

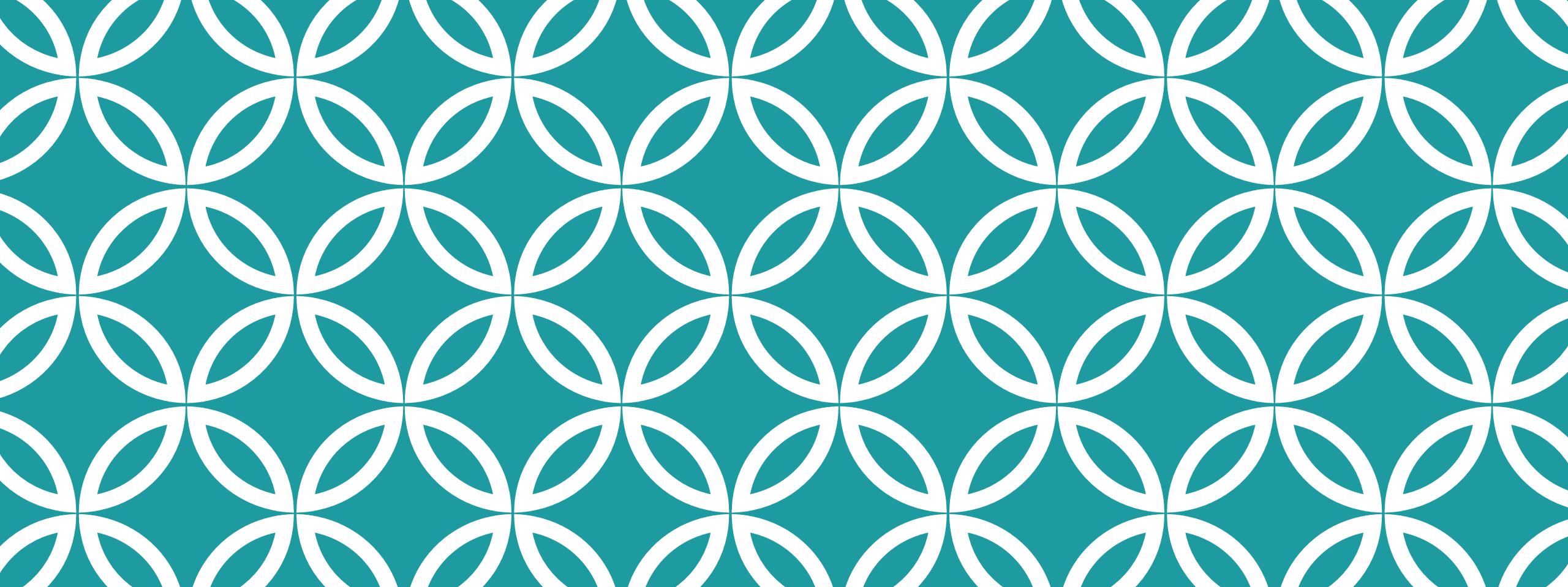


EVENTS

INTERAGEREN MED FIL SYSTEMET

WINDOWS FORMS

Grundlæggende
programmering
Lektion 9



EVENTS

Der sker ting når der sker ting

EVENTS

Events er brugerhandlinger såsom tastetryk, klik, musebevægelser, etc., eller nogle hændelser såsom system genererede meddelelser.

Applikationer er nødt til at reagere på begivenheder, når de opstår. For eksempel interrupts.

Events anvendes til inter-proces kommunikation.

Begivenhederne erklæres og udføres i en klasse og forbindes med event handlers der bruger delegates inden for samme klasse eller en anden klasse.

Klassen, der indeholder eventet, bruges til at udgive eventet.

- Dette kaldes udgiver (**publisher**) klassen.
- Andre klasser, der accepterer eventet, kaldes abonnent (**subscriber**) klassen.

Derfor kaldes det at egivenheder bruger en udgiver-abonnent model.

EVENTS

En **publisher** er et objekt, som indeholder definitionen af eventet og den delegerede.

- Event-delegate associationen er også defineret i dette objekt.
- Et publisher klasse objekt invoker begivenheden og den er anmeldt til andre objekter.

En **subscriber** er et objekt der accepterer eventet og leverer en event handler. Delegate i udgiver klassen invoker metoden (event handler) i abonnent klassen.

For at declare en event i en klasse skal der først laves en delegate type for eventet.

```
public delegate string MyDel(string str);
```

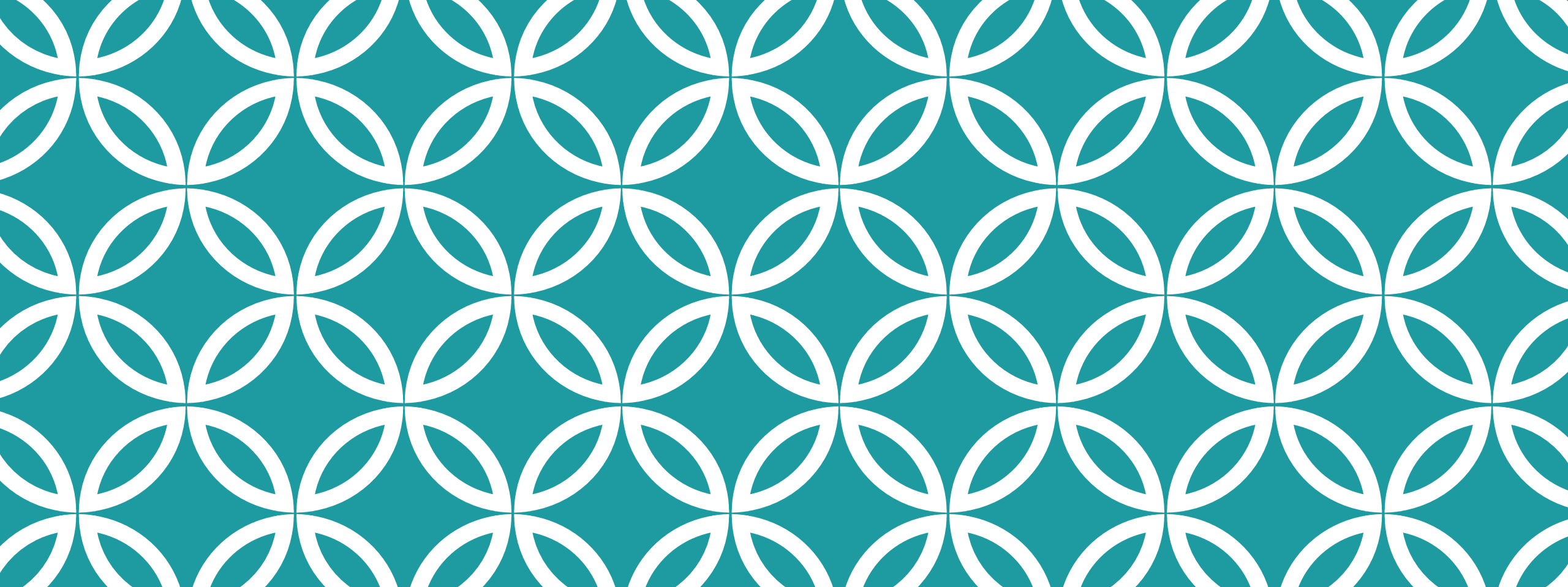
Derefter declares eventet selv med **event** keyword.

```
event MyDel MyEvent;
```

EVENTS

```
1 using System;
2 namespace SampleApp
3 {
4     public delegate string MyDel(string str);
5
6     3 references
7     class EventProgram
8     {
9
10    1 reference
11    public EventProgram()
12    {
13        this.MyEvent += new MyDel(this.WelcomeUser);
14    }
15
16    1 reference
17    public string WelcomeUser(string username)
18    {
19        return "Welcome " + username;
20    }
21
22    0 references
23    static void Main(string[] args)
24    {
25        EventProgram obj1 = new EventProgram();
26        string result = obj1.MyEvent("Student");
27        Console.WriteLine(result);
28        Console.ReadKey();
29    }
30 }
```

Events & Delegates



FIL SYSTEMET

At gemme filer på disken

FIL SYSTEMET

En **fil** er en samling gemt på en disk med et specifikt navn og mappe sti. Når filen åbnes til læsning eller skrivning bliver den en **stream**.

En stream er grundlæggende skevensen af bytes der går gennem kommunikations stien. Der er to hoved streams: **input stream** og the **output stream**.

- **Input stream** bruges til at læse data fra filen (read operation)
- og **output stream** bruges til at skrive til filen (write operation).

FIL SYSTEMET

System.IO namespace har en række klasser der bruges til at udføre en vifte af operationer med filer

- Lave filer
- Slette filer
- Læse fra eller skrive til en fil
- Lukke en fil osv.

I/O Class	Description
BinaryReader	Reads primitive data from a binary stream.
BinaryWriter	Writes primitive data in binary format.
BufferedStream	A temporary storage for a stream of bytes.
Directory	Helps in manipulating a directory structure.
DirectoryInfo	Used for performing operations on directories.
DriveInfo	Provides information for the drives.
File	Helps in manipulating files.
FileInfo	Used for performing operations on files.
FileStream	Used to read from and write to any location in a file.
MemoryStream	Used for random access to streamed data stored in memory.
Path	Performs operations on path information.
StreamReader	Used for reading characters from a byte stream.
StreamWriter	Is used for writing characters to a stream.
StringReader	Is used for reading from a string buffer.
StringWriter	Is used for writing into a string buffer.

FIL SYSTEMET

`FileStream` klassen i `System.IO` namespace hjælper med at skrive fra, skrive til og lukke filer. Klassen er afledt af den abstrakte klasse `Stream`.

For at lave en ny fil eller åbne en eksisterende fil skal man have et **FileStream** objekt.

```
FileStream <object_name> = new FileStream( <file_name>,  
<FileMode Enumerator>, <FileAccess Enumerator>,  
<FileShare Enumerator>);
```

Her laves et `FileStream` objekt `F` til at læse filen `sample.txt`

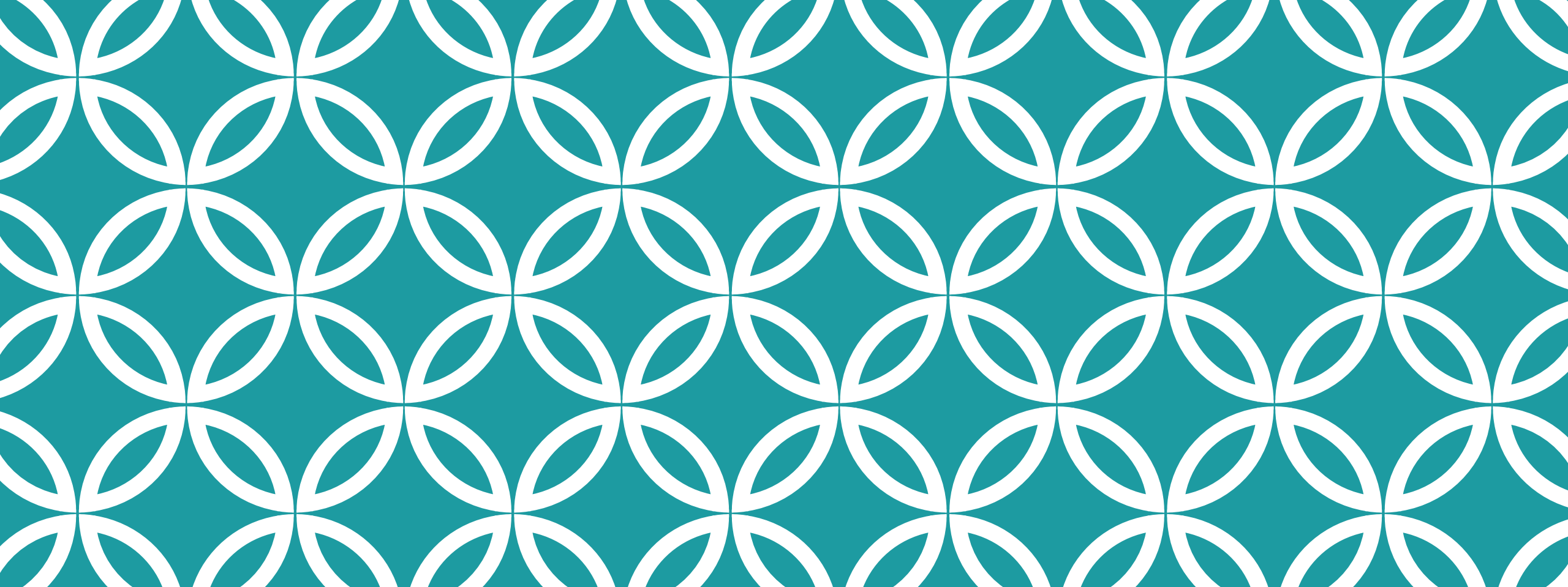
```
FileStream F = new FileStream("sample.txt", FileMode.Open,  
FileAccess.Read, FileShare.Read);
```

FIL SYSTEMET

Parameter	Description
FileMode	<p>The FileMode enumerator defines various methods for opening files. The members of the FileMode enumerator are:</p> <ul style="list-style-type: none">▪ Append: It opens an existing file and puts cursor at the end of file, or creates the file, if the file does not exist.▪ Create: It creates a new file.▪ CreateNew: It specifies to the operating system, that it should create a new file.▪ Open: It opens an existing file.▪ OpenOrCreate: It specifies to the operating system that it should open a file if it exists, otherwise it should create a new file.▪ Truncate: It opens an existing file and truncates its size to zero bytes.

FileAccess	FileAccess enumerators have members: Read , ReadWrite and Write .
FileShare	FileShare enumerators have the following members: <ul style="list-style-type: none">▪ Inheritable: It allows a file handle to pass inheritance to the child processes▪ None: It declines sharing of the current file▪ Read: It allows opening the file for reading▪ ReadWrite: It allows opening the file for reading and writing▪ Write: It allows opening the file for writing

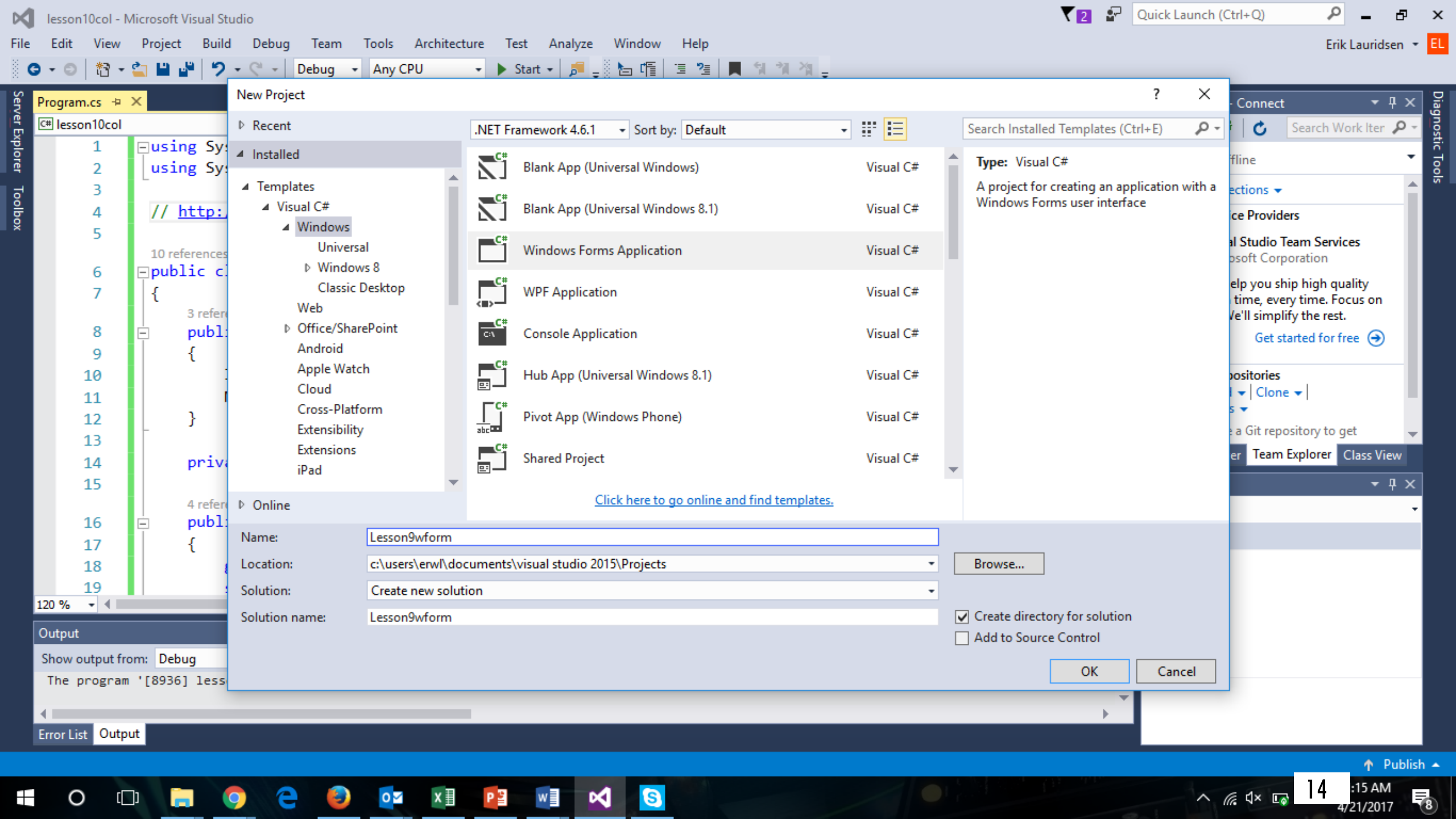
```
1 using System;
2 using System.IO;
3
4 namespace FileIOApplication
5 {
6     0 references
7     class Program
8     {
9         0 references
10        static void Main(string[] args)
11        {
12            FileStream F = new FileStream("test.dat", FileMode.OpenOrCreate, FileAccess.ReadWrite);
13            for (int i = 1; i <= 20; i++)
14            {
15                F.WriteByte((byte)i);
16            }
17
18            F.Position = 0;
19            for (int i = 0; i <= 20; i++)
20            {
21                Console.Write(F.ReadByte() + " ");
22            }
23            F.Close();
24            Console.ReadKey();
25        }
26    }
27 }
```



WINDOWS FORMS

En af flere måder at lave programmer med grafisk brugerflade til Windows

En hands-on tutorial gennem et program der konverterer temperaturer



New Project

Recent: .NET Framework 4.6.1 | Sort by: Default | Search Installed Templates (Ctrl+E)

- Installed
 - Visual C#
 - Windows
 - Universal
 - Windows 8
 - Classic Desktop
 - Web
 - Office/SharePoint
 - Android
 - Apple Watch
 - Cloud
 - Cross-Platform
 - Extensibility
 - Extensions
 - iPad

Icon	Project Name	Type
[C#]	Blank App (Universal Windows)	Visual C#
[C#]	Blank App (Universal Windows 8.1)	Visual C#
[C#]	Windows Forms Application	Visual C#
[C#]	WPF Application	Visual C#
[C#]	Console Application	Visual C#
[C#]	Hub App (Universal Windows 8.1)	Visual C#
[C#]	Pivot App (Windows Phone)	Visual C#
[C#]	Shared Project	Visual C#

[Click here to go online and find templates.](#)

Type: Visual C#
A project for creating an application with a Windows Forms user interface

Name: Lesson9wform

Location: c:\users\erw\documents\visual studio 2015\Projects [Browse...]

Solution: Create new solution

Solution name: Lesson9wform

Create directory for solution
 Add to Source Control

OK Cancel

```

1 using System
2 using System
3
4 // http:
5
6 public class
7 {
8     public
9     {
10
11
12     }
13
14 private
15
16 public
17 {
18
19

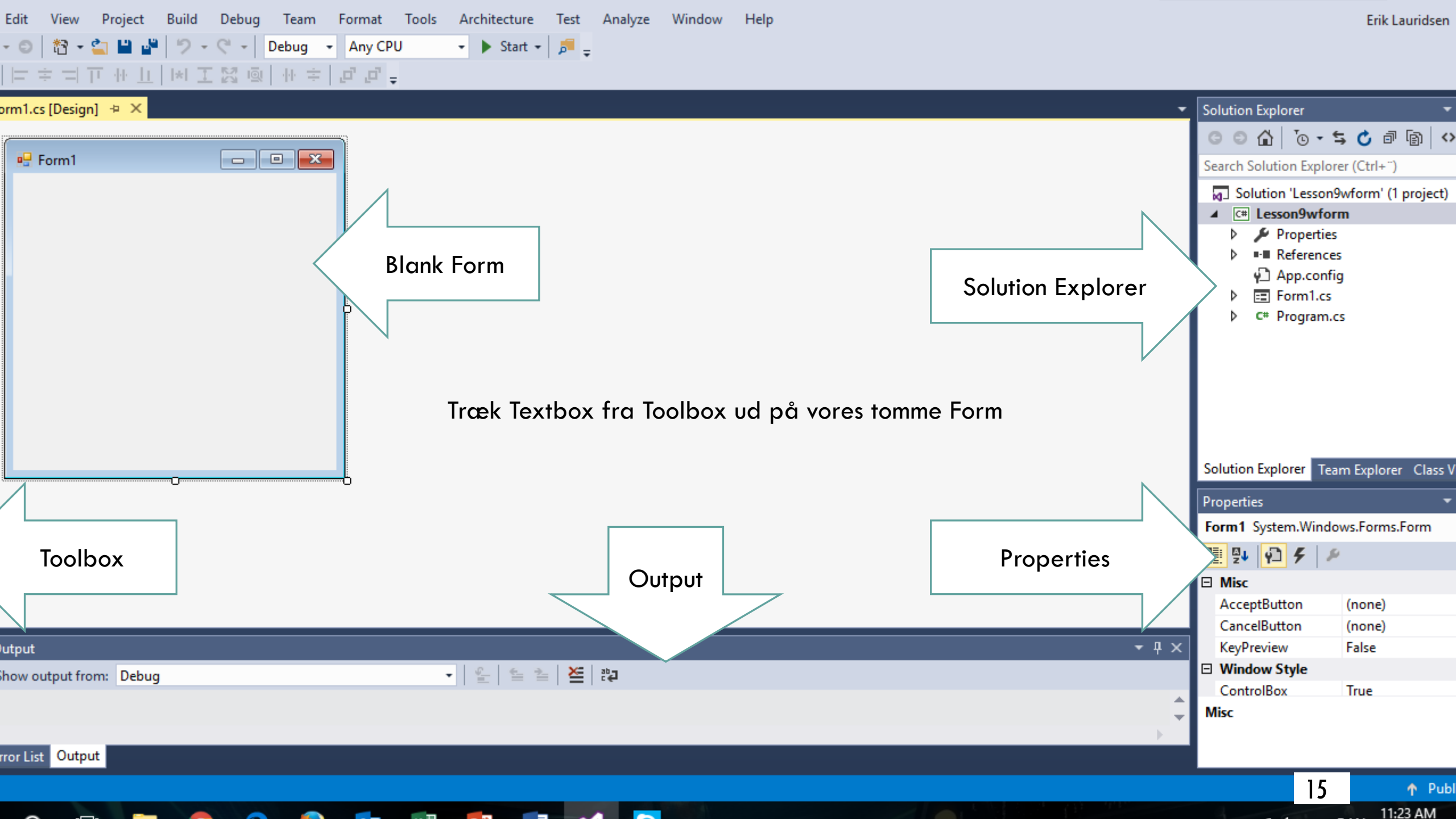
```

Output

Show output from: Debug

The program '[8936] less

Error List Output



Form1.cs [Design]

Solution Explorer

Search Solution Explorer (Ctrl+)

Solution 'Lesson9wform' (1 project)

- C# Lesson9wform
 - Properties
 - References
 - App.config
 - Form1.cs
 - Program.cs

Blank Form

Solution Explorer

Træk Textbox fra Toolbox ud på vores tomme Form

Toolbox

Properties

Output

Output

Show output from: Debug

Solution Explorer Team Explorer Class V

Properties

Form1 System.Windows.Forms.Form

Misc	
AcceptButton	(none)
CancelButton	(none)
KeyPreview	False
Window Style	
ControlBox	True

Misc

Toolbox

- SerialPort
- ServiceController
- SplitContainer
- Splitter
- StatusStrip
- TabControl
- TableLayoutPanel
- TextBox**
- Timer
- ToolStrip
- ToolStripContainer
- ToolTip
- TrackBar
- TreeView
- VScrollBar
- WebBrowser
- ErrorProvider
- Common Controls
- Containers
- Menus & Toolbars
- Data
- Components
- Printing
- Dialogs
- Reporting
- Pointer
- ReportViewer

Træk Textbox fra Toolbox ud på vores tomme Form

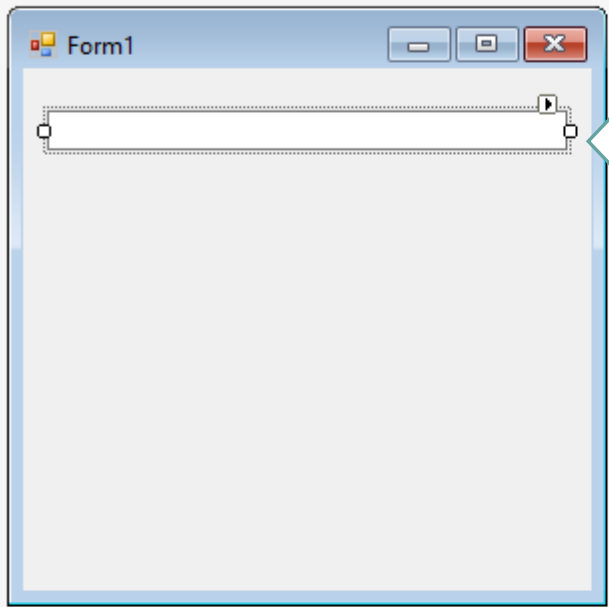
Solution Explorer

Search Solution Explorer (Ctrl+T)

- Solution 'Lesson9wform' (1 project)
 - C# Lesson9wform
 - Properties
 - References
 - App.config
 - Form1.cs
 - Program.cs

Solution Explorer Team Explorer Class V

Properties



Sådan!

Search Solution Explorer (Ctrl+S)

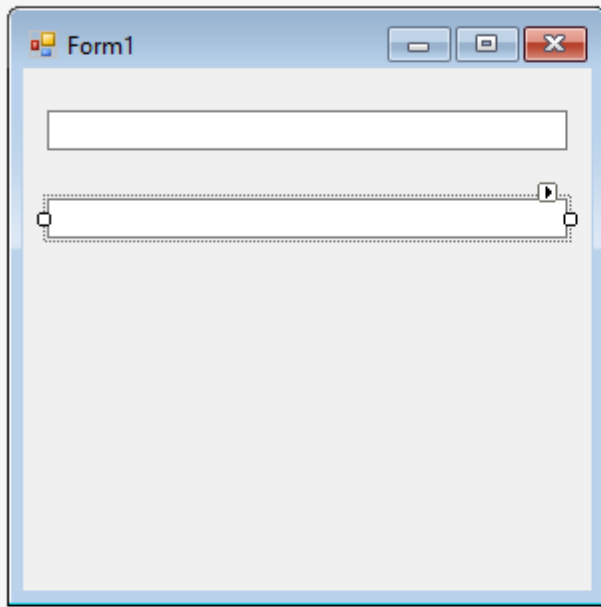
- Solution 'Lesson9wform' (1 project)
 - C# Lesson9wform
 - Properties
 - References
 - App.config
 - Form1.cs
 - Form1.Designer.cs
 - Form1.resx
 - Form1
 - Program.cs

textBox1 System.Windows.Forms.TextBox

ForeColor	WindowText
Lines	String[] Array
RightToLeft	No
ScrollBars	None
Text	
TextAlign	Left

Text
The text associated with the control.

Show output from: Debug



Solution Explorer

Search Solution Explorer (Ctrl+)

- Solution 'Lesson9wform' (1 project)
 - C# Lesson9wform
 - Properties
 - References
 - App.config
 - Form1.cs
 - Form1.Designer.cs
 - Form1.resx
 - Form1
 - Program.cs

Properties

tbTempC System.Windows.Forms.TextBox

Tag

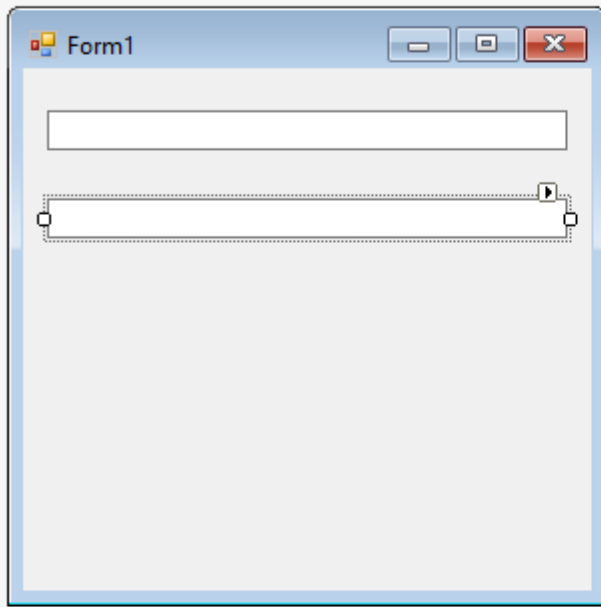
Design

(Name)	tbTempC
GenerateMember	True
Locked	False
Modifiers	Private

(Name)
Indicates the name used in code to identify the object.

Føj en TextBox mere til og kald den tbTempC

[Failure] Could not find file 'c:\users\erwl\documents\visual studio 2015\Projects\Lesson9wform\Lesson9wform\tbTempF.Designer.cs'.



Solution Explorer

Search Solution Explorer (Ctrl+)

- Solution 'Lesson9wform' (1 project)
 - C# Lesson9wform
 - Properties
 - References
 - App.config
 - Form1.cs
 - Form1.Designer.cs
 - Form1.resx
 - Form1
 - Program.cs

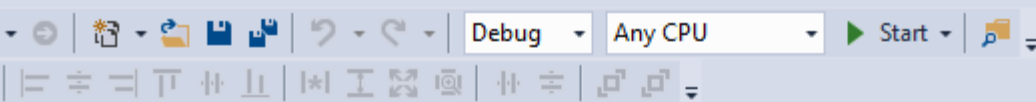
Properties

tbTempC System.Windows.Forms.TextBox

Tag	
Design	
(Name)	tbTempC
GenerateMember	True
Locked	False
Modifiers	Private

(Name)
Indicates the name used in code to identify the object.

Føj en TextBox mere til og kald den tbTempC

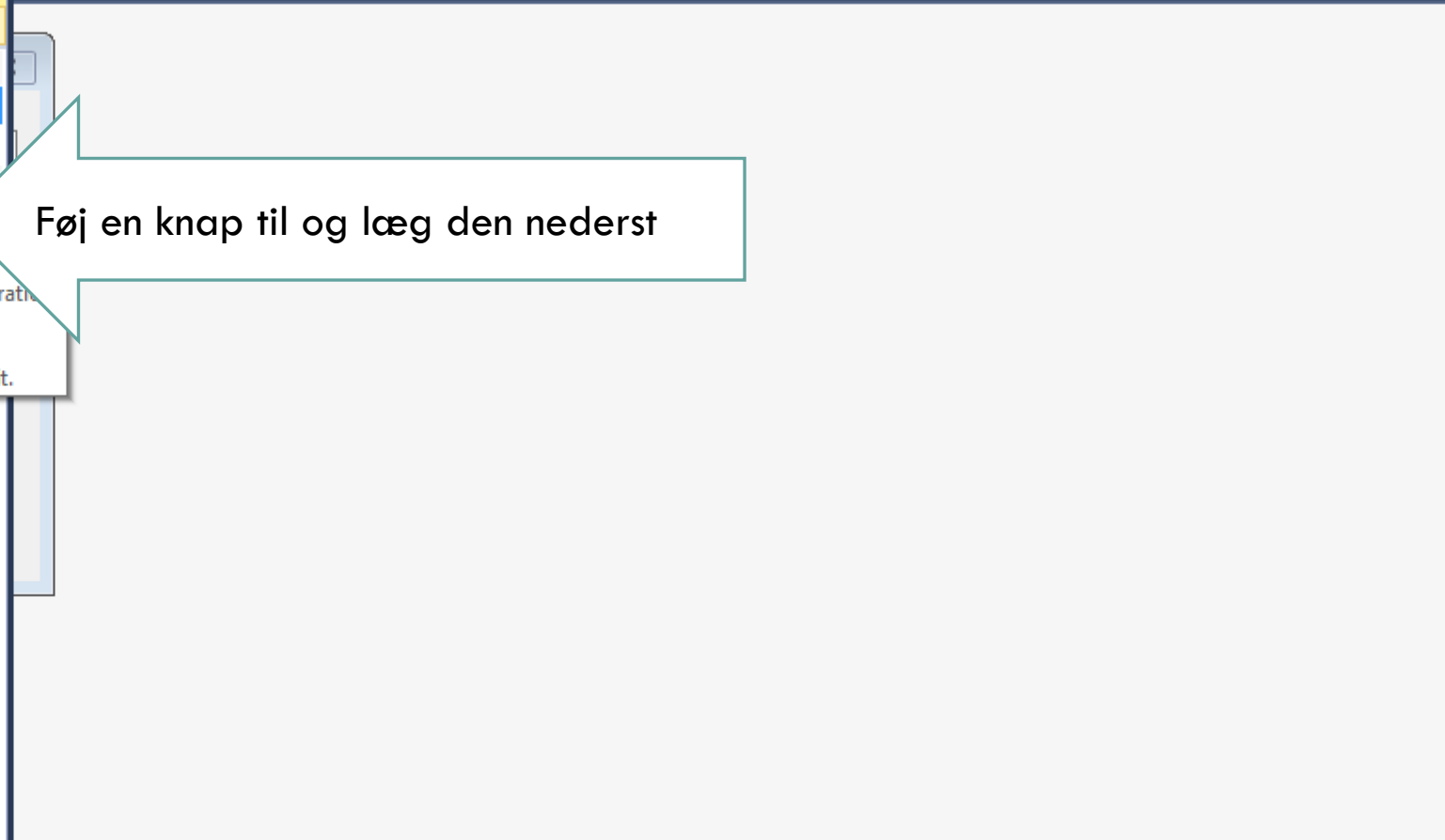


Toolbox

- Button
- All Windows Forms
 - Button
 - RadioButton
- Common Controls
 - Button
 - RadioButton

Button
Version 4.6.1.0 from Microsoft Corporation
.NET Component
Raises an event when the user clicks it.

Føj en knap til og læg den nederst



Solution Explorer

Search Solution Explorer (Ctrl+T)

- Solution 'Lesson9wform' (1 project)
 - C# Lesson9wform
 - Properties
 - References
 - App.config
 - Form1.cs
 - Form1.Designer.cs
 - Form1.resx
 - Form1
 - Program.cs

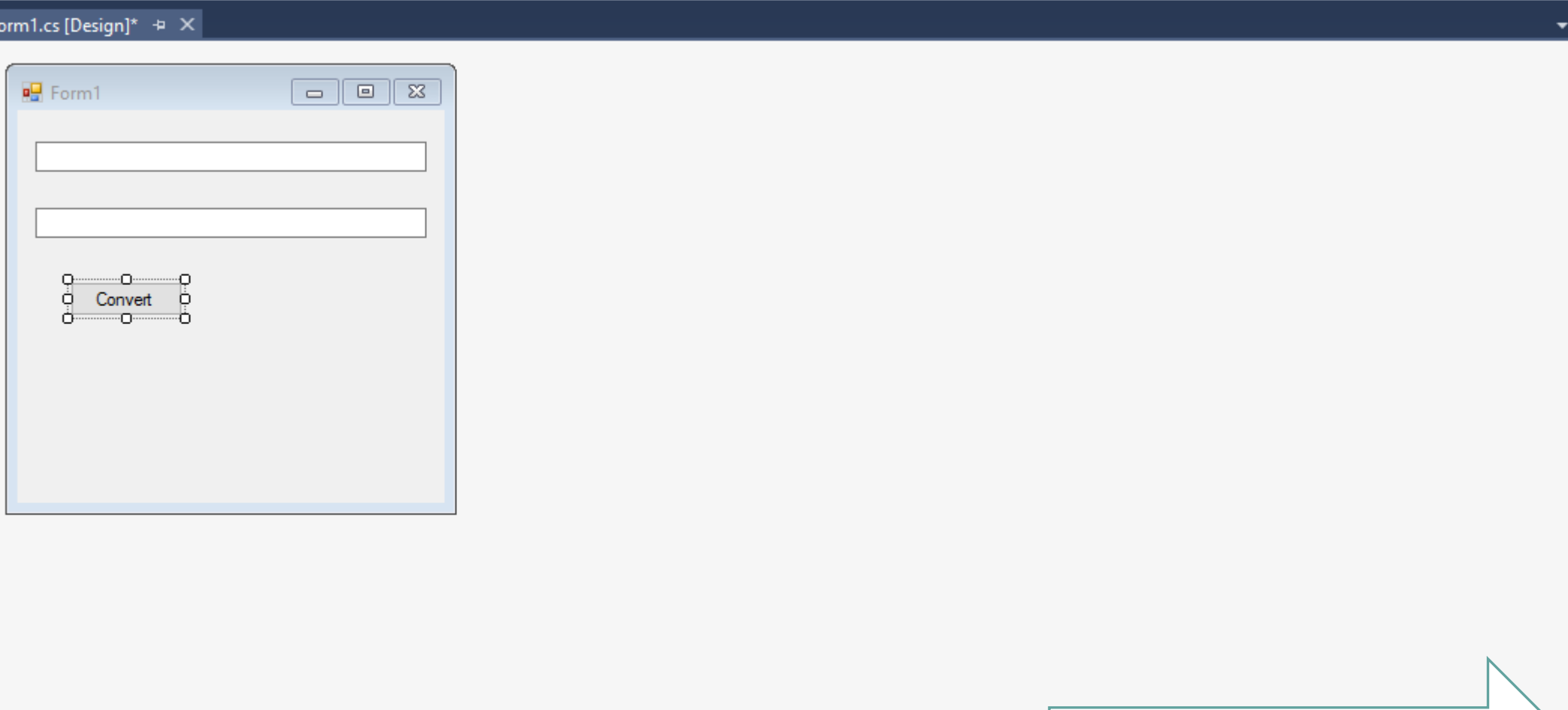
Properties

tbTempC System.Windows.Forms.TextBox

ForeColor	WindowText
Lines	String[] Array
RightToLeft	No
ScrollBars	None
Text	
TextAlian	Left

Text
The text associated with the control.

```
erw\documents\visual studio 2015\Projects\Lesson9wform\Lesson9wform\tbTempF.Designer.cs'
```



Solution Explorer

Search Solution Explorer (Ctrl+`^`)

- Solution 'Lesson9wform' (1 project)
 - C# Lesson9wform
 - Properties
 - References
 - App.config
 - Form1.cs
 - Form1.Designer.cs
 - Form1.resx
 - Form1
 - Program.cs

Solution Explorer Team Explorer Class V

Properties

button1 System.Windows.Forms.Button

ImageIndex	(none)
ImageKey	(none)
ImageList	(none)
RightToLeft	No
Text	Convert
TextAlign	MiddleCenter

Text

The text associated with the control.

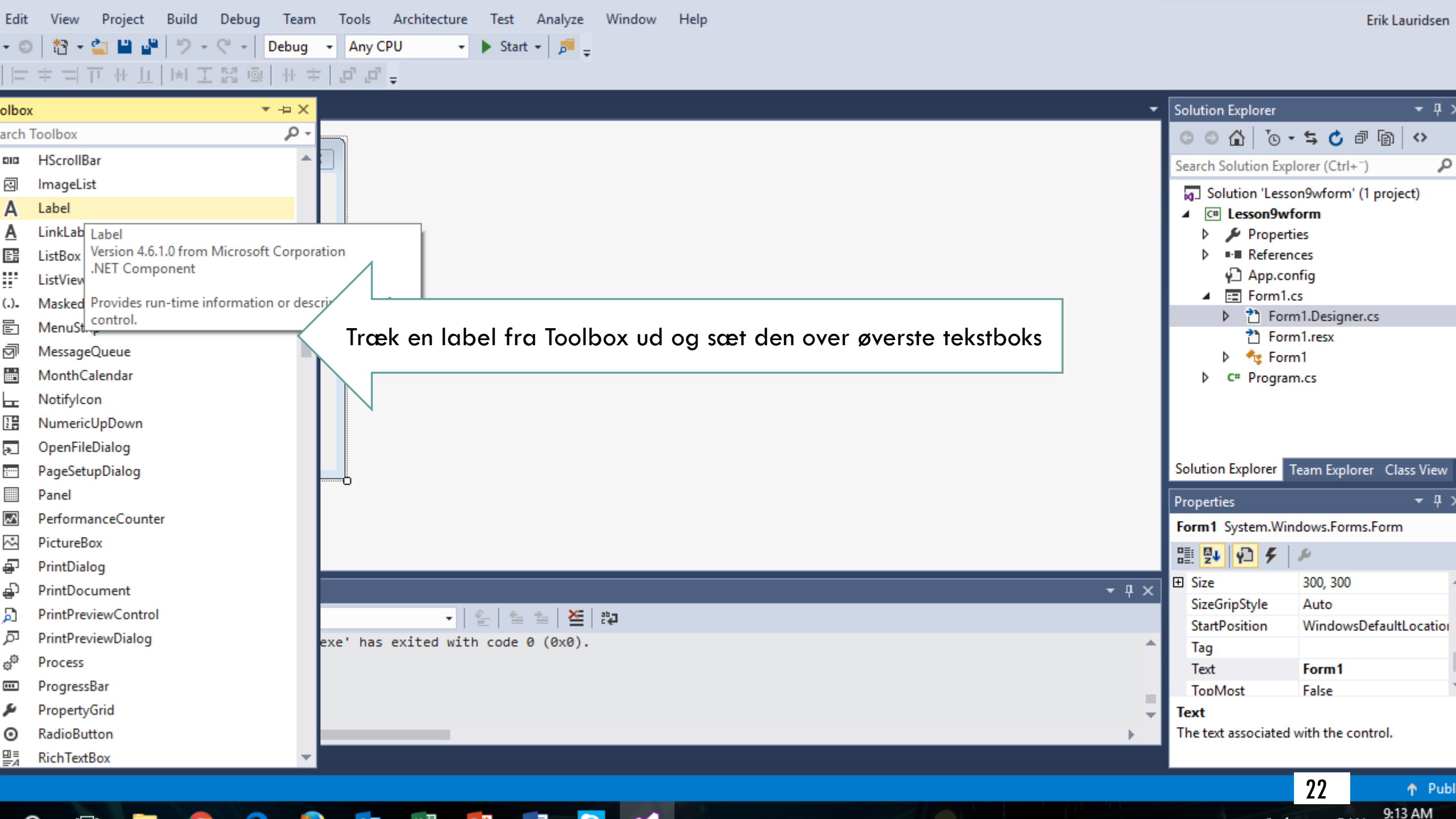
Ændr knappens tekst til Convert

Output

Show output from: IntelliSense

```
[Failure] Could not find file 'c:\users\erwl\documents\visual studio 2015\Projects\Lesson9wform\Lesson9wform\obj\Debug\TempPE\Lesson9wform.exe'.
```

Error List Output



- ToolStrip
- ToolStripItem
- ToolStripLabel
- ToolStripProgressBar
- ToolStripText
- ToolStripTextControl
- ToolStripTextControl2
- ToolStripTextControl3
- ToolStripTextControl4
- ToolStripTextControl5
- ToolStripTextControl6
- ToolStripTextControl7
- ToolStripTextControl8
- ToolStripTextControl9
- ToolStripTextControl10
- ToolStripTextControl11
- ToolStripTextControl12
- ToolStripTextControl13
- ToolStripTextControl14
- ToolStripTextControl15
- ToolStripTextControl16
- ToolStripTextControl17
- ToolStripTextControl18
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- ToolStripTextControl92
- ToolStripTextControl93
- ToolStripTextControl94
- ToolStripTextControl95
- ToolStripTextControl96
- ToolStripTextControl97
- ToolStripTextControl98
- ToolStripTextControl99
- ToolStripTextControl100

Træk en label fra Toolbox ud og sæt den over øverste tekstboks

Solution Explorer

Search Solution Explorer (Ctrl+“)

- Solution 'Lesson9wform' (1 project)
 - C# Lesson9wform
 - Properties
 - References
 - App.config
 - Form1.cs
 - Form1.Designer.cs
 - Form1.resx
 - Form1
 - Program.cs

Solution Explorer Team Explorer Class View

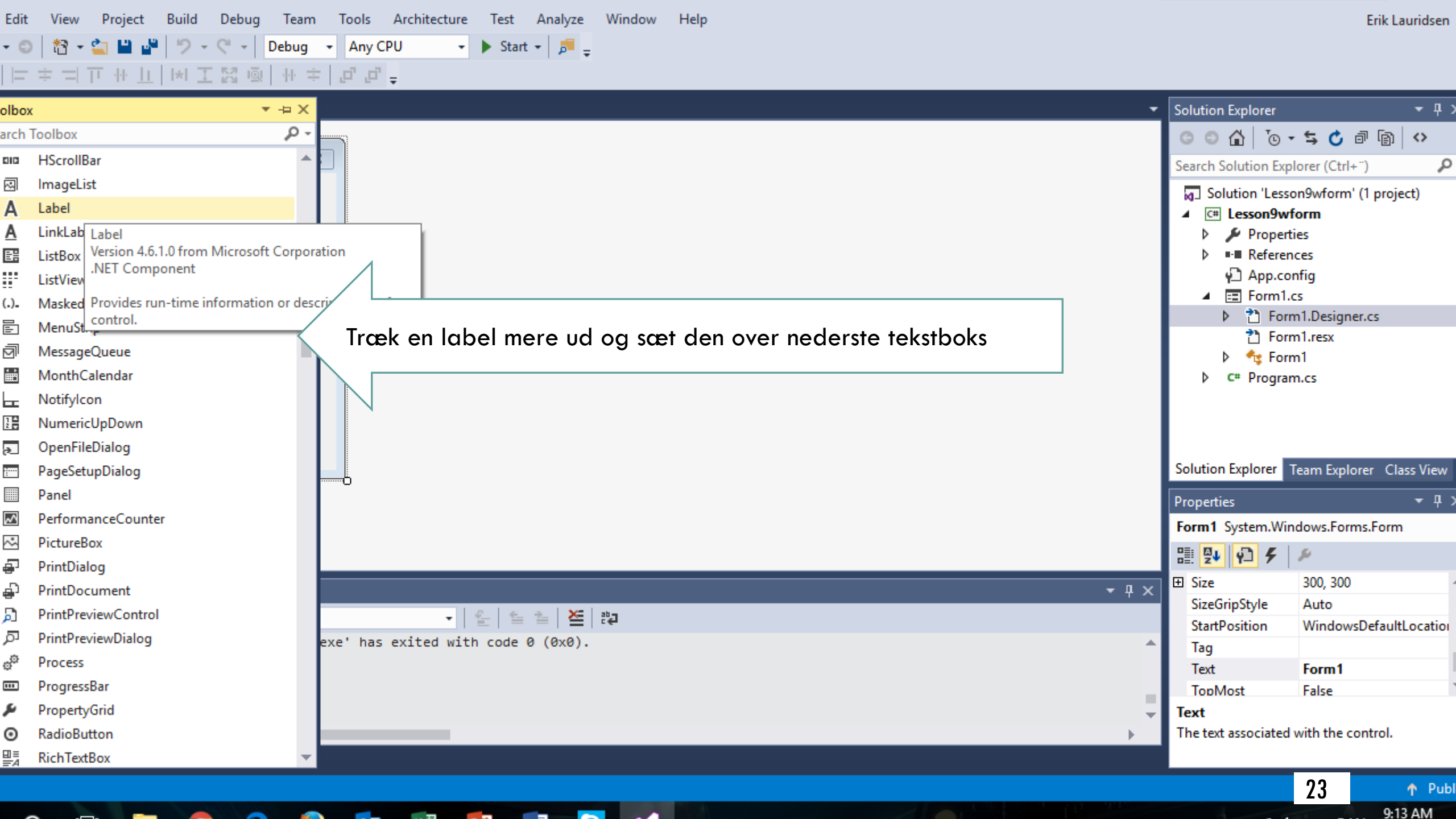
Properties

Form1 System.Windows.Forms.Form

Size	300, 300
SizeGripStyle	Auto
StartPosition	WindowsDefaultLocation
Tag	
Text	Form1
TopMost	False

Text

The text associated with the control.



Toolbox

Arch Toolbox

- HScrollBar
- ImageList
- Label**
- LinkLabel
- ListBox
- ListView
- MaskedTextBox
- MenuStrip
- MessageQueue
- MonthCalendar
- NotifyIcon
- NumericUpDown
- OpenFileDialog
- PageSetupDialog
- Panel
- PerformanceCounter
- PictureBox
- PrintDialog
- PrintDocument
- PrintPreviewControl
- PrintPreviewDialog
- Process
- ProgressBar
- PropertyGrid
- RadioButton
- RichTextBox

Label
Version 4.6.1.0 from Microsoft Corporation
.NET Component

Provides run-time information or description for a control.

Træk en label mere ud og sæt den over nederste tekstboks

Solution Explorer

Search Solution Explorer (Ctrl+)

- Solution 'Lesson9wform' (1 project)
 - C# Lesson9wform
 - Properties
 - References
 - App.config
 - Form1.cs
 - Form1.Designer.cs
 - Form1.resx
 - Form1
 - Program.cs

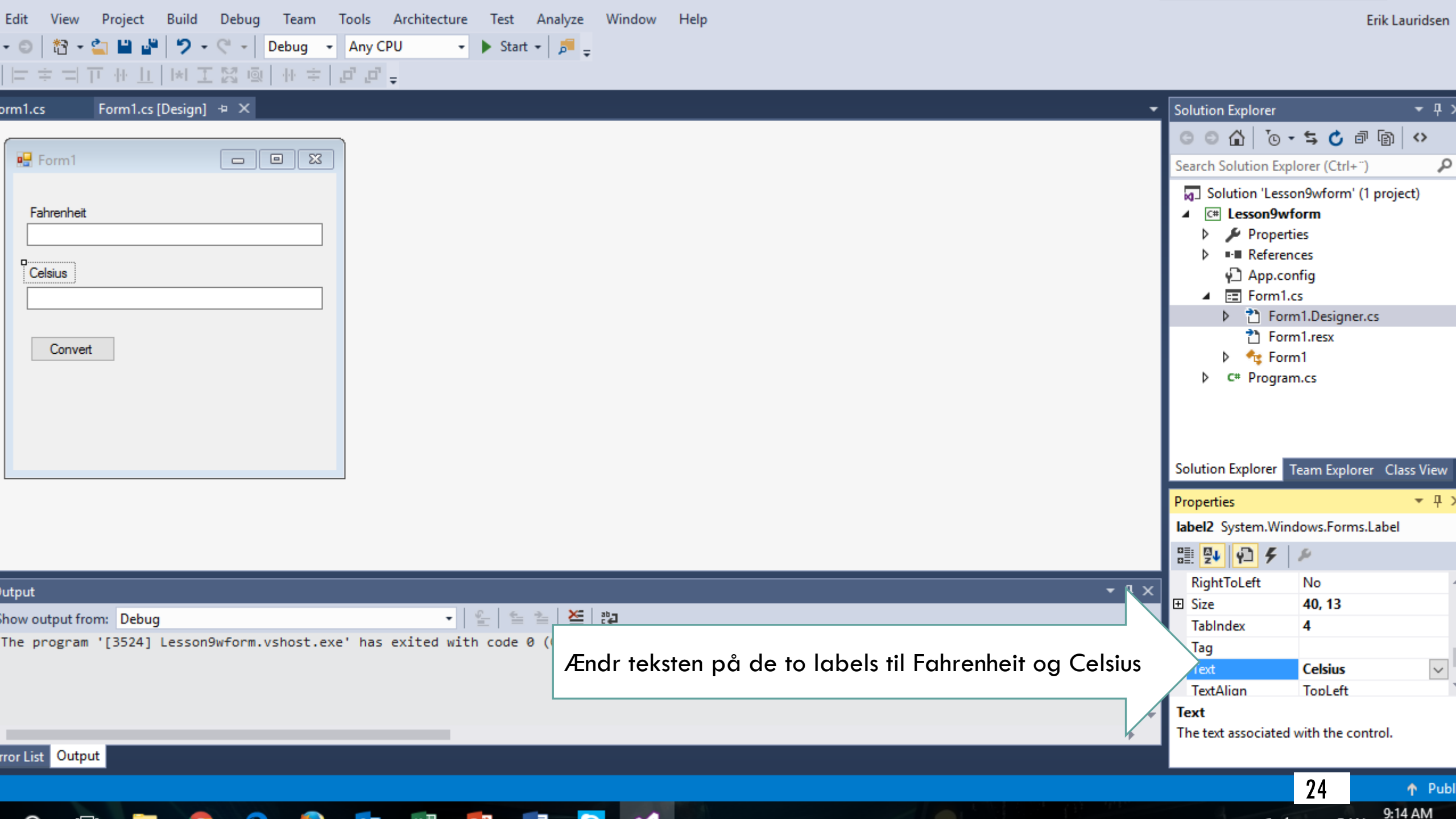
Solution Explorer Team Explorer Class View

Properties

Form1 System.Windows.Forms.Form

Size	300, 300
SizeGripStyle	Auto
StartPosition	WindowsDefaultLocation
Tag	
Text	Form1
TopMost	False

Text
The text associated with the control.



- Solution 'Lesson9wform' (1 project)
 - C# Lesson9wform
 - Properties
 - References
 - App.config
 - Form1.cs
 - Form1.Designer.cs
 - Form1.resx
 - Form1
 - Program.cs

label2 System.Windows.Forms.Label

RightToLeft	No
Size	40, 13
TabIndex	4
Tag	
Text	Celsius
TextAlign	TopLeft

Text
The text associated with the control.

Ændr teksten på de to labels til Fahrenheit og Celsius

Output
Show output from: Debug
The program '[3524] Lesson9wform.vshost.exe' has exited with code 0 (0)

Form1

Fahrenheit

Celsius

Convert

Search Solution Explorer (Ctrl+...)

- Solution 'Lesson9wform' (1 project)
 - C# Lesson9wform
 - Properties
 - References
 - App.config
 - Form1.cs
 - Form1.Designer.cs
 - Form1.resx
 - Form1
 - Program.cs

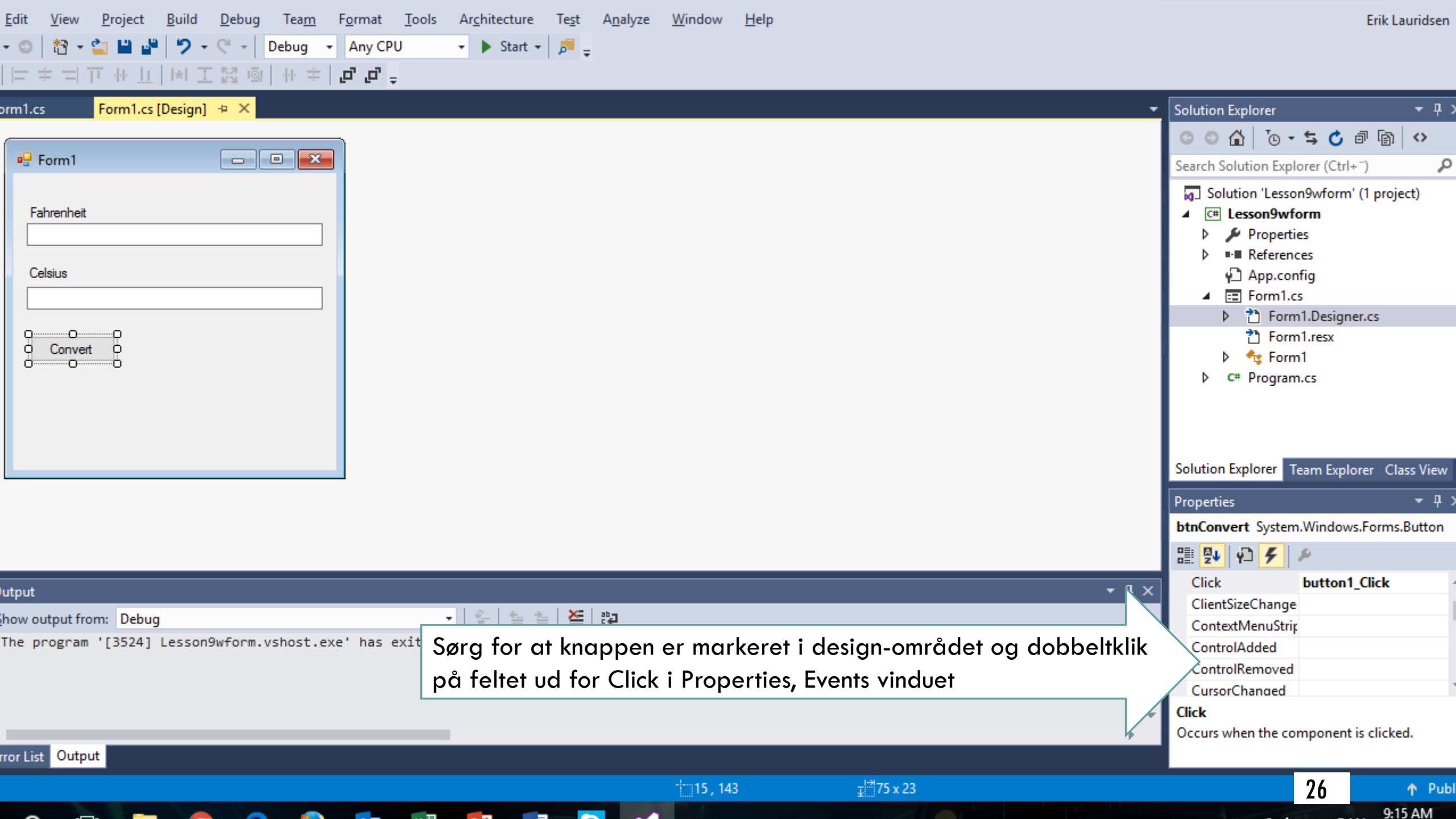
label2 System.Windows.Forms.Label

RightToLeft	No
Size	Events 13
TabIndex	4
Tag	
Text	Celsius
TextAlign	TopLeft

Text
The text associated with the control.

The program '[3524] Lesson9wform.vshost.exe' has exited with code 0 (0x0).

Skift til Events ved at klikke på lynet



- Solution 'Lesson9wform' (1 project)
 - C# Lesson9wform
 - Properties
 - References
 - App.config
 - Form1.cs
 - Form1.Designer.cs
 - Form1.resx
 - Form1
 - Program.cs

Click	button1_Click
ClientSizeChange	
ContextMenuStrip	
ControlAdded	
ControlRemoved	
CursorChanaed	

Click
Occurs when the component is clicked.

Sørg for at knappen er markeret i design-området og dobbeltklik på feltet ud for Click i Properties, Events vinduet

```
Lesson9wform Lesson9wform.Form1 button1_Click(object sender, EventArgs e)  
14 {  
15     1 reference  
16     public Form1()  
17     {  
18         InitializeComponent();  
19     }  
20     1 reference  
21     private void button1_Click(object sender, EventArgs e)  
22     {  
23         double temp;  
24         temp = Convert.ToDouble(tbTempF.Text) - 32.0;  
25         temp = temp / 9.0;  
26         temp = temp * 5.0;  
27         tbTempC.Text = Convert.ToString(temp);  
28     }  
29 }  
30
```

Føj linje 22 til 26 til

Solution Explorer

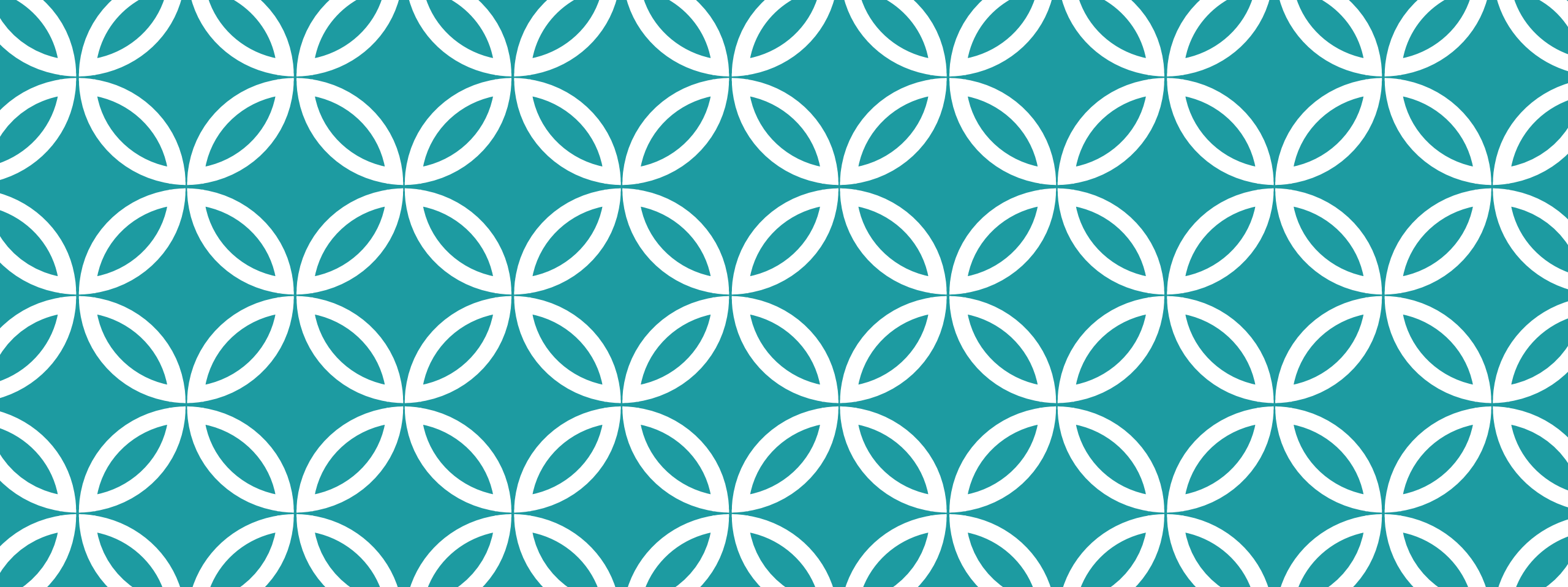
- Solution 'Lesson9wform' (1 project)
 - Lesson9wform
 - Properties
 - References
 - App.config
 - Form1.cs
 - Form1.Designer.cs
 - Form1.resx
 - Form1
 - Program.cs

Properties

Output

Show output from: IntelliSense

[Failure] Could not find file 'c:\users\erwl\documents\visual studio 2015\Projects\Lesson9wform\Lesson9wform\tbTempF.Designer.cs'.



LEKTIE

Kig på dette til næste gang

LEKTIE

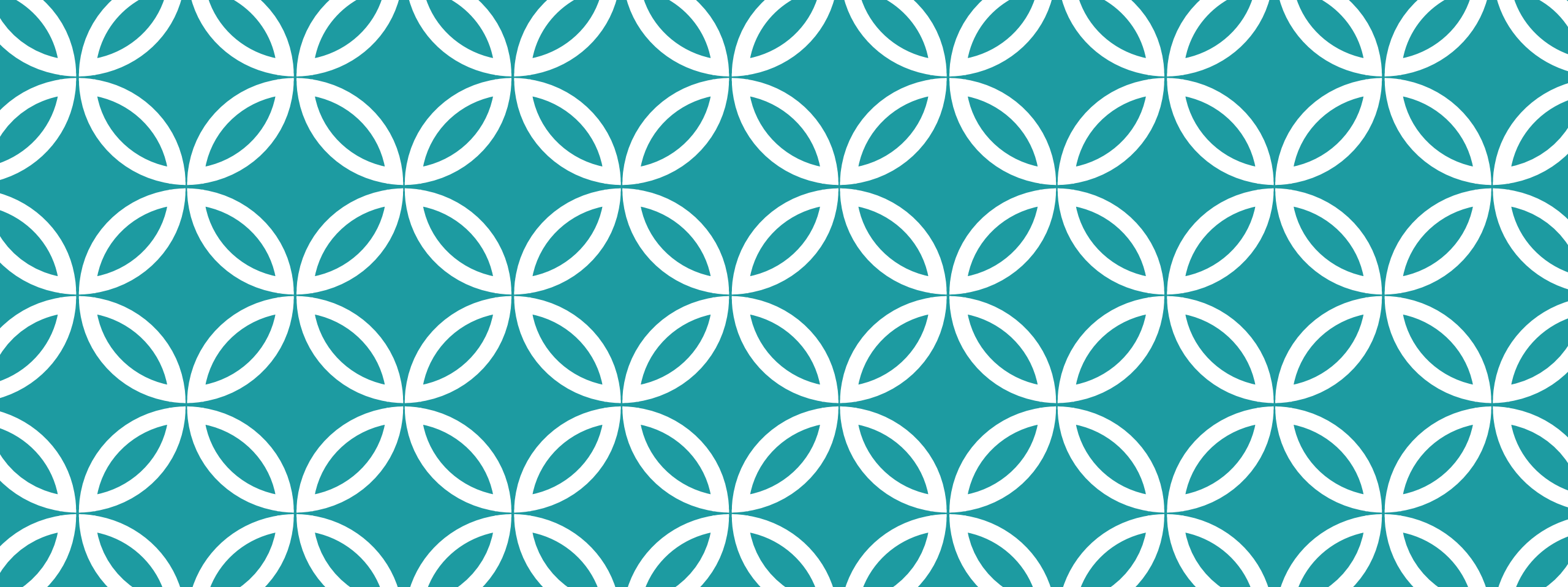
Se og løs opgaverne til <https://mva.microsoft.com/en-US/training-courses/programming-in-c-jump-start-14254> - 08

Læs:

- https://www.tutorialspoint.com/csharp/csharp_collections.htm

Opgave

- Lav en lommeregner med en grafisk brugerflade ved hjælp af Windows forms



KILDER

Materiale benyttet i denne
lektion
Noget af det er udover pensum-
listen!

KILDER

Events

- https://www.tutorialspoint.com/csharp/csharp_events.htm
- <https://youtu.be/jQgwEsJISy0>

Fil systemet

- https://www.tutorialspoint.com/csharp/csharp_file_io.htm