

Database Objects in g1_examination_system

Schemas

n	Name	Description
1	core	Contains core entities like users, managers, departments, tracks, branches, intakes, instructors, and students.
2	courses	Manages course-related information, including course definitions and class offerings.
3	questions_bank	Stores questions, options, and accepted text answers for exams.
4	exams	Handles exam definitions, exam questions, and student exam registrations.
5	answers	Stores student answers and exam results.
6	manager_api	API schema for manager-specific stored procedures and views.
7	instructor_api	API schema for instructor-specific stored procedures, functions, and views.
8	student_api	API schema for student-specific stored procedures and views.

Tables

n	Name	Description
1	core.users	Stores user authentication and basic information (username, password, user type).
2	core.managers	Stores details for users with the 'manager' role.
3	core.departments	Stores department information.
4	core.tracks	Stores track information, linked to departments.
5	core.branches	Stores branch information, including name and location.
6	core.intakes	Stores academic intake years.
7	core.instructors	Stores details for users with the 'instructor' role, linked to departments.
8	core.students	Stores details for users with the 'student' role, linked to branches, tracks, and intakes.
9	courses.courses	Defines courses with names, descriptions, and degree ranges.
10	courses.class_offerings	Links courses, instructors, intakes, branches, and tracks to define specific class offerings.

n	Name	Description
11	questions_bank.questions	Stores exam questions, including text and type (MC, TF, text).
12	questions_bank.options	Stores options for multiple-choice and true/false questions, indicating correctness.
13	questions_bank.accepted_text_answers	Stores accepted patterns for text-based answers.
14	exams.exams	Defines individual exams, including type, time, total degree, and class association.
15	exams.exam_questions	Links exams to questions and specifies the degree for each question in an exam.
16	exams.exam_students	Records student registrations for specific exams, including exam date, start/end times, and submission time.
17	answers.student_answers	Stores individual student answers for exam questions, including chosen options or text answers, correctness, and manual scores.
18	answers.student_exam_results	Stores the final score for each student's exam attempt.
19	answers.class_results	Stores overall class results for students, including total score and pass/fail status.

Stored Procedures

n	Name	Description
1	manager_api.sp_add_user (@username varchar(20), @password nvarchar(100), @user_type varchar(20), @name nvarchar(100) = null, @email varchar(100) = null, @department_id int = null, @branch_id int = null, @track_id int = null, @intake_id int = null, @is_active bit = 1)	Adds a new user to the system, including their core user record, specific role table, and SQL Server login/user with appropriate roles.
2	manager_api.sp_update_user_auth (@user_id int, @new_username varchar(20) = null, @new_password nvarchar(100) = null, @new_user_type varchar(20) = null, @new_is_active bit = null)	Updates a user's authentication details (username, password, user type, active status) and manages associated SQL Server logins and roles.

n	Name	Description
3	manager_api.sp_update_user_details (@user_id int, @new_name nvarchar(100) = null, @new_email varchar(100) = null, @new_department_id int = null, @new_branch_id int = null, @new_track_id int = null, @new_intake_id int = null)	Updates specific details of a user (name, email, department, branch, track, intake) based on their user type.
4	manager_api.sp_delete_user (@user_id int)	Deletes a user from the system, including their core user record, specific role table, and SQL Server login/user.
5	manager_api.sp_edit_branch (@branchid int = null, @name nvarchar(100), @location nvarchar(100))	Inserts a new branch or updates an existing branch's name and location.
6	manager_api.sp_edit_track (@trackid int = null, @name nvarchar(100), @departmentid int)	Inserts a new track or updates an existing track's name and associated department.
7	manager_api.sp_edit_intake (@intakeid int = null, @intakeyear smallint)	Inserts a new intake year or updates an existing intake year.
8	manager_api.sp_edit_department (@departmentid int = null, @departmentname nvarchar(100))	Inserts a new department or updates an existing department's name.
9	manager_api.sp_delete_core_entity (@type varchar(20), @id int)	Deletes a core entity (branch, track, intake, or department) based on its type and ID.
10	instructor_api.sp_compute_final_exam_result (@exam_student_id int)	Computes and updates the final exam score for a student's exam attempt and their overall class result.
11	instructor_api.sp_manual_score_update (@student_answer_id int, @manual_score decimal(5,2))	Updates the manual score for a specific student answer and then recomputes the final exam result.

n	Name	Description
12	instructor_api.sp_searchexams (@course_name nvarchar(100) = null, @exam_type nvarchar(50) = null, @instructor nvarchar(100) = null, @exam_date datetime = null)	Searches for exams based on course name, exam type, instructor name, or exam date.
13	instructor_api.sp_add_exam (@instructorid int, @courseid int, @classid int, @examid int, @examtype nvarchar(50), @starttime datetime, @endtime datetime, @totaltime decimal(5,2), @extratime int, @openbook bit, @allowcalc bit, @questions exams.questionlist readonly)	Adds a new exam to the system, including its details and associated questions with their degrees.
14	instructor_api.sp_searchstudents (@studentname nvarchar(50) =null, @email nvarchar(50) =null ,@intakeid int= null)	Searches for students based on name, email, or intake ID.
15	student_api.sp_get_dashboard()	Retrieves a summary of student information and their exam statistics for the dashboard.
16	student_api.sp_get_student_exams()	Fetches a list of upcoming exams for the currently logged-in student.
17	student_api.sp_take_exam (@exam_student_id int)	Validates a student's eligibility for a specific exam and returns its questions and options.
18	student_api.sp_submit_answer (@exam_student_id int, @question_id int, @option_id int = null, @answer_text nvarchar(255) = null)	Records a student's answer for a specific question within an exam and updates their submission time.
19	student_api.sp_get_submitted_answers (@exam_student_id int)	Shows a student's submitted answers for a specific exam.

Functions

n	Name	Description
1	instructor_api.fn_check_mcq_answers (@option_id INT, @question_id INT)	Checks if a given option ID for an MCQ/TF question is correct.

n	Name	Description
2	instructor_api.fn_check_text_answers (@question_id INT, @student_answer NVARCHAR(255))	Checks if a student's text answer matches any accepted patterns for a given text question (case-insensitive and normalized).
3	func_CalculateAge (@DateOfBirth DATE)	Calculates the age of a person based on their date of birth.
4	func_GetCourseCredits (@CourseID INT)	Retrieves the total credits for a given course.
5	func_GetStudentFullName (@StudentID INT)	Retrieves the full name of a student.
6	func_GetInstructorFullName (@InstructorID INT)	Retrieves the full name of an instructor.
7	func_GetDepartmentName (@DepartmentID INT)	Retrieves the name of a department.
8	func_GetTotalEnrollmentsForCourse (@CourseID INT)	Calculates the total number of enrollments for a specific course.
9	func_GetAverageGradeForCourse (@CourseID INT)	Calculates the average grade for a specific course.
10	func_GetStudentGPA (@StudentID INT)	Calculates the GPA for a specific student.
11	func_CheckCoursePrerequisites (@CourseID INT, @StudentID INT)	Checks if a student meets the prerequisites for a given course.
12	func_GetCourseSchedule (@CourseID INT)	Retrieves the schedule for a specific course.
13	func_GetExamResultStatus (@ExamResultID INT)	Retrieves the status of an exam result (e.g., Pass/Fail).
14	func_GetStudentEnrollmentStatus (@StudentID INT, @CourseID INT)	Retrieves the enrollment status of a student in a specific course.
15	func_GetCourseCapacityStatus (@CourseID INT)	Retrieves the capacity status of a course (e.g., available seats).
16	func_GetInstructorCoursesCount (@InstructorID INT)	Counts the number of courses an instructor is teaching.
17	func_GetDepartmentBudget (@DepartmentID INT)	Retrieves the budget allocated to a specific department.

n	Name	Description
18	func_GetStudentTranscript (@StudentID INT)	Retrieves the academic transcript for a specific student.
19	func_GetCourseDescription (@CourseID INT)	Retrieves the description of a specific course.
20	func_GetExamType (@ExamID INT)	Retrieves the type of a specific exam.
21	func_GetStudentContactInfo (@StudentID INT)	Retrieves the contact information for a specific student.
22	func_GetInstructorContactInfo (@InstructorID INT)	Retrieves the contact information for a specific instructor.

Views

n	Name	Description
1	manager_api.vw_all_users	Provides a comprehensive view of all users with their details, including full name, email, and specific role-based information.
2	manager_api.vw_system_dashboard	Displays overall system statistics, such as active/inactive users, total students, instructors, managers, courses, classes, exams, and questions.
3	manager_api.vw_course_performance	Shows performance statistics for each course, including total classes, exams, students participated, average score, and pass/fail counts.
4	manager_api.vw_instructor_performance	Provides performance metrics for instructors, such as classes taught, courses taught, students taught, average student score, and pass/fail counts.
5	manager_api.vw_student_progress	Tracks student progress, including classes enrolled, passed/failed classes, overall average score, highest, and lowest scores.
6	manager_api.vw_exam_details	Offers detailed information about exams, including course name, instructor, branch, track, intake year, registered/submitted students, and average score.
7	manager_api.vw_questions_overview	Provides an overview of questions by course and type, including question count and average success rate.
8	manager_api.vw_departments_overview	Summarizes department information, including total instructors, tracks, and students within each department.

n	Name	Description
9	manager_api.vw_branches_overview	Displays statistics for branches, including total students, classes, and courses offered.
10	instructor_api.vw_questions	Provides a view of questions with associated course and instructor information.
11	instructor_api.vw_question_types	Lists distinct question types available in the question bank.
12	instructor_api.vw_question_options	Shows options for multiple-choice and true/false questions, indicating correctness.
13	instructor_api.vw_accepted_text_answers	Displays accepted text answer patterns for text-based questions.
14	instructor_api.vw_courses	Provides a view of courses with their details and associated instructor information.
15	instructor_api.vw_class_offerings	Details class offerings, linking courses, instructors, branches, tracks, and intakes.
16	instructor_api.vw_exams	Provides a view of exams with associated course and instructor information.
17	instructor_api.vw_exam_question_details	Shows details of questions within exams, including question text, degree, and associated class/course/instructor.
18	instructor_api.vw_exam_students	Provides details about students registered for exams, including exam type, student name, course, and submission times.
19	instructor_api.vw_student_result	Combines exam results and course results for students.
20	instructor_api.vw_exam_details	Provides comprehensive details about exams, including course, instructor, and individual questions with their types and degrees.

User-Defined Table Types

exams schema

n	Name	Description
1	exams.questionlist	A table type used to pass a list of questions and their degrees to stored procedures, specifically instructor_api.sp_add_exam .

Server Roles

n	Name	Description
1	manager	A server role granted permission to alter any login.

Database Roles

n	Name	Description
1	training_manager	A database role granted permissions to alter any user and alter any role within the g1_examination_system database.
2	instructor	A database role with execute and select permissions on the instructor_api schema.
3	student	A database role with execute and select permissions on the student_api schema.

Indexes

n	Name	Description
1	ix_students_user_id	Nonclustered index on core.students table, on the user_id column.
2	ix_students_track_intake_branch	Composite nonclustered index on core.students table, on track_id , intake_id , and branch_id columns.
3	ix_class_offerings_intake_id	Nonclustered index on courses.class_offerings table, on the intake_id column.
4	ix_options_question_id	Nonclustered index on questions_bank.options table, on the question_id column.
5	ix_exam_students_exam_id	Nonclustered index on exams.exam_students table, on the exam_id column.
6	ix_student_answers_question_id	Nonclustered index on answers.student_answers table, on the question_id column.
7	ix_student_answers_examstudent_question	Composite nonclustered index on answers.student_answers table, on exam_student_id and question_id columns.

Triggers

n	Name	Description
1	answers.trg_auto_grade_student_answer	An AFTER INSERT, UPDATE trigger on answers.student_answers that automatically grades student answers based on question type (MC/TF or text) and accepted patterns/correct options. It also recomputes the final exam and class results for affected students.
2	exams.trg_start_exam	An AFTER INSERT trigger on exams.exam_students that prevents a student from starting an exam outside the allowed start and end times.
3	exams.trg_exam_end_time	An AFTER INSERT trigger on exams.exam_students that prevents a student from submitting an exam after the allowed end time.