**Stored Procedure: dbo.Examanswer**

**Purpose**

This stored procedure is designed to **record or update a single answer** provided by a specific student for a specific question within a specific exam. It includes validation checks to ensure the question is valid for the exam and the submitted answer is appropriate for the question type (MCQ or True/False) or is explicitly NULL (indicating the question was skipped).

**Parameters**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Data Type** | **Description** | **Notes** |
| @exam\_id | INT | The unique identifier (**Exam\_ID**) of the exam being answered. | Required |
| @question\_id | INT | The unique identifier (**Question\_ID**) of the question being answered. | Required |
| @student\_id | INT | The unique identifier (**Student\_ID**) of the student submitting the answer. | Required |
| @answer | NVARCHAR(1000) | The text of the student's answer. | Required (Can be NULL) |

**Logic**

1. **Validate Question within Exam:**
   * It first checks the dbo.Exam\_Questions table to confirm that the provided @question\_id is actually part of the specified @exam\_id.
   * If the question is **not** part of the exam, it raises an error (Invalid Question ID...) and stops execution.
2. **Validate Answer (or handle NULL):**
   * **If @answer is NULL:** It accepts this as valid (meaning the student skipped the question) and proceeds to the insertion/update step.
   * **If @answer is NOT NULL:**
     + It retrieves the Question\_Type ('MCQ' or 'True/False') from the dbo.Question\_Bank table based on the @question\_id.
     + **For 'MCQ' questions:** It checks if the provided @answer text exists within the dbo.Question\_Choice table for that specific @question\_id.
     + **For 'True/False' questions:** It checks if the provided @answer (case-insensitive) is either 'TRUE' or 'FALSE'.
     + If the answer is **invalid** for the question type, it raises an error (Invalid answer...) and stops execution.
     + If the Question\_Type is unknown, it raises an error (Unknown Question Type...) and stops.
3. **Insert or Update Answer:**
   * If all validations pass, it checks if an answer record already exists in dbo.Student\_Exam\_Answer for the given @student\_id, @exam\_id, and @question\_id.
   * **If a record exists:** It **updates** the existing Student\_Answer with the new @answer and resets the Student\_Grade to NULL (assuming a regrade is needed).
   * **If no record exists:** It **inserts** a new row into dbo.Student\_Exam\_Answer with the provided details, setting the initial Student\_Grade to NULL.

**Error Handling**

* **Invalid Question for Exam:** Raises a specific error using RAISERROR if the @question\_id is not linked to the @exam\_id in dbo.Exam\_Questions.
* **Invalid Answer Choice:** Raises a specific error using RAISERROR if a non-NULL @answer is not a valid choice for an 'MCQ' question or not 'True'/'False' for a 'True/False' question.
* **Unknown Question Type:** Raises an error if the Question\_Type in dbo.Question\_Bank is neither 'MCQ' nor 'True/False'.
* **Database Errors:** Uses a TRY...CATCH block around the INSERT/UPDATE operations. If a database error occurs during the data modification (e.g., constraint violation, connection issue), the original error is re-thrown using THROW;.

**Usage Example**

SQL

-- Example 1: Submit a valid answer for an MCQ question

EXEC dbo.Examanswer

@exam\_id = 97,

@question\_id = 1,

@student\_id = 1,

@answer = N'Power BI Desktop';

-- Example 2: Submit a valid answer for a True/False question

EXEC dbo.Examanswer

@exam\_id = 97,

@question\_id = 2,

@student\_id = 1,

@answer = N'False'; -- Case doesn't matter here

-- Example 3: Submit a skipped answer (NULL)

EXEC dbo.Examanswer

@exam\_id = 97,

@question\_id = 3,

@student\_id = 1,

@answer = NULL;

-- Example 4: Update a previously submitted answer

EXEC dbo.Examanswer

@exam\_id = 97,

@question\_id = 1,

@student\_id = 1,

@answer = N'Power BI Service'; -- Change the answer for question 1

-- Example 5: This would raise an error (invalid choice for MCQ)

-- EXEC dbo.Examanswer @exam\_id = 97, @question\_id = 1, @student\_id = 1, @answer = N'Some Invalid Choice';

-- Example 6: This would raise an error (invalid question for the exam)

-- EXEC dbo.Examanswer @exam\_id = 97, @question\_id = 999, @student\_id = 1, @answer = N'Answer';