SPRING 2025

Subject: PRN212

Duration: 85 minutes

INSTRUCTIONS

Please read the instructions carefully before doing the questions.

● You are **NOT allowed** to use any other materials. You are **NOT allowed** to use any device to share data with others.

● You must use IDE as **Visual Studio 2019 or later, MSSQL Server 2016 or later database** for your development tools.

IMPORTANT – Before you start doing your solution, MUST do the following steps:

1. To do your program, you must use **Windows Presentation Foundation (WPF), apply 3-Layer architecture**, there are at least 2 Projects for the Solution. *The database connection string must get from appsettings.json file.*

In the case your program connects directly to database from WPF Windows/Pages or you hardcode connection string, you will get 0 point.

2. Create Solution in Visual Studio 2019/2022 named **PE_PRN212_SU25_TrialTest_StudentName**. Inside the Solution, Project WPF named: **ResearchProjectManagement_StudentCode.**

3. Create your MS SQL database named **SU25ResearchDB** by running code in script **SU25ResearchDB.sql.**

4. Set the default user interface for your project as **Login** window/page.
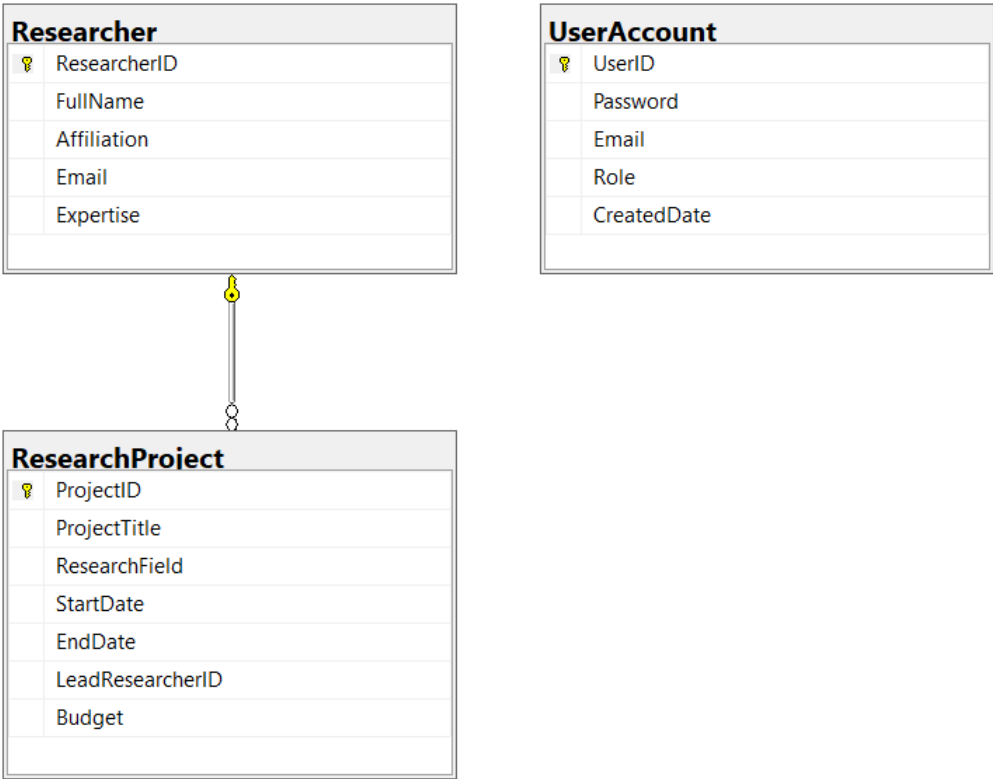
5. ***If there are syntax errors or compilation errors in your PE program, you will not pass the PE requirements, the point will be 0.***

6. ***Your work will be considered invalid (0 point) if your code inserts stuff that is unrelated to the test.***

Create an application using **Windows Presentation Foundation (WPF)** with .NET8/ .NET9, C#, and Entity Framework Core. A MS SQL Server database will be created to persist the data and it will be used for reading and managing data.

The below Figure is a part of **SU25ResearchDB** database.

Researcher			UserAccount	
🔑	ResearcherID		🔑	UserID
	FullName			Password
	Affiliation			Email
	Email			Role
	Expertise			CreatedDate

ResearchProject	
🔑	ProjectID
	ProjectTitle
	ResearchField
	StartDate
	EndDate
	LeadResearcherID
	Budget

Note that: *Role: Administrator = 1; Manager = 2; Staff = 3; Member = 4.*

Question 1. **(0.5 point)** Design Login Window/Page includes UI controls for login function.

Object Type	Properties
Window	Title: **Login Window SU 2025** Height: **400** Width: **700** FontFamily: **Tahoma** FontSize: **26** Background: **#FFF5F5DC** WindowStartupLocation: **CenterScreen**
Label	FontFamily: **Arial** FontSize: **24** Foreground: **#FF6B705C**

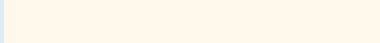| TextBox	Height: **32** Background: **#FFFFF8EB**	
Button	Padding: **10** Background: **#FFB38B82** Foreground: **#FFFFFFFF (White)**	

Table 1. Properties of Login Window/Page

Question 2. **(1.0 point)** The permissions are defined in Table 2, you must use email/password for the *authentication/authorization* process.

Role Function	Administrator	Manager	Staff	Member
Create	✓	✓		
Update	✓	✓		
Delete	✓			
View list of items	✓	✓	✓	
View detail of an item	✓	✓	✓	
Search	✓	✓	✓	

Table 2. Permissions to implement functions in the test

- *The Create, Update functions for ResearchProject are required Manager role or Administrator role.*
- *The Delete functions for ResearchProject are required Administrator role.*
- *The search and View list, View detail functions for ResearchProject are required Administrator or Manager role or Staff role*
- Other role (*Member role*) cannot do any functions in this case. Display *"You have no permission to access this function!"*.
- No Authentication *"Invalid Email or Password!"*.
- If login is successful, the main **Research Project Management Window/Page** will open, otherwise you must be shown a suitable message.

Question 3. **(1.0 point)** Design **Research Project Management** Window/Page, This window/page includes UI controls for CRUD actions with **ResearchProject** information. Note: The **LeadResearcherID/FullName** will come from the **Researcher** table. Design a window that allows you to view the list of records, create a new item, update an existing item, and delete a specific item.

Object Type	Properties
Window	Title: **Research Project Management - SU 2025** Height: **500** Width: **800** FontFamily: **Tahoma** FontSize: **13** Background: **#FFF5F5DC** WindowStartupLocation: CenterScreen
Label	FontFamily: **Arial** FontSize: **12** Foreground: **#FF6B705C**
TextBox	Height: **14** Background: **#FFFFF8EB**
Button	Padding: **5** Background: **#FFB38B82** Foreground: #FFFFFFFF (White)

Table 3. Properties of Research Project Management Window/Page

Question 4. **(1.5 points)** *Please check the permissions listed in Table 2; In case you do the authentication/authorization wrong, you will not get any points for this section;* Display a list of all research projects from the **ResearchProject** table along with the *FullName* of the *LeadResearcher* from the **Researcher** table.

Question 5. **(1.5 points)** *Please check the permissions listed in Table 2; In case you do the authentication/authorization wrong, you will not get any points for this section;* Search the *research projects* by *Project Title* **OR** *Research Field* using a relative search. The UI for this function contains only **one** input field. In case you do the authentication/authorization wrong, you will not get any points for this section.

Question 6. **(1.0 point)** *Please check the permissions listed in Table 2; In case you do the authentication/authorization wrong, you will not get any points for this section.* Delete the selected item(s) with the confirmation then update the list of *items*.

Question 7. **(2.0 points)** *Please check the permissions listed in Table 2; In case you do the authentication/authorization wrong, you will not get any points for this section*; Implement the add new item function with the following *requirements:*

- The *LeadResearcherID / FullName* will come from the **Researcher** table (you can use ComboBox UI control in this case)

- All fields are required.

- StartDate must be earlier than EndDate.

- *ProjectTitle* must be between 5 and 100 characters. Each word in the *ProjectTitle* must start with a capital letter or a digit (1-9). *ProjectTitle* cannot contain special characters such as $,%,^, @.

Question 8. **(1.5 points)** *Please check the permissions listed in Table 2; In case you do the authentication/authorization wrong, you will not get any points for this section.* Update an existing item with the *same validation requirements with* the *Add* function.

Note: You can use your different Window/Page or use the data grid view for this update function (update by *ProjectID*).

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