-- Stored Procedure: Allocate Open Elective Subjects to Students

-- Based on GPA, preferences, and seat availability

CREATE PROCEDURE AllocateSubjects

AS

BEGIN

-- Declare cursors and variables

DECLARE @StudentId INT, @SubjectId VARCHAR(20), @Preference INT, @GPA FLOAT;

-- Temp table to store allotments

IF OBJECT\_ID('tempdb..#Allotments') IS NOT NULL DROP TABLE #Allotments;

CREATE TABLE #Allotments (StudentId INT, SubjectId VARCHAR(20));

-- Temp table to track unallotted students

IF OBJECT\_ID('tempdb..#UnallotedStudents') IS NOT NULL DROP TABLE #UnallotedStudents;

CREATE TABLE #UnallotedStudents (StudentId INT);

-- Cursor to iterate students by GPA DESC

DECLARE student\_cursor CURSOR FOR

SELECT StudentId

FROM StudentDetails

ORDER BY GPA DESC;

OPEN student\_cursor;

FETCH NEXT FROM student\_cursor INTO @StudentId;

WHILE @@FETCH\_STATUS = 0

BEGIN

DECLARE @Allocated BIT = 0;

DECLARE preference\_cursor CURSOR FOR

SELECT SubjectId

FROM StudentPreference

WHERE StudentId = @StudentId

ORDER BY Preference;

OPEN preference\_cursor;

FETCH NEXT FROM preference\_cursor INTO @SubjectId;

WHILE @@FETCH\_STATUS = 0 AND @Allocated = 0

BEGIN

IF EXISTS (

SELECT 1 FROM SubjectDetails

WHERE SubjectId = @SubjectId AND RemainingSeats > 0

)

BEGIN

-- Allot the subject

INSERT INTO #Allotments VALUES (@StudentId, @SubjectId);

-- Update Remaining Seats

UPDATE SubjectDetails

SET RemainingSeats = RemainingSeats - 1

WHERE SubjectId = @SubjectId;

SET @Allocated = 1;

END

FETCH NEXT FROM preference\_cursor INTO @SubjectId;

END

CLOSE preference\_cursor;

DEALLOCATE preference\_cursor;

IF @Allocated = 0

BEGIN

INSERT INTO #UnallotedStudents VALUES (@StudentId);

END

FETCH NEXT FROM student\_cursor INTO @StudentId;

END

CLOSE student\_cursor;

DEALLOCATE student\_cursor;

-- Insert into final output tables

INSERT INTO Allotments (StudentId, SubjectId)

SELECT StudentId, SubjectId FROM #Allotments;

INSERT INTO UnallotedStudents (StudentId)

SELECT StudentId FROM #UnallotedStudents;

END

GO