam Name	Duration (mins)
2	Science	10
3	Math	5

Delete Selected Exam





# Introduction

- A secure Java-based platform for conducting online exams.
- Includes role-based login for Students and Admin.
- Supports multiple exams, question banks, and stored results.
- Features security & anti-cheating (webcam + focus detection).
- Admin creates/manages exams; students attempt with live timer.

# Objectives

The project's objectives focus on enhancing exam integrity, improving accessibility, and simplifying the overall process.

Objective 01

**Ensure Secure  
& Fair Online  
Examinations**

Objective 02

**Provide a  
Complete Exam  
Management  
System**

Objective 03

**Deliver a Smooth  
Automated  
Workflow**

# System Architecture

## Presentation Layer (Swing GUI)

- Login, Registration, Student & Admin Dashboards
- Exam Window, Question Manager, Result Viewer

## Application Logic Layer

- Authentication & role handling
- Exam creation, question loading, validation
- Anti-cheating (camera + window focus)
- Timer and auto-submit

## Database Layer (MySQL + JDBC)

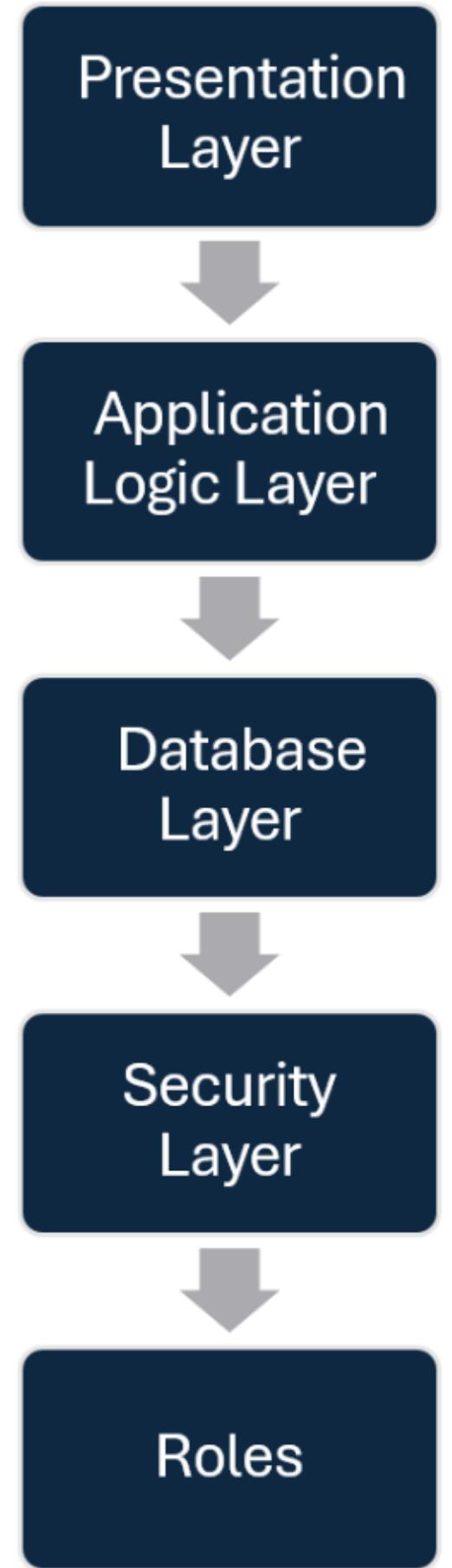
- UTables: Users, Exams, Questions, Results
- Secure data storage & retrieval via DatabaseUtil

## Security Layer

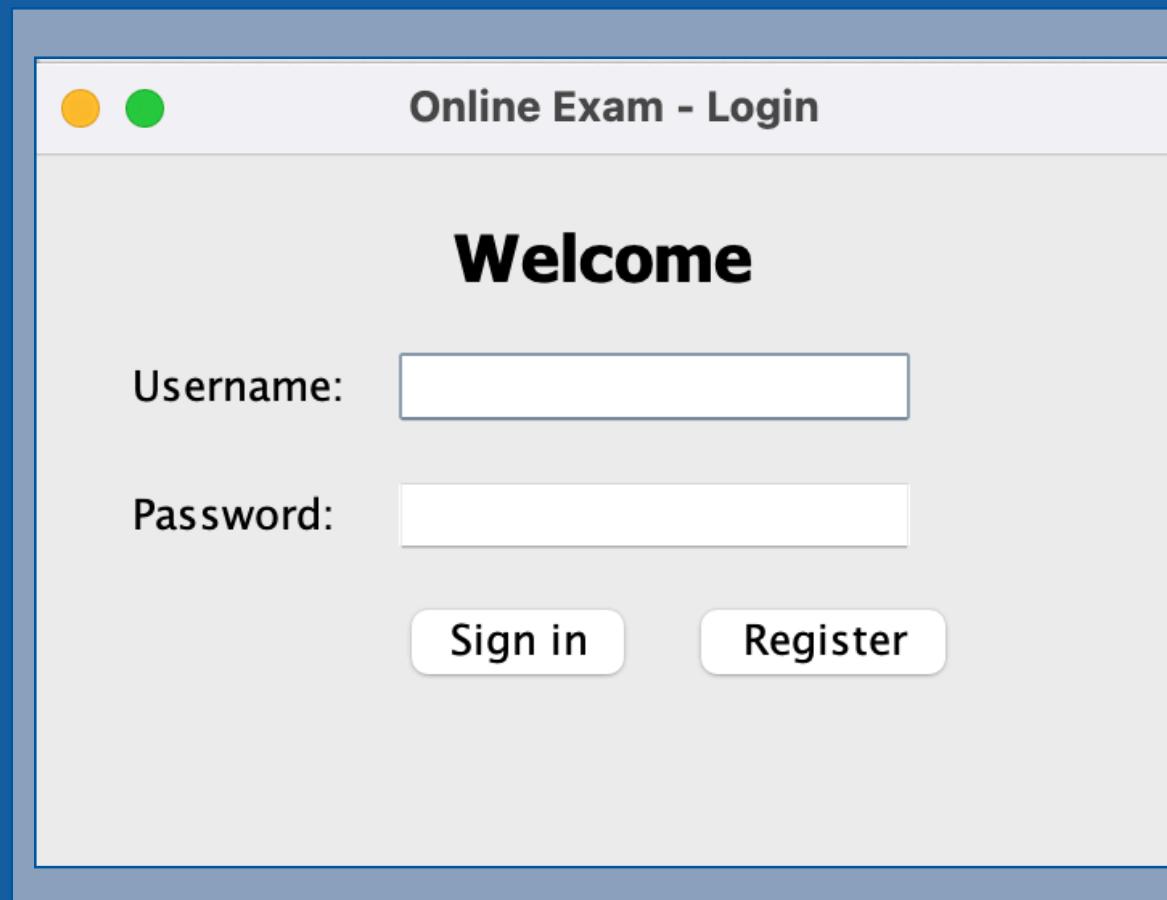
- Password encryption (SecurityUtil)
- Admin password recovery
- Webcam check & forced exam termination

## Roles

- Admin: Manage questions/exams/results
- Student: Attempt exams, view results

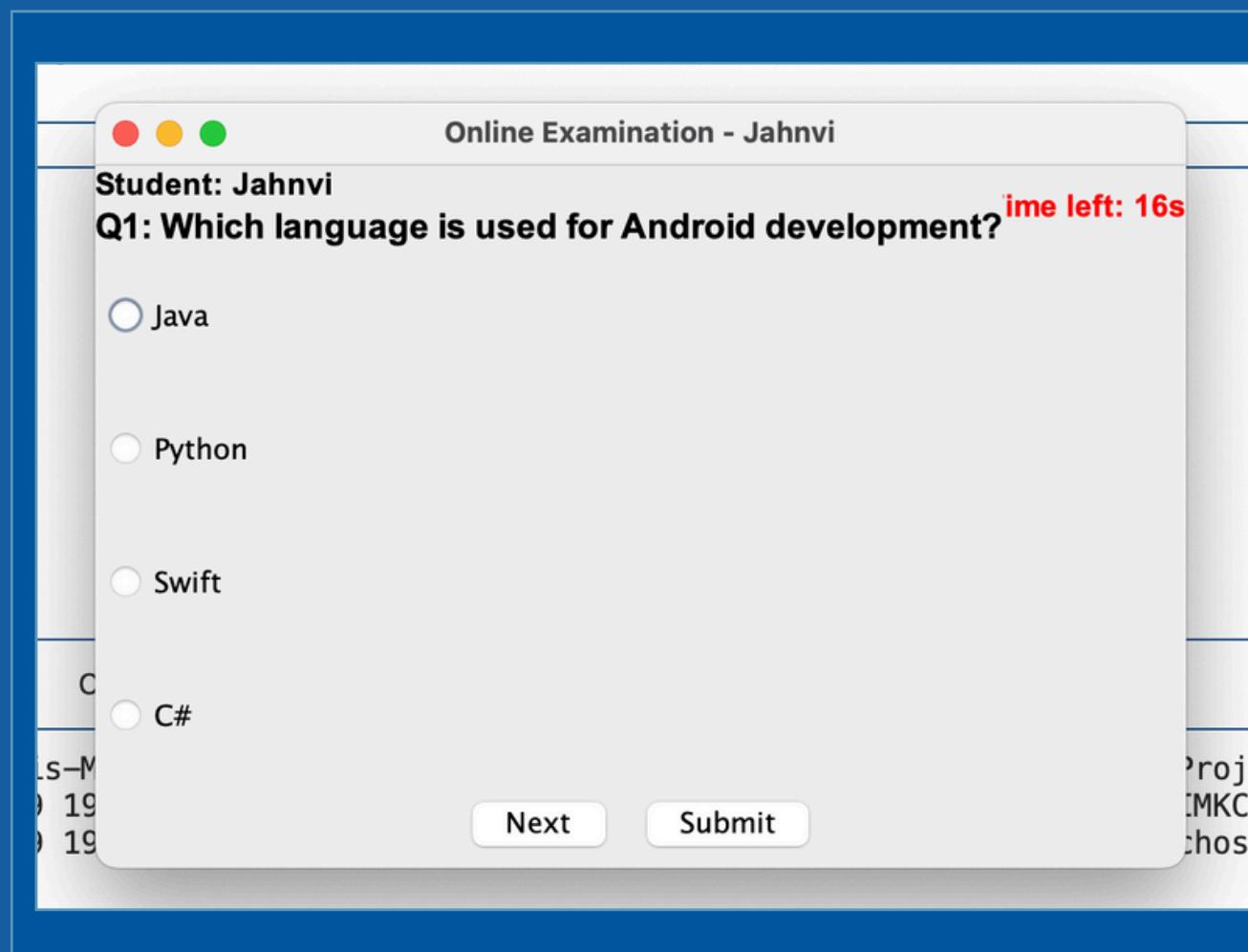


# WORKING OF LOGIN PAGE



- 01 User enters login details, which are verified through the database using DatabaseUtil.
- 02 Password is checked against the securely encrypted stored password.
- 03 Based on the role (Student/Admin), the system opens the respective dashboard.
- 04 Invalid inputs show error messages, and new users can register through RegistrationScreen.

# WORKING OF QUIZ APP



- 01 Loads the exam's questions and options dynamically from the database.
- 02 Displays each question with a live countdown timer and records the selected answer.
- 03 Anti-cheating checks run continuously (camera on + window focus). If violated, the exam auto-closes.
- 04 On submit or timer end, the system auto-calculates the score and saves the result in the database.

# Admin Side Features

- Dedicated dashboard to manage the entire examination system.
- Create, update, and delete exams with full database integration.
- Add, edit, and remove questions through an organized question manager.
- View all student results with real-time stored performance data.
- Secure access with encrypted login and admin-only controls.

**Manage Questions**

Select Exam: Math

Add New Question

Question: What is the Factorial Of 0?

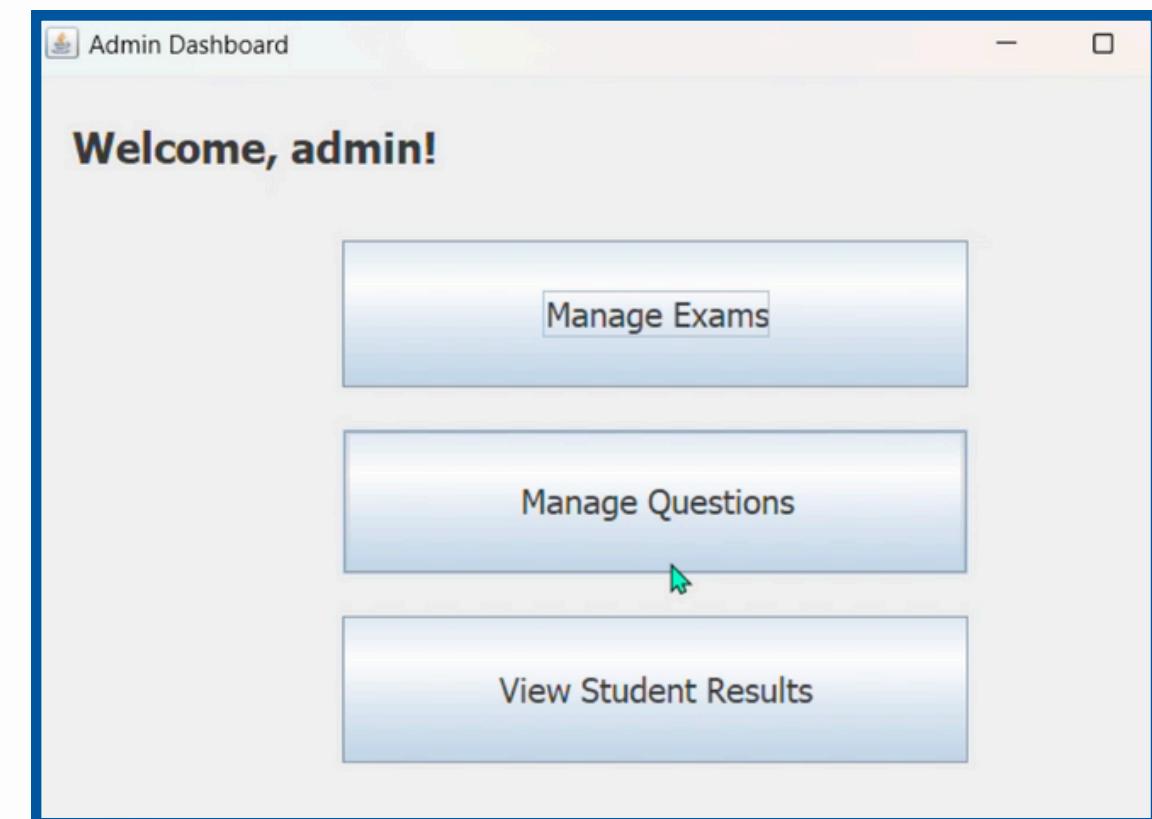
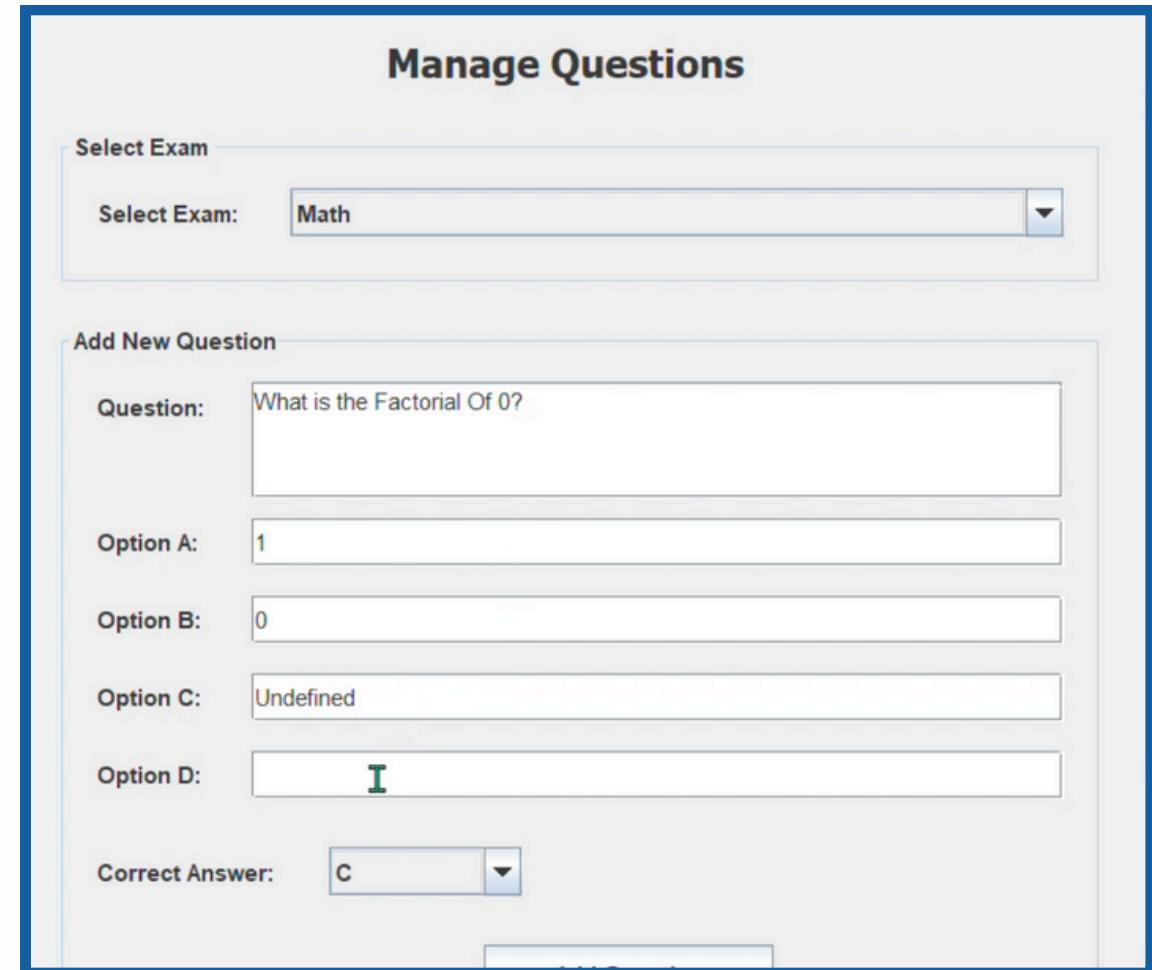
Option A: 1

Option B: 0

Option C: Undefined

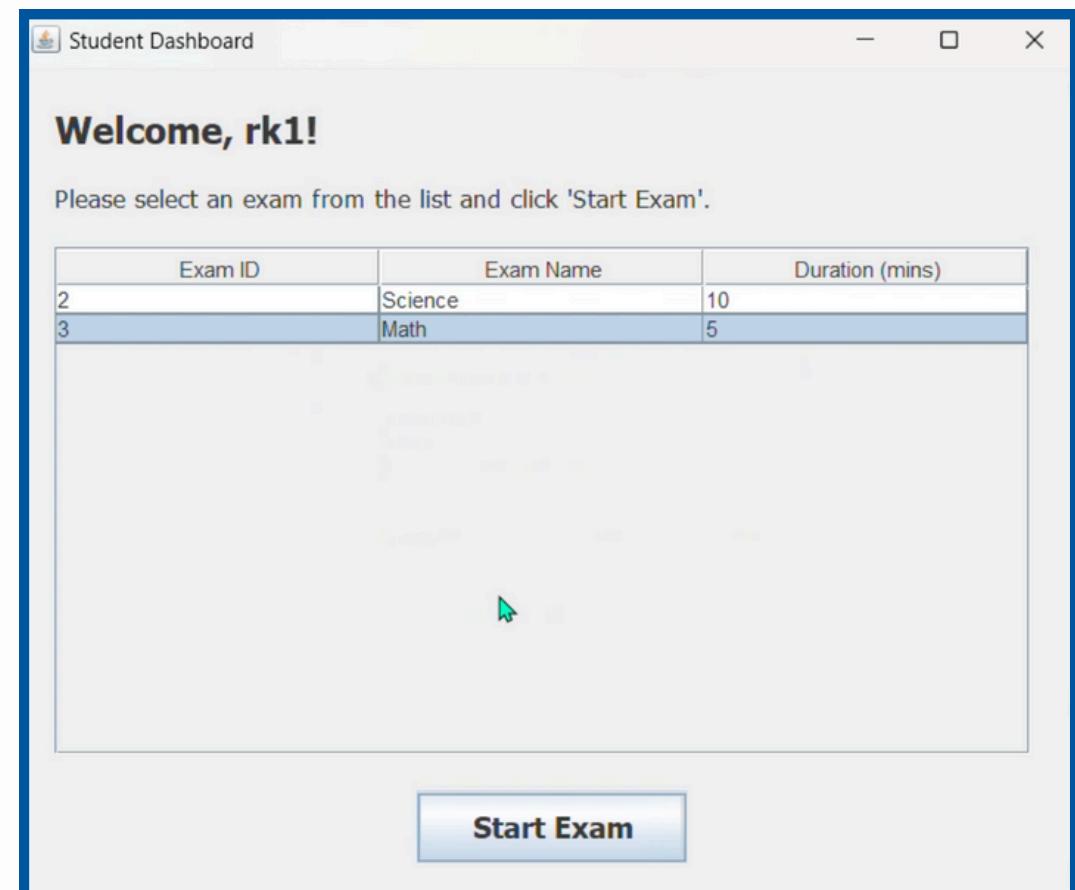
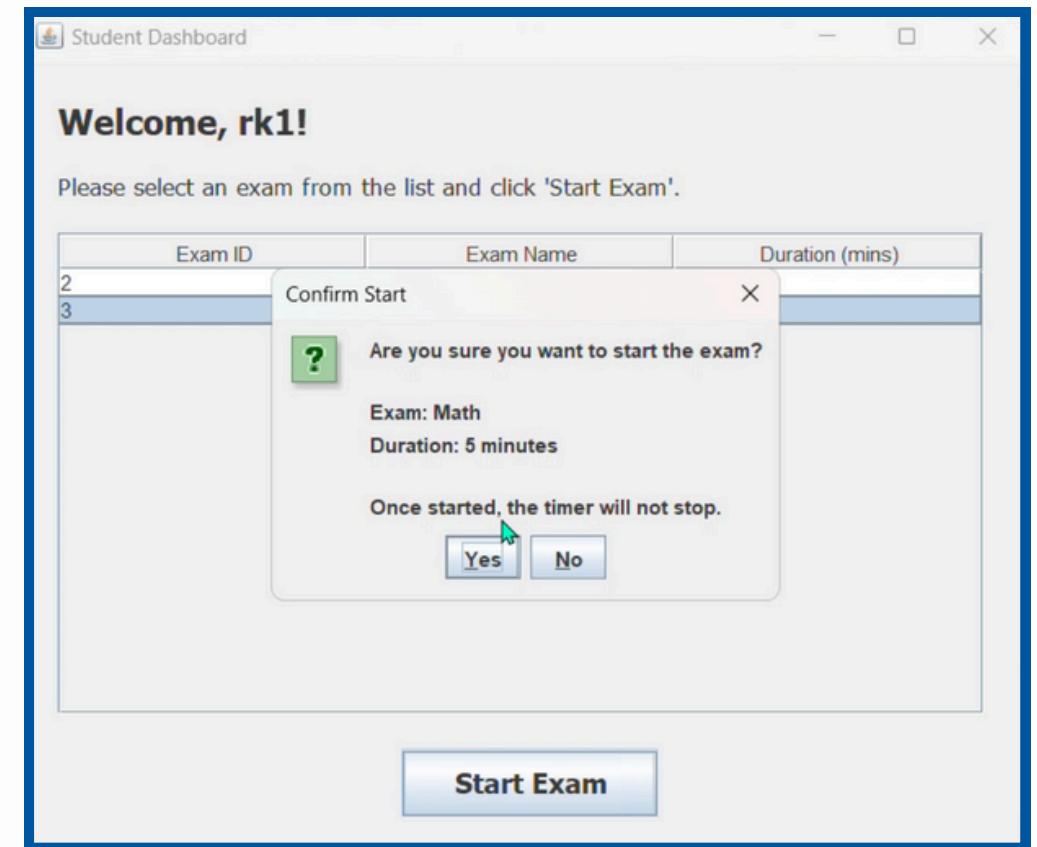
Option D: I

Correct Answer: C



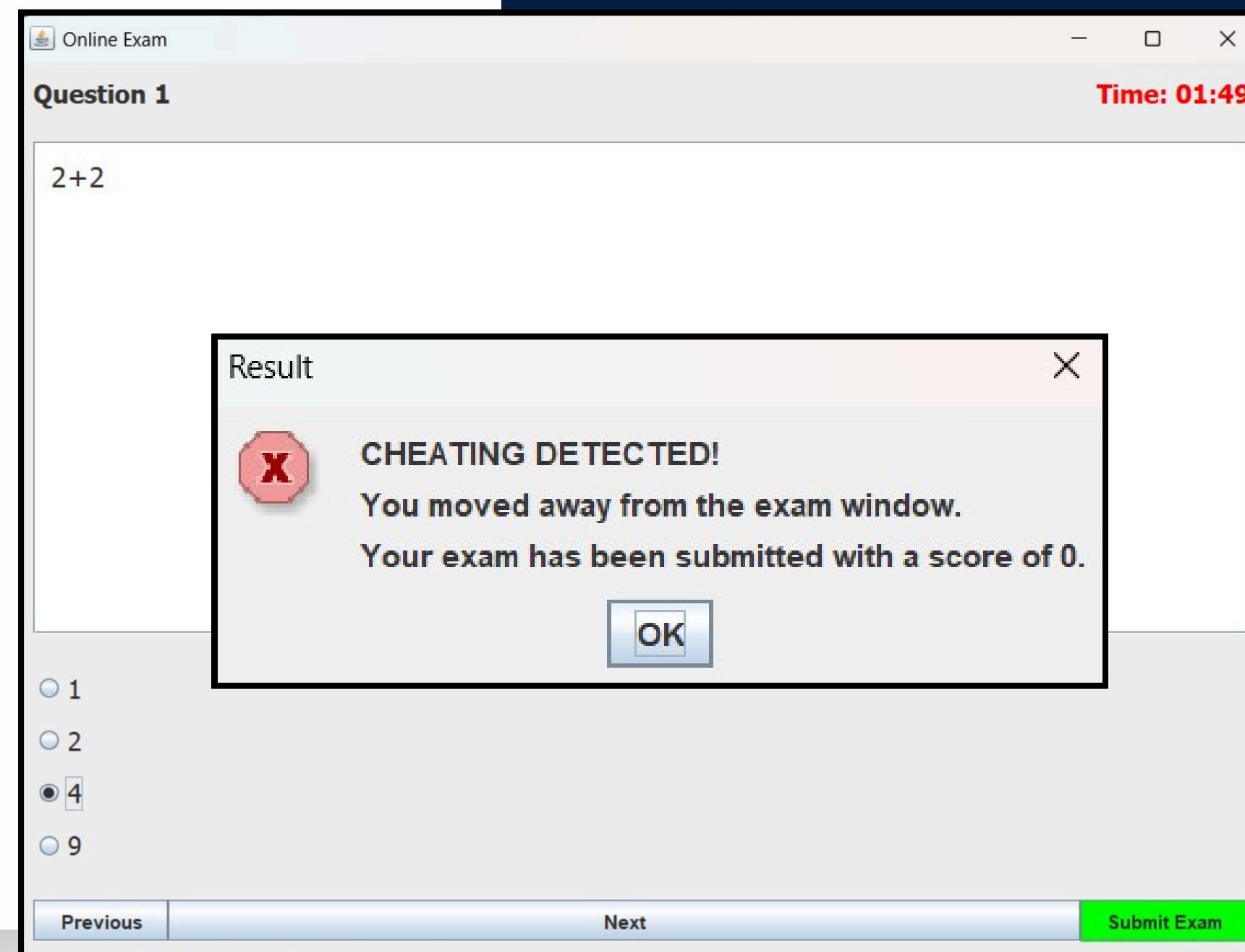
# Student Side Features

- Clean dashboard showing all available exams assigned by admin.
- Start exam with a live countdown timer and smooth question navigation.
- Answers auto-recorded and submitted securely.
- Instant score display and stored result history for future reference.
- Simple, user-friendly interface designed for fast interaction.



# Anti-Cheating Features

- Mandatory webcam monitoring; exam auto-closes if camera turns off.
- Window-focus detection with warnings for switching tabs or minimizing.
- Repeated violations trigger automatic submission for fairness.
- Timed questions prevent seeking help or unnecessary delays.
- Ensures a safe, supervised, and honest exam environment.



# Java Concepts Used

## Object-Oriented Programming

- Classes: LoginPage, User, Questions
- Encapsulation of data using private variables.

## Swing Framework

GUI design (windows, buttons, labels).

## Event Handling

ActionListener detects button clicks.

## Timer Class

Runs background countdown every second.

## WebCam API

Camera detection,  
Cheating Prevention

## Conditionals & Loops

Used to check answers and navigate questions

## Popups (JOptionPane)

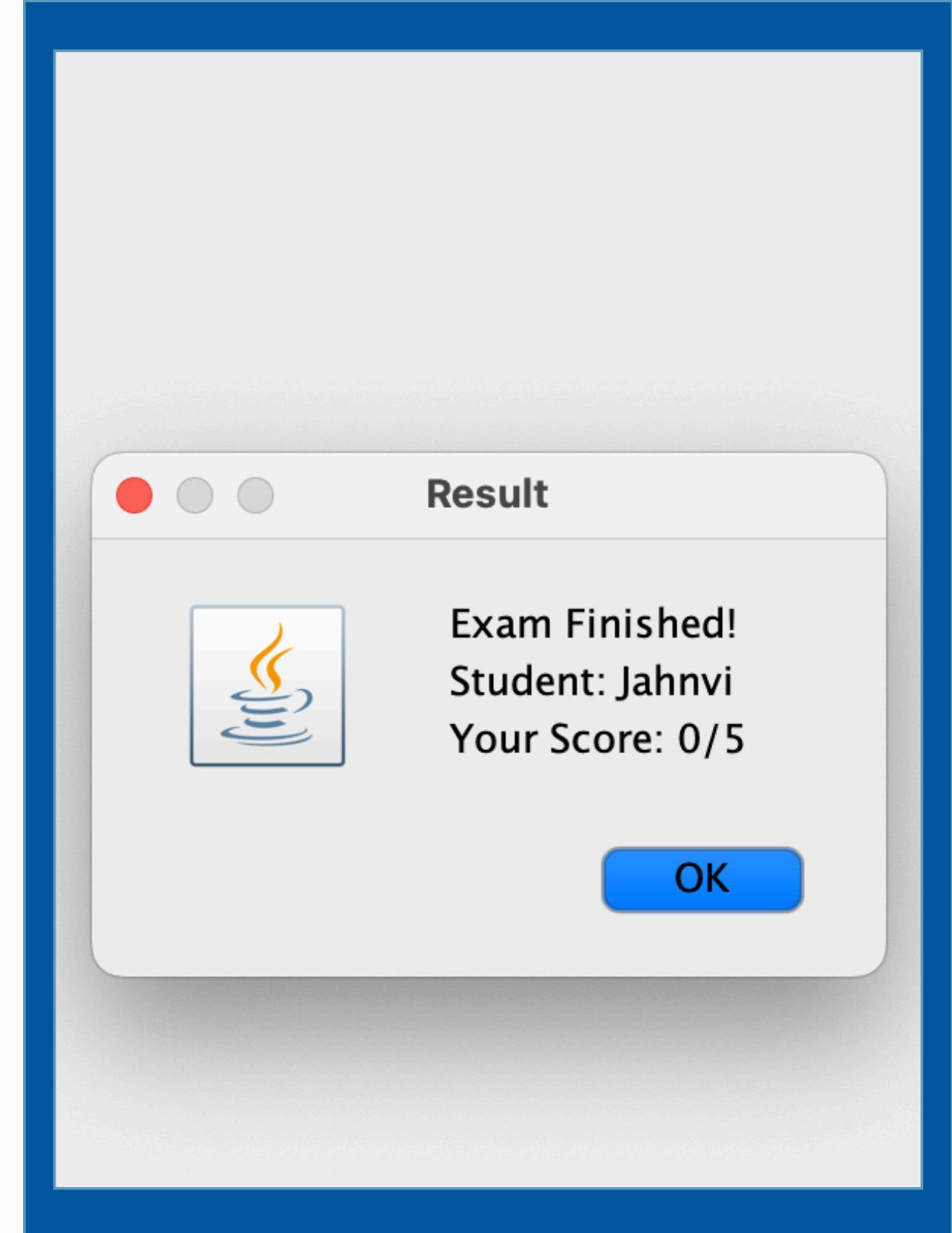
For messages and result display

# Technologies and Libraries Used

Technology / Library	Purpose in Project
Core Java (OOP)	Classes, objects, encapsulation, inheritance
Java Swing & AWT	GUI screens (buttons, labels, panels, forms)
JDBC (Java Database Connectivity)	Connect Java code to MySQL database
MySQL Database	Store users, questions, exams, results
java.sql Package	Statements, PreparedStatements, ResultSet
javax.swing.Timer	Countdown timer for exams
JOptionPane	Alerts, confirmations, result popups
SecurityUtil (Custom)	Password encryption & security
DatabaseUtil (Custom)	Database setup, queries, connection handling
Webcam API / Camera Integration Logic	Anti-cheating camera detection
Event Handling (ActionListener)	Button clicks, window interactions
Layout Managers	GridLayout, BorderLayout, FlowLayout

# Results & Outcome

- Stores every student's exam performance securely in the database.
- Instant and accurate score calculation through automated evaluation.
- Anti-cheating features ensure fair exam conditions.
- Admin can easily view all results, and students can check their past scores anytime.
- A scalable, professional system that supports multiple exams and complete exam management.



# Conclusion & Future Scope

- Successfully built a secure and scalable online exam platform using Java.
- Demonstrates real-life integration of OOP, Swing GUI, JDBC, and security mechanisms.

## Future Enhancements:

- Add advanced AI-based proctoring features.
- Provide detailed analytics and performance reports.
- Enable exporting results to PDF/Excel formats.
- Expand admin controls with scheduling and notification tools.



# Our Team

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# THANK YOU