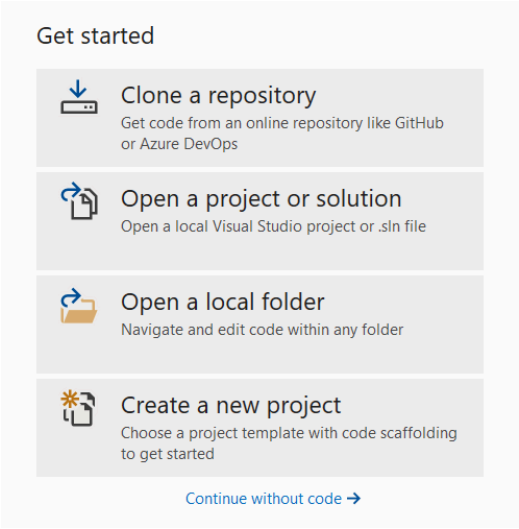
Introduction

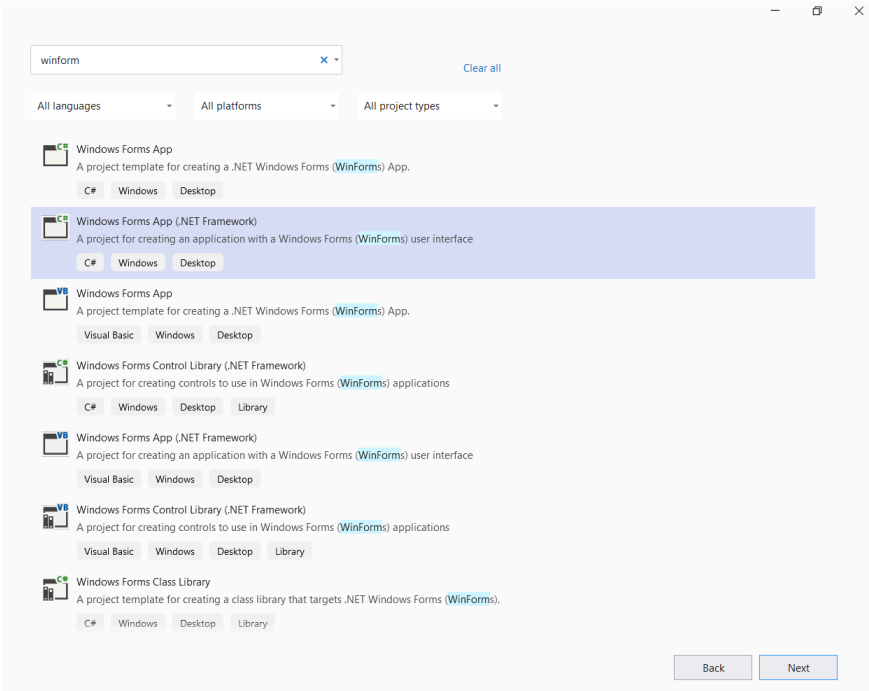
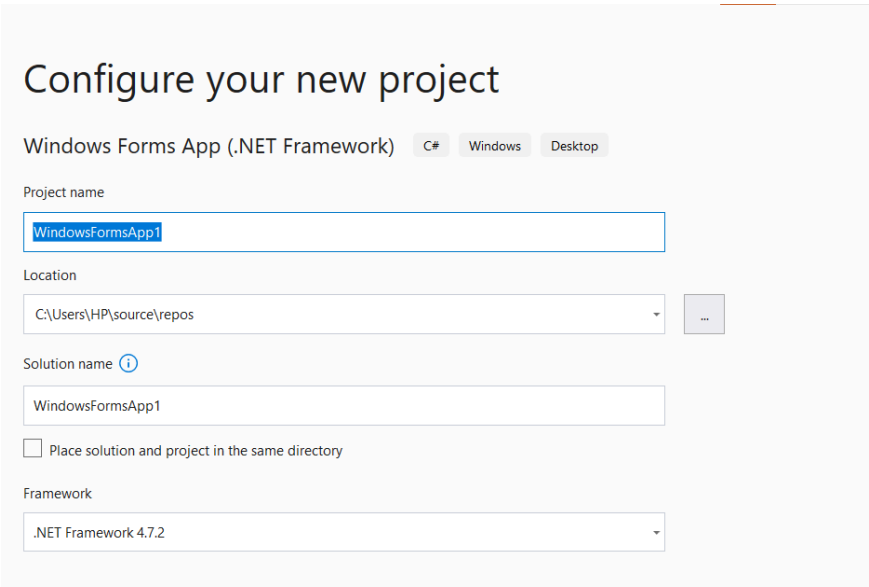
After a week of rigorous coding, Welcome back!

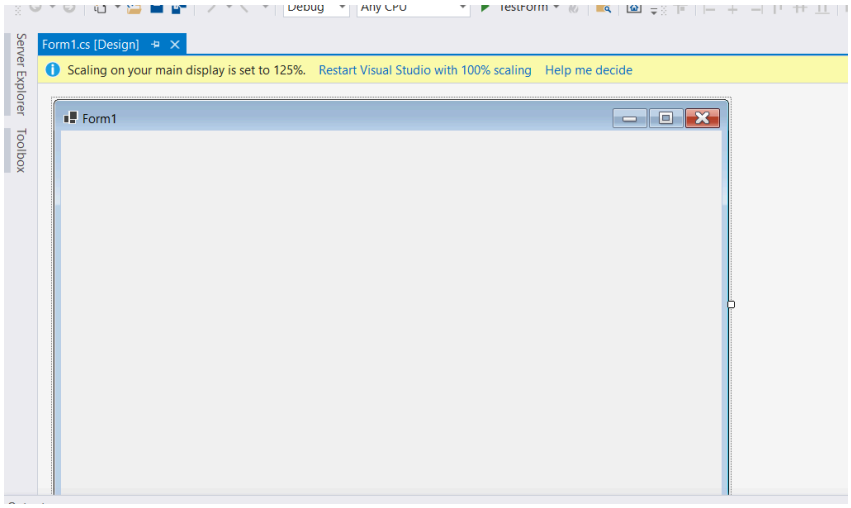
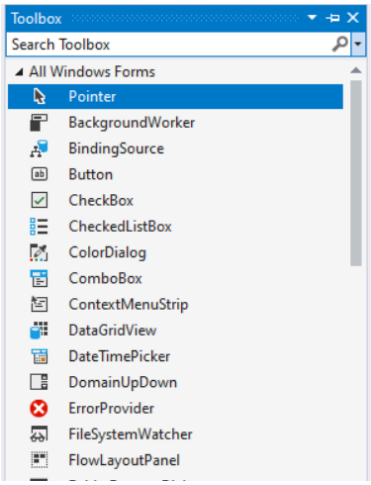
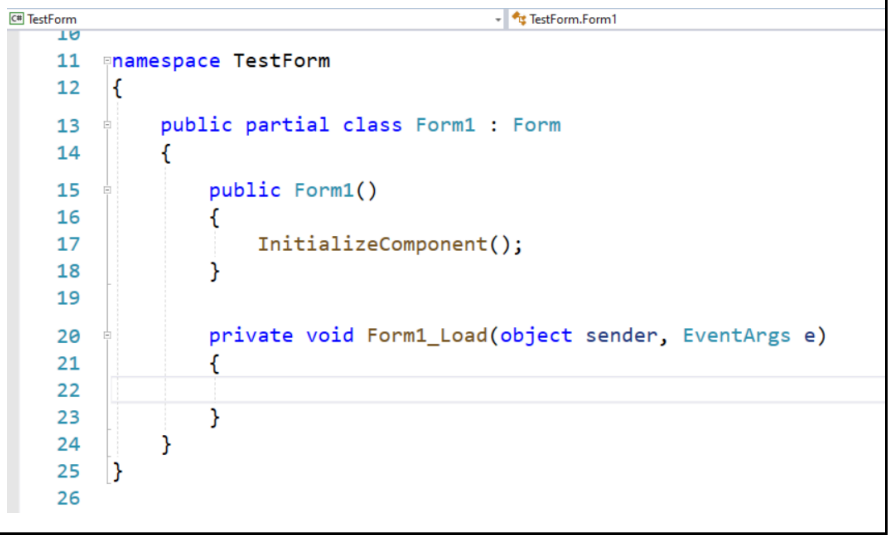
You have learned all about the C#, .NET Framework, and Object-Oriented Programming in the previous lab manuals. Let's move on to the next, new, and exciting concepts.

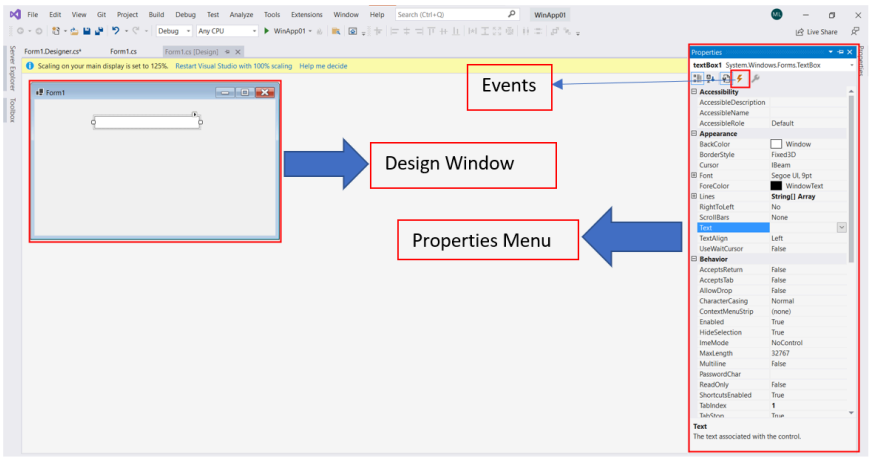
Students, in contrast to Object-Oriented Programming, there is another kind of programming paradigm that is known as **Event-Driven Programming**. Event-driven programming is a programming paradigm in which the flow of program execution is determined by events - for example, a user action such as a mouse click, keypress, or a message from the operating system or another program.
In this Lab, we will learn about the **Event-Driven Application Program** by incorporating the existing knowledge that we have learned so far.

Let's jump right into it.

S #	Description	Snapshot
1.	• Open Microsoft Visual Studio 2019. • Click on "**Create a new project**".	

2.	• Search "**Winform**" in the search bar. • Select the "**Windows Forms App (.NET Framework)**" from the list of options available. • Click next.	
3.	Rename your project	
Let's get familiar with different components of forms.		

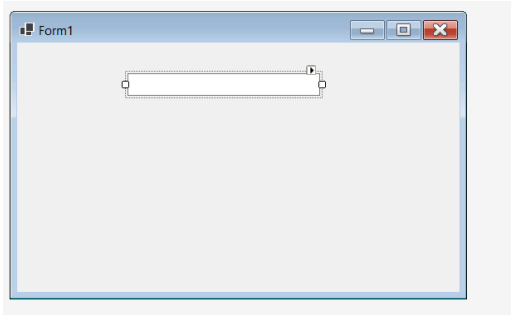
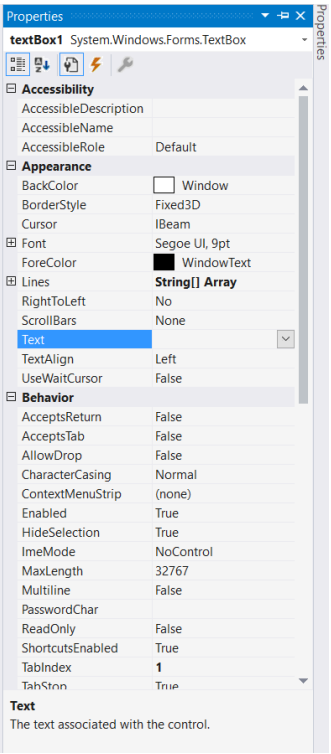
5.	This is the "**Design Window**" that provides the graphical layout of the form.	
5(a).	It also includes the "toolbox" option on the left side of the windows that includes multiple draggable options that are dropped on the form.	
6.	Double click on the "**design view**" to open the "**code view**".	

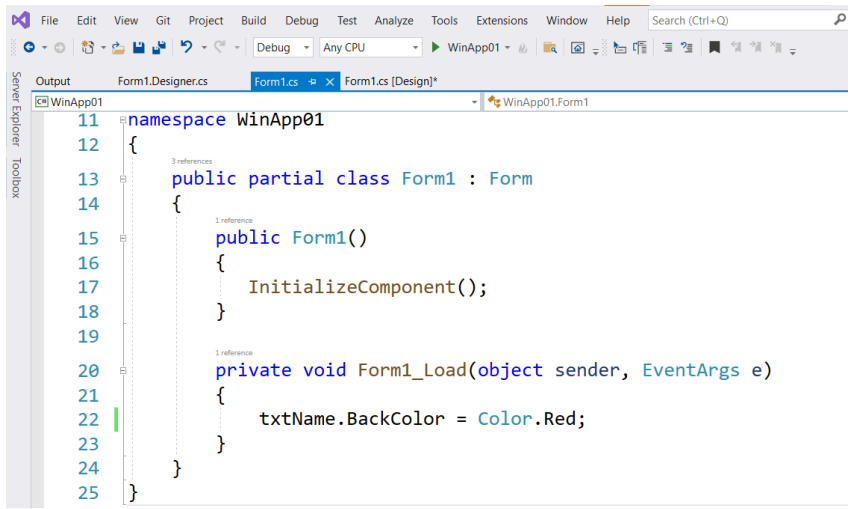
7.	Each control component has a variety of properties and events that can be defined by using the properties menu. Note: You can access it by clicking on the properties menu on the right side of the window. Or select **view > properties**.	

Congratulations !!!!! You have learned about the basic working windows of the forms.

Let's insert some controls and components on some forms and update their properties.

Task01: Create a textbox and set its properties by using the **properties** menu.

Sr #	Description	Snapshot
1.	Create a new project and insert a **textbox** using the toolbox menu.	
2.	Set the properties such as ● Name ● Back Color ● Font	

3.	You can also set the properties through "**code view**".	 **output:** 
	Note: The properties defined in the design view will be defined as part of the form's design and will be visible even before the execution of the program.	On the other hand, the properties defined through code view will be visible at **run time** and these may overwrite the already existing properties.

```
namespace WinApp01
{
    public partial class Form1 : Form
    {
        public Form1()
        {
            InitializeComponent();
        }

        private void Form1_Load(object sender, EventArgs e)
        {
            txtName.BackColor = Color.Red;
        }
    }
}
```

Congratulations !!!!! You have successfully learned how to implement control components into your forms.

Now, Let's Attempt the tasks and challenges that are listed on the next page.

Self Assessment Task 01:

A Program that shows Helloworld in the Message PopUp window at a button click.

Self Assessment Task 02:

A Program that Shows HelloWorld in the message PopUp window at form Load

Self Assessment Task 03:

A Program that shows Hello world within the text box on Button Click.

Self Assessment Task 04:

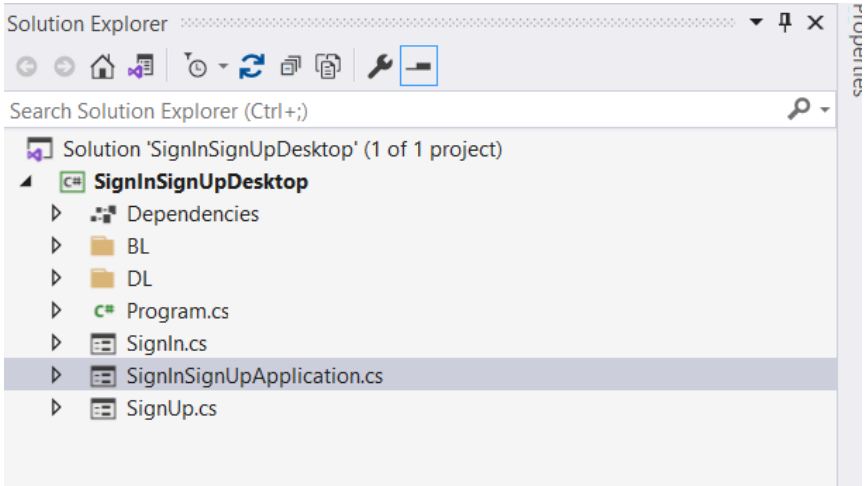
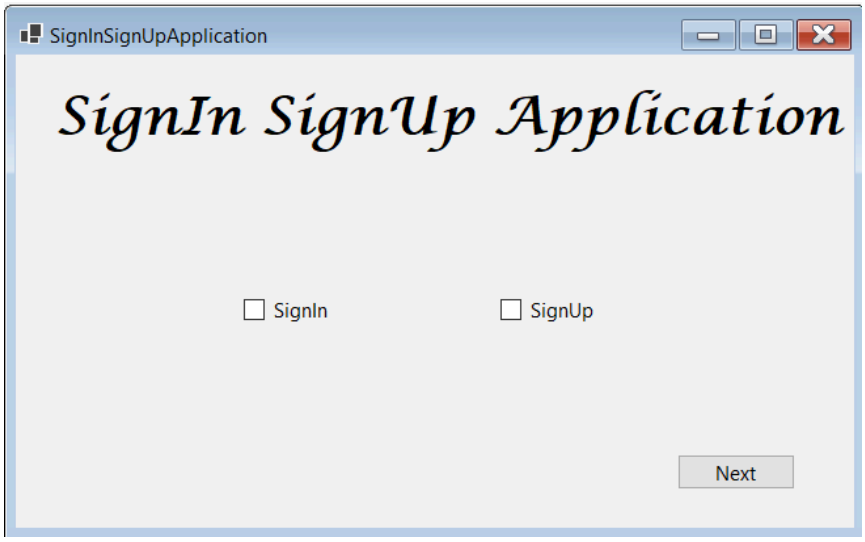
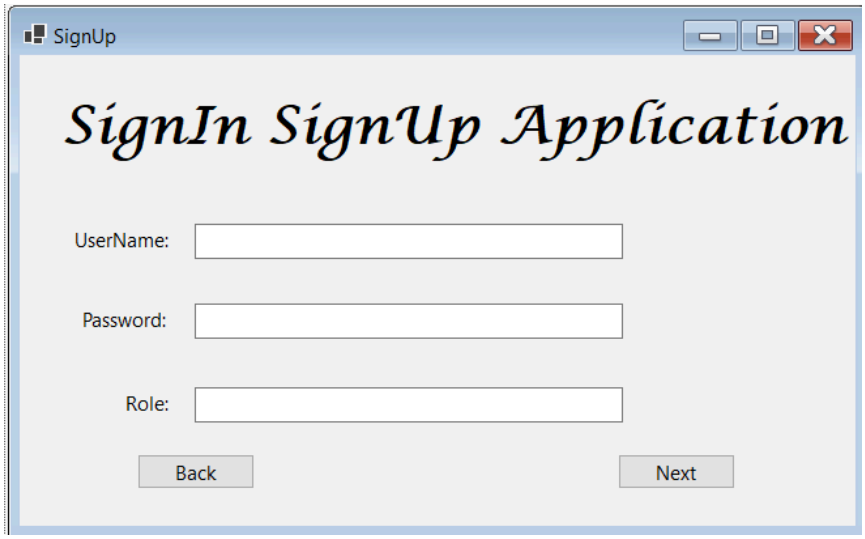
Create a form that asks the user for two names and displays if they are the same or different.

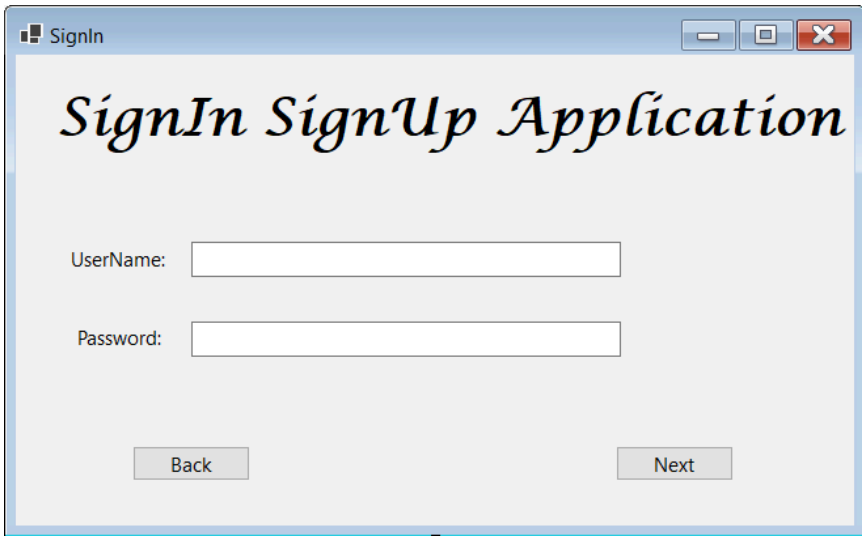
Self Assessment Task 02:

Create a form with two checkboxes with text option 1 and option 2 respectively. Add a button on the form that upon clicking informs the user about the option selected.

Task 01:
Use the learned knowledge to Convert the SignUpSignIn Application.

Sr #	Description	Snapshot

1.	Create three forms by using the same method that we used to create new classes.	
2.	The first form asks the user to choose to either signIn or signUp. - Insert and Update the label - Insert and Update the check box - Insert and Update the button	
3.	Create a **SignUp** form. - Insert and Update the labels. - Insert the text boxes. - Insert and Update buttons.	

4.	Create a **signIn** form. - Insert and Update the labels. - Insert the text boxes. - Insert and Update the buttons.	
Let's Implement the back-end functionality of these forms now.		
5.	Define the MUser Class (BL) - Define Constructors - Define getters functions. - Define isAdmin function.	

```
16 references
class MUser
{
    private string userName;
    private string userPassword;
    private string userRole;


    2 references
    public MUser(string userName, string userPassword, string userRole)
    {
        this.userName = userName;
        this.userPassword = userPassword;
        this.userRole = userRole;
    }

    1 reference
    public MUser(string userName, string userPassword)
    {
        this.userName = userName;
        this.userPassword = userPassword;
        this.userRole = "NA";
    }
```

		3 references
		`public string getUserName()`
		`{`
		`  return userName;`
		`}`
		3 references
		`public string getUserPassword()`
		`{`
		`  return userPassword;`
		`}`
		1 reference
		`public string getUserRole()`
		`{`
		`  return userRole;`
		`}`
		0 references
		`public bool isAdmin()`
		`{`
		`  if (userRole == "Admin")`
		`  {`
		`  return true;`
		`  }`
		`  else`
		`  {`
		`  return false;`
		`  }`
		`}`

6.	Define the MUser Class (DL)
	- Define the associated functions.
		4 references
		`class MUserDL`
		`{`
		`  private static List<MUser> usersList = new List<MUser>();`
		2 references
		`  public static void addUserIntoList(MUser user)`
		`  {`
		`  usersList.Add(user);`
		`  }`
		1 reference
		`  public static MUser SignIn(MUser user)`
		`  {`
		`  foreach (MUser storedUser in usersList)`
		`  {`
		`  if (storedUser.getUserName() == user.getUserName() && storedUser.getUserPassword() == user.getUserPassword())`
		`  {`
		`  return storedUser;`
		`  }`
		`  }`
		`  return null;`
		`  }`
		3 references
		`public static string parseData(string record, int field)`
		`{`
		`  int comma = 1;`
		`  string item = "";`
		`  for (int x = 0; x < record.Length; x++)`
		`  {`
		`  if (record[x] == ',')`
		`  {`
		`  comma++;`
		`  }`
		`  else if (comma == field)`
		`  {`
		`  item = item + record[x];`
		`  }`
		`  }`
		`  return item;`
		`}`

```
1 reference
public static bool readDataFromFile(string path)
{
    if (File.Exists(path))
    {
        StreamReader fileVariable = new StreamReader(path);
        string record;
        while ((record = fileVariable.ReadLine()) != null)
        {
            string userName = parseData(record, 1);
            string userPassword = parseData(record, 2);
            string userRole = parseData(record, 3);
            MUser user = new MUser(userName, userPassword, userRole);
            addUserIntoList(user);
        }
        fileVariable.Close();
        return true;
    }
    else
        return false;
}
```

```
1 reference
public static void storeUserIntoFile(MUser user, string path)
{
    StreamWriter file = new StreamWriter(path, true);
    file.WriteLine(user.getUserName() + "," + user.getUserPassword() + "," + user.getUserRole());
    file.Flush();
    file.Close();
}
```

7.

- Read the data from the file as soon as the form starts.
- Additionally, provide the functionality in case of **click event** is triggered.

```
namespace SignInSignUpDesktop
{
    3 references
    public partial class SignInSignUpApplication : Form
    {
        1 reference
        public SignInSignUpApplication()
        {
            InitializeComponent();
                string path = "data.txt";
                if (MUserDL.readDataFromFile(path))
                {
                    MessageBox.Show("Data Loaded From the File");
                }
                else
                {
                    MessageBox.Show("Data not loaded");
                }
        }
```

```
1 reference
private void button1_Click(object sender, EventArgs e)
{

    if (SignIn.Checked)
    {
        Form moreForm = new SignInForm();
        moreForm.Show();
        SignIn.Checked = false;
    }
    else if(SignUp.Checked)
    {
        Form moreForm = new SignUpForm();
        moreForm.Show();
        SignUp.Checked = false;
    }

}
```

8.	Implement the code view for the **SignUp** Form. - Implement the code for the click events of buttons “next” and “back”.	3 references `public partial class SignUpForm : Form` `{` 1 reference `public SignUpForm()` `{ InitializeComponent(); }` 1 reference `private void ClearDataFromForm()` `{ usernameText.Text = ""; passwordText.Text = ""; roleText.Text = ""; }` 1 reference `private void next_Click(object sender, EventArgs e)` `{ string username = usernameText.Text; string password = passwordText.Text; string role = roleText.Text; string path = "data.txt"; MUser user = new MUser(username, password, role); MUserDL.addUserIntoList(user); MUserDL.storeUserIntoFile(user, path); MessageBox.Show("User Added Successfully"); ClearDataFromForm(); }` 1 reference `private void back_Click(object sender, EventArgs e)` `{ this.Close(); }`

	- Implement the logic in Code View for the associated events in **SignIn Form**.
	- Provide the **on-click functionality** for events of “next” and “back”.
		3 references
		`public partial class SignInForm : Form`
		`{`
		1 reference
		`public SignInForm()`
		`{ InitializeComponent(); }`
		1 reference
		`private void ClearDataFromForm()`
		`{ usernameText.Text = ""; passwordText.Text = ""; }`

```
1 reference
private void button1_Click(object sender, EventArgs e)
{
    string username = usernameText.Text;
    string password = passwordText.Text;
    MUser user = new MUser(username, password);
    MUser validUser = MUserDL.SignIn(user);
    if (validUser != null)
    {
        MessageBox.Show("User is Valid");
    }
    else
    {
        MessageBox.Show("User is Invalid");
    }
    ClearDataFromForm();
}

1 reference
private void Back_Click(object sender, EventArgs e)
{
    this.Close();
}
```

Working with DataGridView

How to Add Columns in Datagridview?

In your Windows Forms load event, you can write this code to initialize the DataGridView with columns

```
DataTable dataTable = new DataTable();
1 reference
private void Form1_Load(object sender, EventArgs e)
{
    dataTable.Columns.Add("ID", typeof(int));
    dataTable.Columns.Add("Name", typeof(string));
    dataTable.Columns.Add("Age", typeof(int));

    dataGridView1.DataSource = dataTable;
}
```

How to add rows in Datagridview?

Create a button and attach a click event or any event you prefer to that button.

You can first add your data to a DataTable and then assign the DataTable as the source for the DataGridView. In this code, the values are hardcoded, but you can retrieve them from your fields.

```
1 reference
private void AddButton_Click(object sender, EventArgs e)
{
    dataTable.Rows.Add(1, "Ali", 28);
    dataGridView1.DataSource= dataTable;
}
```

Code to get data from Text Fields and add into datagrid view

```
1 reference
private void AddButton_Click(object sender, EventArgs e)
{
    dataTable.Rows.Add(int.Parse(idField.Text), nameField.Text,int.Parse(ageField.Text));
    dataGridView1.DataSource= dataTable;
}
```

How to update DataGridView selected rows in your text fields?

You need to attach a cell click event to the DataGridView first. Then, create a global variable named **SelectedRow** in your form's code.

```
1 reference
public Form1()
{
    InitializeComponent();
}

DataTable dataTable = new DataTable();
int selectedRow;
```

Here's the code to retrieve data from a DataGridView and assign it to text fields

```
1 reference
private void dataGridView1_CellClick(object sender, DataGridViewCellEventArgs e)
{
    selectedRow = e.RowIndex;
    if(selectedRow > 0)
    {
        DataGridViewRow row = dataGridView1.Rows[selectedRow];
        idField.Text = row.Cells["ID"].Value.ToString();
        nameField.Text = row.Cells["Name"].Value.ToString();
        ageField.Text = row.Cells["Age"].Value.ToString();
    }
}
```

How to display selected row values from DataGridView to Text Fields?

Create an 'Update' button and attach a click event to it. Then, write the following code (making necessary changes such as your DataGridView's name and field names):

You can utilize the 'selectedRow' variable to access the selected row of the DataGridView and update it with this code.

```
1 reference
private void updateButton_Click(object sender, EventArgs e)
{
    if(selectedRow > 0)
    {
        DataGridViewRow row = dataGridView1.Rows[selectedRow];
        row.Cells["ID"].Value = idField.Text;
        row.Cells["Name"].Value = nameField.Text;
        row.Cells["Age"].Value = ageField.Text;
    }
    else
    {
        //show any message like you have not selected any row yet
    }
}
```

How to Delete selected row from Datagridview?

Here is code to delete the selected row from Datagridview.

```
1 reference
private void deleteButton_Click(object sender, EventArgs e)
{
    if(selectedRow > 0)
    {
        dataGridView1.Rows.RemoveAt(selectedRow);
        selectedRow = -1;
    }


}
```

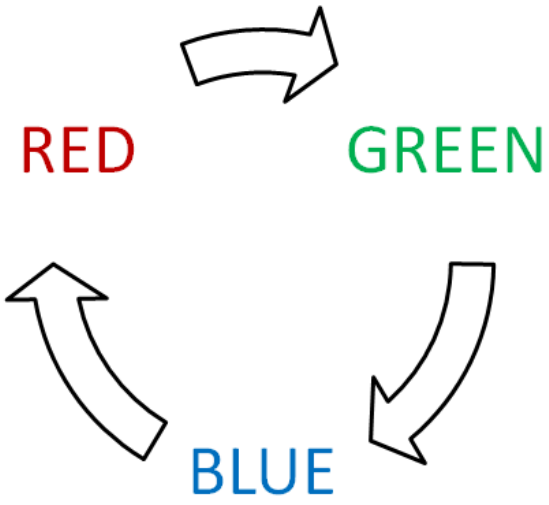
Watch this video to work with datagrid view in C#
https://www.youtube.com/watch?v=0flYZTNE7RU

Congratulations !!!! you have implemented your first complete project by using the windows forms.

Great Work students !!!!

Challenge 01:

Create a graphical interface that shows a text box and two buttons with next and previous labels. When the user clicks on the next button it sets the textbox background color to the next color from the loop as given below and if the user presses the next button again it sets the background color of the text box with the next color. In case the user presses back it sets the previous color to the background of the textbox.



Good Luck and Best Wishes !!

Happy Coding ahead :)