

**Problem Statement:**

A college needs to develop a system to allocate Open Elective Subjects to its respective students. The way the system would work is that each student is allowed 5 choices with the respective preference, where number 1 indicates the first preference, number 2 indicates second preference and so on, the subjects are supposed to be allotted on the basis of the Student’s GPA, which means the student with the students with the highest GPAs are allotted the subject they want. Every subject has a limited number of seats so if a subject has 60 seats and all of them are filled then the student would not be allotted his first preference but instead second would be checked, if the second preference is full as well then the third preference would be checked, this process would be repeated till the student is allotted a subject of his/her choice. If in case all the preferences that the student has selected are already full, then the student would be considered as unallotted and would be marked so.

For example, Mohit has filled his 5 choices with the respective preferences and they are as following:

The below table has the subject to student mapping with the preference

Note: StudentId and SubjectId are foreign keys in this table.

Constraints: A single Student cannot select the same subject twice.

|  |  |  |
| --- | --- | --- |
| StudentId | SubjectId | Preference |
| 159103036 | PO1491 | 1 |
| 159103036 | PO1492 | 2 |
| 159103036 | PO1493 | 3 |
| 159103036 | PO1494 | 4 |
| 159103036 | PO1495 | 5 |

(Table Name: StudentPreference)

The below table has the details of subjects such as Subject Id, Subject name, and the maximum number of seats

Note: SubjectId is the primary key for this table

|  |  |  |  |
| --- | --- | --- | --- |
| SubjectId | SubjectName | MaxSeats | RemainingSeats |
| PO1491 | Basics of Political Science | 60 | 2 |
| PO1492 | Basics of Accounting | 120 | 119 |
| PO1493 | Basics of Financial Markets | 90 | 90 |
| PO1494 | Eco philosophy | 60 | 50 |
| PO1495 | Automotive Trends | 60 | 60 |

(Table Name: SubjectDetails)

The below table has the student Details such as StudentId, StudentName, GPA and their Branch:

Note: StudentId is the primary key for this table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| StudentId | StudentName | GPA | Branch | Section |
| 159103036 | Mohit Agarwal | 8.9 | CCE | A |
| 159103037 | Rohit Agarwal | 5.2 | CCE | A |
| 159103038 | Shohit Garg | 7.1 | CCE | B |
| 159103039 | Mrinal Malhotra | 7.9 | CCE | A |
| 159103040 | Mehreet Singh | 5.6 | CCE | A |
| 159103041 | Arjun Tehlan | 9.2 | CCE | B |

(Table Name: StudentDetails)

Final Resultant Table if the student has been allotted to a subject:

|  |  |
| --- | --- |
| SubjectId | StudentId |
| PO1491 | 159103036 |

(Table Name: Allotments)

Final Resultant Table if the student is unallotted:

|  |
| --- |
| StudentId |
| 159103036 |

(Table Name: UnallotedStudents)

Your Task is to write a Stored Procedure to assign all the students to a respective subject according the above stated workflow.

Code :

CREATE TABLE StudentPreference

( [StudentID] [BIGINT] NOT NULL,

[SubjectID] nvarchar(50),

[Preference] [smallint] NOT NULL

)

CREATE TABLE SubjectDetails(

[SubjectID] nvarchar(50),

[SubjectName] nvarchar(50),

[MaxSeats] [smallint] NOT NULL,

[RemainingSeats] [smallint] Not Null )

CREATE TABLE StudentDetails(

StudentId [BIGINT] Not Null,

StudentName nvarchar(50),

GPA DEC(4,3),

Branch nvarchar(5),

Section nvarchar(2)

)

CREATE TABLE Allotments (

[StudentID] [BIGINT] NOT NULL,

[SubjectID] nvarchar(50))

CREATE TABLE UnallotedStudents (

[StudentID] [BIGINT] NOT NULL,

)

INSERT INTO StudentPreference ([StudentId],[SubjectId],[Preference])

VALUES(159103036,'PO1491',1)

INSERT INTO StudentPreference ([StudentId] ,[SubjectId] ,[Preference])

VALUES (159103036,'PO1492',2)

INSERT INTO StudentPreference ([StudentId] ,[SubjectId],[Preference])

VALUES (159103036,'PO1493',3)

INSERT INTO StudentPreference([StudentId],[SubjectId],[Preference])

VALUES(159103036,'PO1494',4)

INSERT INTO StudentPreference([StudentId],[SubjectId],[Preference])

VALUES(159103036,'PO1495',5)

INSERT INTO SubjectDetails([SubjectId ],[SubjectName],[MaxSeats],[RemainingSeats])

VALUES ('PO1491', 'Basics of Political Science' ,60, 2)

INSERT INTO SubjectDetails([SubjectId ],[SubjectName],[MaxSeats],[RemainingSeats])

VALUES ('PO1492',' Basics of Accounting ',120, 119)

INSERT INTO SubjectDetails([SubjectId ],[SubjectName],[MaxSeats],[RemainingSeats])

VALUES('PO1493', 'Basics of Financial Markets', 90, 90)

INSERT INTO SubjectDetails([SubjectId ],[SubjectName] ,[MaxSeats],[RemainingSeats])

VALUES('PO1494' ,'Eco philosophy' ,60, 50)

INSERT INTO SubjectDetails ([SubjectId ],[SubjectName],[MaxSeats],[RemainingSeats])

VALUES ('PO1495', 'Automotive Trends', 60, 60)

INSERT INTO StudentDetails ([StudentId] ,[StudentName] ,[GPA] ,[Branch], [Section])

VALUES (159103036,' Mohit Agarwal' ,8.9, 'CCE',' A')

INSERT INTO StudentDetails ([StudentId] ,[StudentName] ,[GPA] ,[Branch], [Section])

VALUES (159103037,' Rohit Agarwal', 5.2, 'CCE',' A')

INSERT INTO StudentDetails ([StudentId] ,[StudentName] ,[GPA] ,[Branch], [Section])

VALUES (159103038,' Shohit Garg', 7.1,' CCE',' B')

INSERT INTO StudentDetails ([StudentId],[StudentName] ,[GPA],[Branch], [Section])

VALUES(159103039,' Mrinal Malhotra', 7.9 ,'CCE ','A')

INSERT INTO StudentDetails([StudentId],[StudentName],[GPA],[Branch],[Section])

VALUES(159103040,' Mehreet Singh', 5.6,' CCE',' A')

INSERT INTO StudentDetails ([StudentId] ,[StudentName] ,[GPA] ,[Branch], [Section])

VALUES (159103041 ,'Arjun Tehlan', 9.2,' CCE',' B')

CREATE PROCEDURE wsp\_AllocateSubjects

AS

BEGIN

-- Declare variables

DECLARE @student\_id BIGINT;

DECLARE @subject\_id CHAR(6);

DECLARE @preference INT;

DECLARE @max\_preference INT;

DECLARE @remaining\_seats INT;

-- Create a temporary table to store student preferences in order of GPA

CREATE TABLE #TempStudentPreferences (

StudentId BIGINT,

SubjectId CHAR(6),

Preference INT,

GPA INT

);

INSERT INTO #TempStudentPreferences (StudentId, SubjectId, Preference, GPA) SELECT

sp.StudentId, sp.SubjectId, sp.Preference, sd.GPAFROM

StudentPreference sp

INNER JOIN StudentDetails sd ON sp.StudentId = sd.StudentId

ORDER BY sd.GPA DESC;

-- Loop through the temporary table to allocate subjects to students WHILE (SELECT COUNT(\*) FROM #TempStudentPreferences) > 0

BEGIN

-- Get the first student in the temporary table

SELECT TOP 1 @student\_id = StudentId FROM #TempStudentPreferences;

-- Initialize the preference counter

SET @preference = 1;

-- Loop through the student's preferences

WHILE @preference <= 5

BEGIN

-- Get the subject based on the preference

SELECT TOP 1 @subject\_id = SubjectId

FROM #TempStudentPreferences

WHERE StudentId = @student\_id AND Preference = @preference;

-- Check if the subject has available seats

SELECT @remaining\_seats = RemainingSeats FROM SubjectDetails WHERE SubjectId = @subject\_id;

IF @remaining\_seats > 0

BEGIN

-- Allocate the subject to the student

INSERT INTO Allotments (SubjectId, StudentId) VALUES (@subject\_id,

@student\_id);

-- Update the remaining seats for the subject

UPDATE SubjectDetails SET RemainingSeats = @remaining\_seats - 1 WHERE SubjectId = @subject\_id;

-- Remove the student from the temporary table

DELETE FROM #TempStudentPreferences WHERE StudentId = @student\_id;

-- Break the preference loop as the student has been allocated a subject BREAK;

END

-- Increment the preference counter to check the next preference SET @preference = @preference + 1;

END

-- If the loop finishes without an allocation, the student is unallottedIF @preference > 5

BEGIN

INSERT INTO UnallotedStudents (StudentId) VALUES (@student\_id); DELETE FROM #TempStudentPreferences WHERE StudentId = @student\_id;

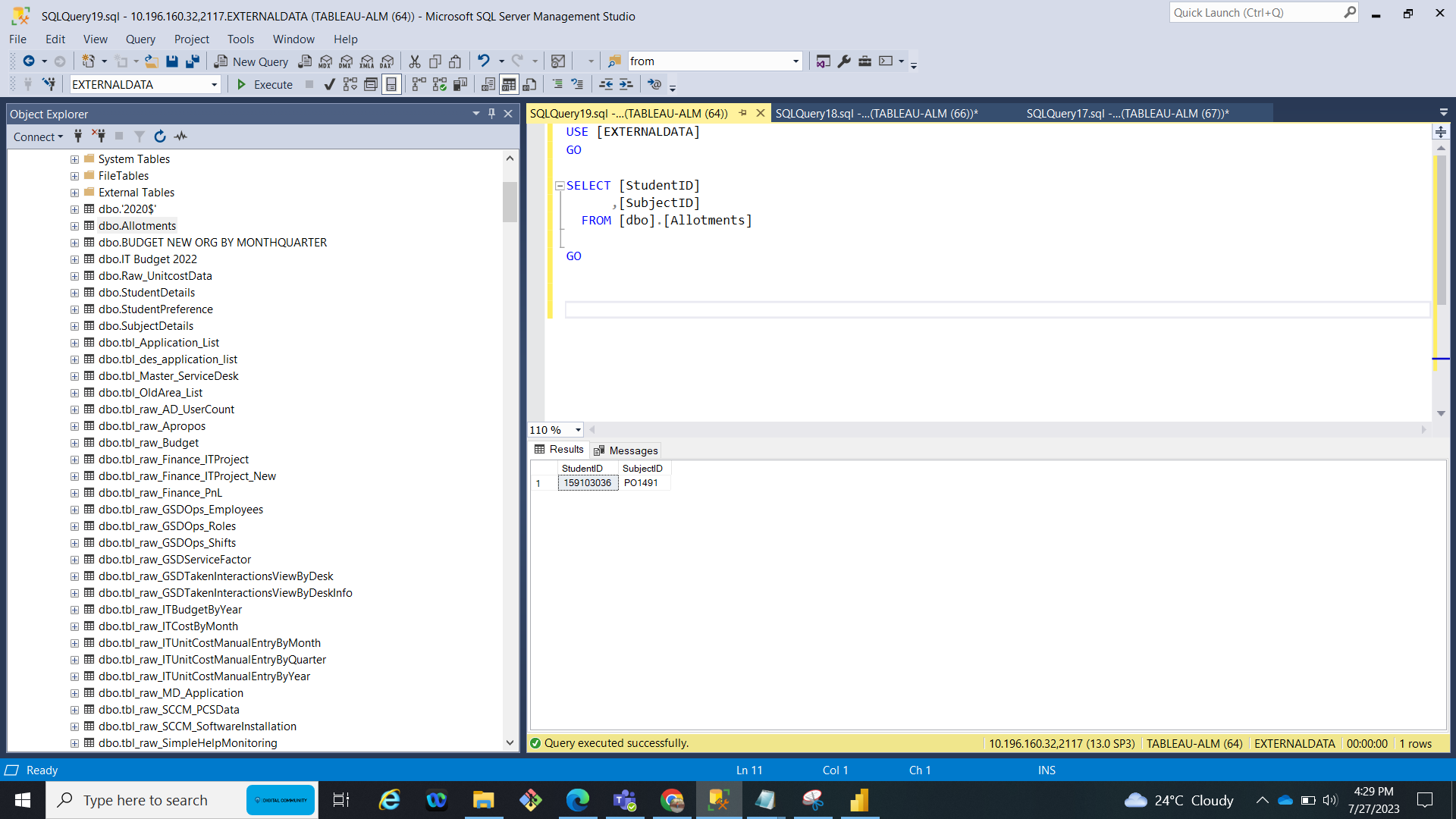
END

END

-- Drop the temporary table

DROP TABLE IF EXISTS #TempStudentPreferences; END;

GO



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