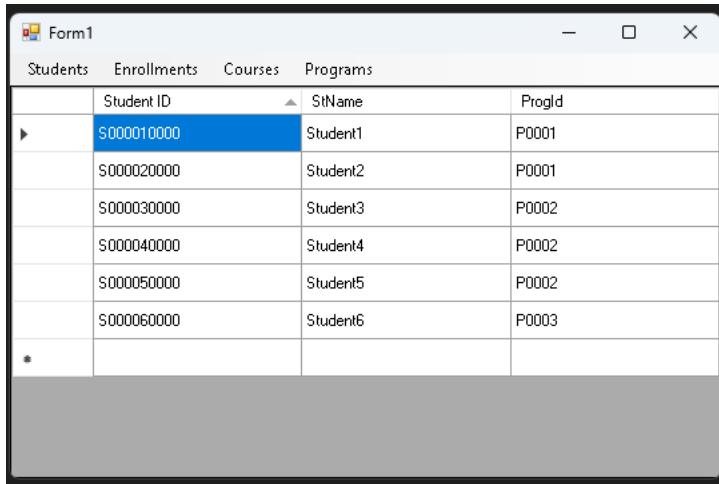


FINAL PROJECT – MULTI-TIER, Fall 2023

Student – Bruno Lopes (2234087)

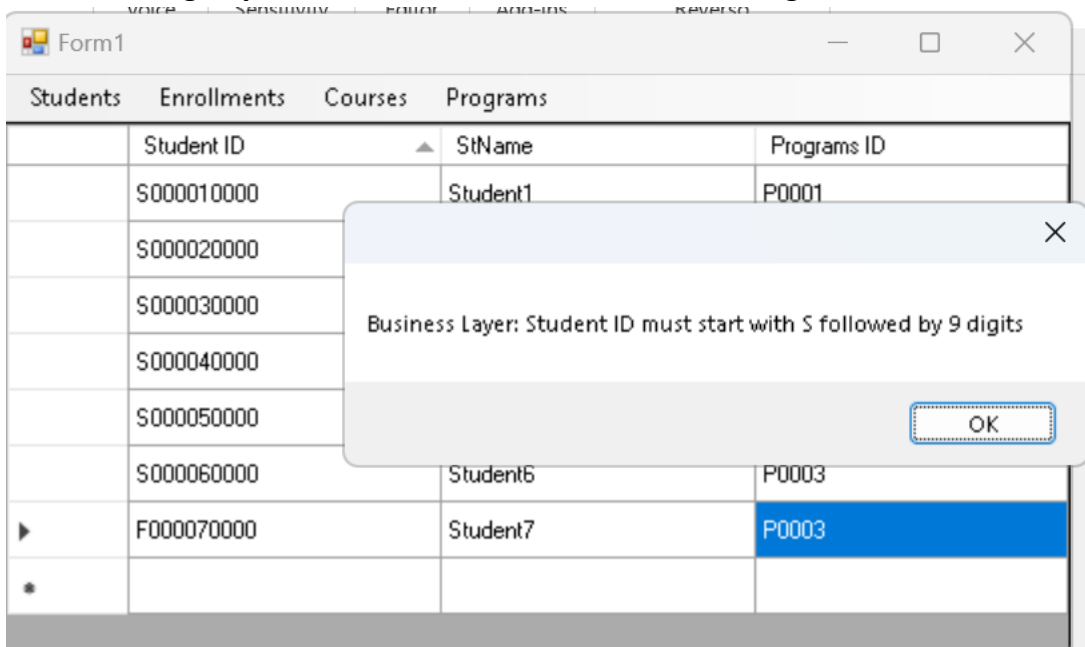
- FORMS

➤ Table Students – able to add and remove students



Students	Enrollments	Courses	Programs
Student ID	StName	ProgId	
S000010000	Student1	P0001	
S000020000	Student2	P0001	
S000030000	Student3	P0002	
S000040000	Student4	P0002	
S000050000	Student5	P0002	
S000060000	Student6	P0003	
*			

Error Handling: Try to add new student with ID in the wrong format



Students	Enrollments	Courses	Programs
Student ID	StName	Programs ID	
S000010000	Student1	P0001	
S000020000			
S000030000			
S000040000			
S000050000			
S000060000	Student6	P0003	
F000070000	Student7	P0003	
*			

Business Layer: Student ID must start with S followed by 9 digits

OK

➤ Table Courses

Form1			
Students	Enrollments	Courses	Programs
	Course ID	CName	ProgId
▶	C000100	C#	P0001
	C000200	Python	P0001
	C000300	Economy	P0002
	C000400	Taxes	P0002
	C000500	Java	P0001
	C000600	Management	P0003
*			

Error Handling: Try to add new course with ID in the wrong format

Form1			
Students	Enrollments	Courses	Programs
	Course ID	CName	Programs ID
	C000100		
	C000200		
	C000300		
	C000400		
	C000500		
	C000600	Management	P0003
▶	K000700	Math	P0001
*			

Business Layer: Course ID must start with C followed by 6 digits

OK

➤ Table Programs

Form1		
Students	Enrollments	Programs
	Programs ID	ProgName
▶	P0001	IT
	P0002	Finances
	P0003	Management
*		

Error Handling: Try to add new Program with ID in the wrong format

The screenshot shows a window titled 'Form1' with tabs for 'Students', 'Enrollments', 'Courses', and 'Programs'. The 'Programs' tab is active, displaying a table with columns 'Programs ID' and 'ProgName'. The table contains four rows: P0001 (IT), P0002 (Finances), P0003 (Management), and B0004 (Management). The row with ID 'B0004' is selected. A modal dialog box is open in the foreground with the text: 'Business Layer: Program ID must start with P followed by 4 digits'. An 'OK' button is at the bottom right of the dialog.

Programs ID	ProgName
P0001	IT
P0002	Finances
P0003	Management
B0004	Management

Business Layer: Program ID must start with P followed by 4 digits

OK

➤ Enrollments View

The screenshot shows a window titled 'Form1' with tabs for 'Students', 'Enrollments', 'Courses', and 'Programs'. The 'Enrollments' tab is active, displaying a table with columns: 'Student ID', 'StName', 'CId', 'CName', 'Final Grade', 'Programs ID', and 'ProgName'. The table contains six rows of enrollment data. The first row is highlighted.

Student ID	StName	CId	CName	Final Grade	Programs ID	ProgName
S0000100...	Student1	C000100	C#	90	P0001	IT
S0000100...	Student1	C000200	Phyton	98	P0001	IT
S0000100...	Student1	C000500	Java	95	P0001	IT
S0000200...	Student2	C000200	Phyton		P0001	IT
S0000400...	Student4	C000400	Taxes	80	P0002	Finances
S0000500...	Student5	C000400	Taxes		P0002	Finances

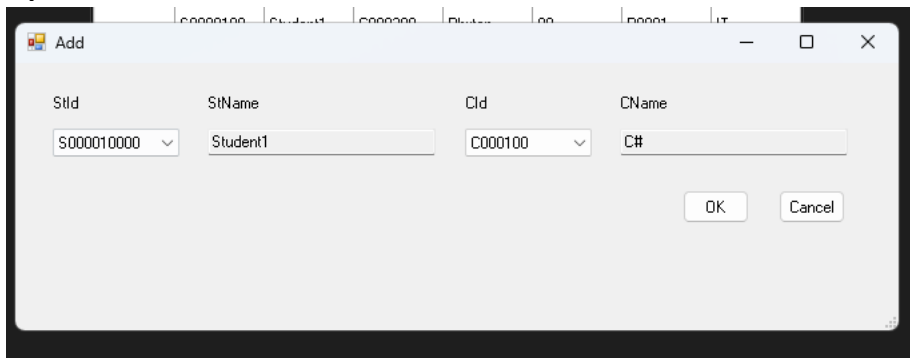
• ENROLLMENTS SUBMENU

The screenshot shows a window titled 'Form1' with tabs for 'Students', 'Enrollments', 'Courses', and 'Programs'. The 'Enrollments' tab is active, and a submenu is open over it. The submenu contains the options: 'add', 'modify', 'delete', and 'Manage Final Grade'. The table in the background is the same as in the previous screenshot, with the first row highlighted.

Student ID	StName	CId	CName	Final Grade	Programs ID	ProgName
S0000100...	Student1	C000500	Java	95	P0001	IT
S0000200...	Student2	C000200	Phyton		P0001	IT
S0000400...	Student4	C000400	Taxes	80	P0002	Finances
S0000500...	Student5	C000400	Taxes		P0002	Finances

add
modify
delete
Manage Final Grade

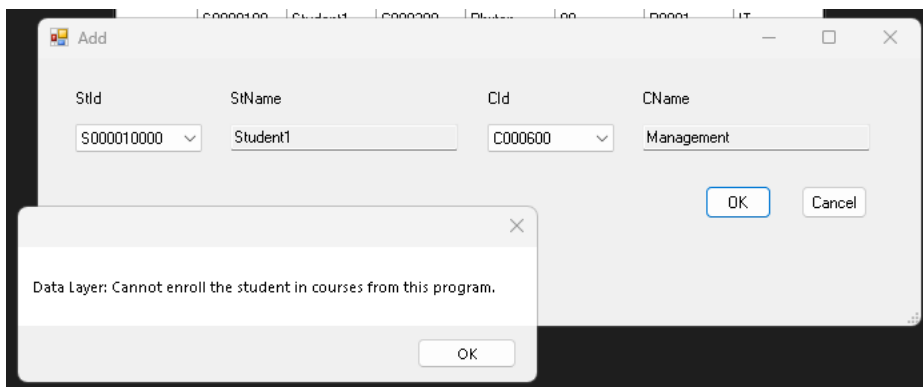
➤ Option add



A dialog box titled "Add" with a standard Windows window frame. It contains four input fields arranged in a 2x2 grid. The first row has labels "StId", "StName", "CId", and "CName". The second row has a dropdown menu with "S000010000", a text box with "Student1", a dropdown menu with "C000100", and a text box with "C#". At the bottom right are "OK" and "Cancel" buttons.

StId	StName	CId	CName
S000010000	Student1	C000100	C#

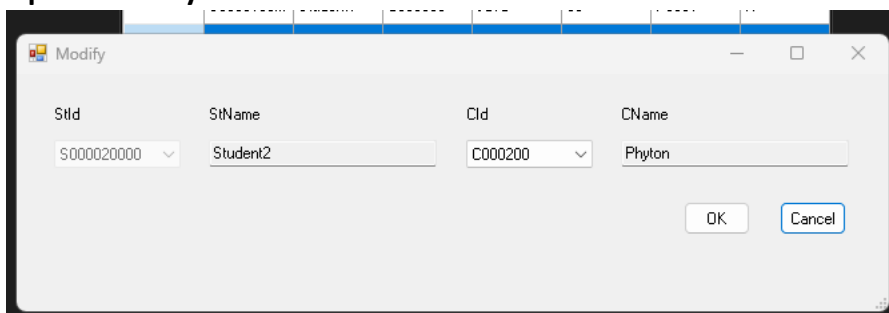
Error Handling: Try to enroll a student in a course from another Program



The "Add" dialog box is shown with "S000010000" in the StId field, "Student1" in the StName field, "C000600" in the CId field, and "Management" in the CName field. An error message box is overlaid on top of the dialog. The error message box has a title bar with a close button and contains the text "Data Layer: Cannot enroll the student in courses from this program." with an "OK" button at the bottom.

Data Layer: Cannot enroll the student in courses from this program.

➤ Option modify



A dialog box titled "Modify" with a standard Windows window frame. It contains four input fields arranged in a 2x2 grid. The first row has labels "StId", "StName", "CId", and "CName". The second row has a dropdown menu with "S000020000", a text box with "Student2", a dropdown menu with "C000200", and a text box with "Phyton". At the bottom right are "OK" and "Cancel" buttons.

StId	StName	CId	CName
S000020000	Student2	C000200	Phyton

Modify

SId: S000020000

StName: Student2

CId: C000200, C000100, C000200, C000300, C000400, C000500, C000600

CName: Phyton

OK Cancel

Form1

Students Enrollments Courses Programs

	Student ID	StName	CId	CName	Final Grade	ProgId	ProgName
	S0000100...	Student1	C000100	C#	90	P0001	IT
	S0000100...	Student1	C000200	Phyton	98	P0001	IT
	S0000100...	Student1	C000500	Java	95	P0001	IT
▶	S0000200...	Student2	C000100	C#		P0001	IT
	S0000400...	Student4	C000400	Taxes	80	P0002	Finances
	S0000500...	Student5	C000400	Taxes		P0002	Finances
*							

Error Handling: Try to modify a row that has already a Final Grade:

Form1

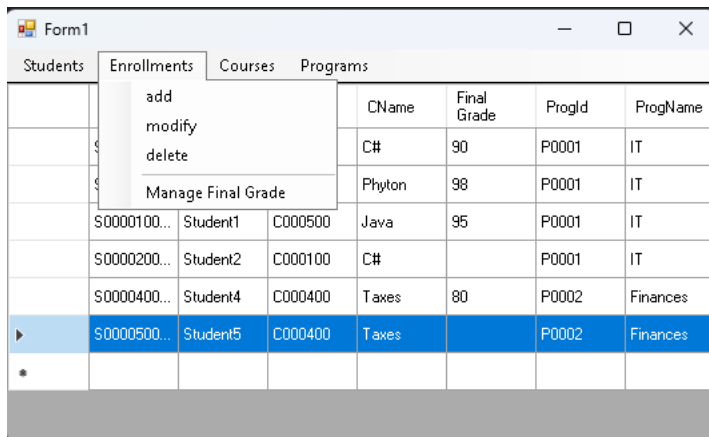
Students Enrollments Courses Programs

	Student ID	StName	CId	CName	Final Grade	ProgId	ProgName
	S0000100...	Student1	C000100	C#	90	P0001	IT
	S0000100...	Student1	C000200	Phyton	98	P0001	IT
▶	S0000100...	Student1	C000500	Java	95	P0001	IT
	S0000200...	Student2	C000100	C#		P0001	IT
							Finances
							Finances

Cannot modify. To update this row, Final Grade must be removed first

OK

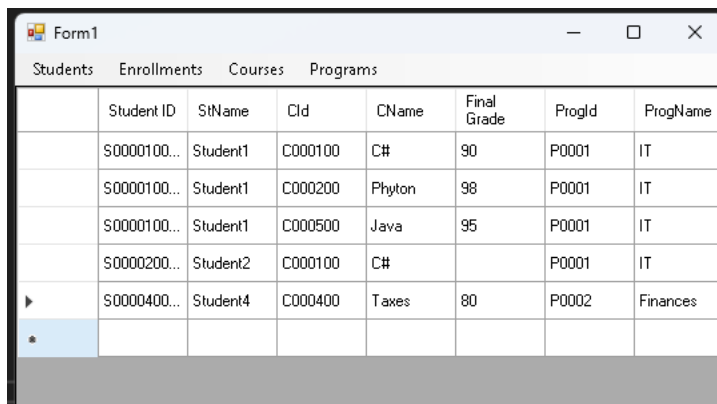
➤ Option delete



Form1

Students Enrollments Courses Programs

			CName	Final Grade	ProgId	ProgName	
			C#	90	P0001	IT	
			Phyton	98	P0001	IT	
	S0000100...	Student1	C000500	Java	95	P0001	IT
	S0000200...	Student2	C000100	C#		P0001	IT
	S0000400...	Student4	C000400	Taxes	80	P0002	Finances
▶	S0000500...	Student5	C000400	Taxes		P0002	Finances
*							

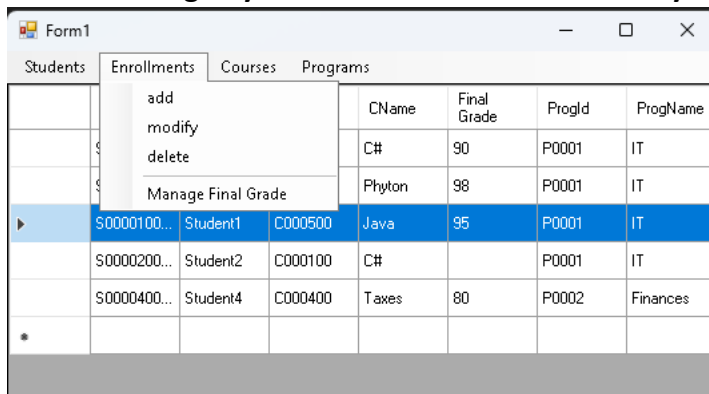


Form1

Students Enrollments Courses Programs

	Student ID	StName	CId	CName	Final Grade	ProgId	ProgName
	S0000100...	Student1	C000100	C#	90	P0001	IT
	S0000100...	Student1	C000200	Phyton	98	P0001	IT
	S0000100...	Student1	C000500	Java	95	P0001	IT
	S0000200...	Student2	C000100	C#		P0001	IT
▶	S0000400...	Student4	C000400	Taxes	80	P0002	Finances
*							

Error Handling: Try to delete a row that has already a Final Grade:



Form1

Students Enrollments Courses Programs

			CName	Final Grade	ProgId	ProgName	
			C#	90	P0001	IT	
			Phyton	98	P0001	IT	
▶	S0000100...	Student1	C000500	Java	95	P0001	IT
	S0000200...	Student2	C000100	C#		P0001	IT
	S0000400...	Student4	C000400	Taxes	80	P0002	Finances
*							

Form1

Students Enrollments Courses Programs

	Student ID	StName	CId	CName	Final Grade	ProgId	ProgName
	S0000100...	Student1	C000100	C#	90	P0001	IT
	S0000100...	Student1	C000200	Phyton	98	P0001	IT
▶	S0000100...	Student1	C000500	Java	95	P0001	IT
	S0000200...	Student2	C000100	C#		P0001	IT
	S0000400...	Student4	C000400	Taxes	80	P0002	Finances

Cannot delete. To delete this row, Final Grade must be removed first

OK

➤ Option Manage Final Grade

Form1

Students Enrollments Courses Programs

	Student ID	StName	CId	CName	Final Grade	ProgId	ProgName
	S0000100...	Student1	C000100	C#	90	P0001	IT
	S0000100...	Student1	C000200	Phyton	98	P0001	IT
	S0000100...	Student1	C000500	Java	95	P0001	IT
▶	S0000200...	Student2	C000100	C#		P0001	IT
	S0000400...	Student4	C000400	Taxes	80	P0002	Finances

add
modify
delete
Manage Final Grade

Form1

Students Enrollments Courses Programs

	Student ID	StName	CId	CName	Final Grade	ProgId	ProgName
	S0000100...	Student1	C000100	C#	90	P0001	IT
	S0000100...	Student1	C000200	Phyton	98	P0001	IT
	S0000100...	Student1	C000500	Java	95	P0001	IT
▶	S0000200...	Student2	C000100	C#		P0001	IT
	S0000400...	Student4	C000400	Taxes	80	P0002	Finances

FinalGrade

StId: S000020000 StName: Student2

CId: C000100 CName: C#

Final Grade: 98

OK Cancel

Form1

Students

Enrollments

Courses

Programs

	Student ID	StName	CId	CName	Final Grade	ProgId	ProgName
▶	S0000100...	Student1	C000100	C#	90	P0001	IT
	S0000100...	Student1	C000200	Phyton	98	P0001	IT
	S0000100...	Student1	C000500	Java	95	P0001	IT
	S0000200...	Student2	C000100	C#	98	P0001	IT
	S0000400...	Student4	C000400	Taxes	80	P0002	Finances
*							