



C# Crash Course

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BIO



Dimitar Minchev

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Education

- Bachelor of Informatics, Burgas Free University, 2003.
- Master of Informatics, Shumen University "Episkop Konstantin Preslavski", 2007.
- PhD of Informatics, Bulgarian Academy of Sciences, The Institute of Information and Communication Technologies, 2012.

Scientific Interests

- Computer Science
- Computer Architectures and Networks
- Digital Signal Processing



Where to start?

What you need to start developing C# applications ?

Technologies

This Crash Course is about C#, and it is targeting development using Microsoft technology. Target millions of potential users by choosing Microsoft.



Microsoft



Windows® 8



Visual Studio®

Development Environment



To Develop Desktop Apps Download:
Visual Studio Express 2012 for Desktop



To Develop Windows 8 Compatible Apps Download:
Visual Studio Express 2012 for Windows 8



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Visual Studio Express 2012 for Windows Phone

Students Benefits



DreamSpark is the Newest Microsoft Academic Program that Allows Students to use the Company's Products for Free.



C# Basics

Let's Start with Introduction to C# Programming Language

Storing Integer Values

| | | |
|--------|---------|---|
| sbyte | 8 bits | -128 to 127 |
| byte | 8 bits | 0 to 255 |
| short | 16 bits | -32768 to 32767 |
| ushort | 16 bits | 0 to 65535 |
| int | 32 bits | -2147483648 to 2147483647 |
| uint | 32 bits | 0 to 4294967295 |
| long | 64 bits | -9223372036854775808 to 9223372036854775807 |
| ulong | 64 bits | 0 to 18446744073709551615 |
| char | 16 bits | 0 to 65535 |

Storing Real Values

| | | |
|---------|--------------|---------------------|
| float | 7 digits | 1.5E-45 to 3.4E48 |
| double | 15 digits | 5.0E-324 to 1.7E308 |
| decimal | 28-29 digits | |

Casting

We can force C# to regard a value as being of a certain type by the use of casting like this ...

```
double d = 1.5;  
float f = (float) d ;
```

Conditional Execution

```
if ( width > 5.0 )
```

```
{
```

```
    Console.WriteLine ("Too big, use maximum\n") ;
```

```
    width = 5.0 ;
```

```
}
```

Loops

for, while, do ... while

```
for ( SETUP; FINISH_TEST; UPDATE )  
{  
    // things we want to do a given number of times  
}
```

```
while (CONDITION)  
{  
    // statement or block  
}
```

```
do  
{  
    // statement or block  
} while (CONDITION) ;
```

Breaking loops

```
while ( RUNNING_OK )  
{  
    // complex stuff  
    if ( ABORTED ) { break ; }  
    // more complex stuff  
}  
// we are here if aborted becomes true
```

Continuing loops

```
for ( item = 1 ; item < TOTAL_ITEMS ; item=item+1 )  
{  
    // item processing stuff  
    if ( DONE_ALL_WE_NEED_THIS_TIME ) continue ;  
    // additional item processing stuff ....  
}
```

Methods, Parameters, Return value

```
using System ;  
  
class ReturnDemo  
{  
    static int sillyReturnPlus ( int i)  
    {  
        i = i + 1;  
        Console.WriteLine ( "i is : " + i ) ;  
        return i;  
    }  
    public static void Main ()  
    {  
        int res = sillyReturnPlus (5);  
        Console.WriteLine ( "result = " + res ) ; }  
}
```

Arrays

```
using System;
class ArrayDemo
{
    public static void Main ()
    {
        int [] scores = new int [11] ;
        for ( int i=0; i<11; i=i+1)
        {
            scores [i] = readInt ( "Score : ", 0,1000);
        }
    }
}
```

Multi Dimensional Arrays

```
int [,] board = new int [3,3];
```

```
board [1,1] = 1;
```

| | 0 | 1 | 2 |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 |
| 2 | 0 | 0 | 0 |

Exceptions

```
int age;  
try {  
    age = int.Parse(ageString);  
    Console.WriteLine("Thank you");  
} catch (Exception e) {  
    // Get the error message out of the exception  
    Console.WriteLine(e.Message);  
}
```

Finally Clause

```
try
{
    // Code that might throw an exception
}
catch (Exception outer)
{
    // Code that catches the exception
}
finally
{
    // Code that is obeyed whether an exception is thrown or not
}
```

Throwing an Exception

```
throw new Exception( "BOOM" );
```

Streams

Read

```
TextReader reader = new StreamReader("Test.txt");  
string line = reader.ReadLine();  
Console.WriteLine (line);  
reader.Close();
```

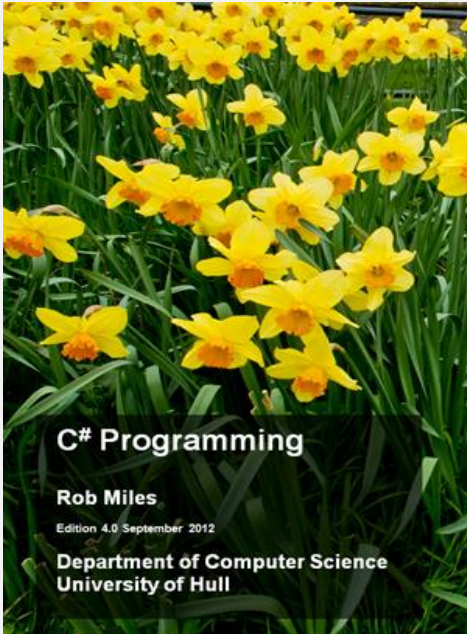
Write

```
StreamWriter writer = new StreamWriter("test.txt");  
writer.WriteLine("hello world");  
writer.Close();
```

File Path

```
string path;  
path = @"c:\data\2009\sales.txt";
```

To Learn Fast Read Books ☺



C# Yellow Book by Rob Miles

<http://www.robmiles.com/c-yellow-book/>

The C# Book is used by the Department of Computer Science in the University of Hull as the Basis of the First Year Programming Course.

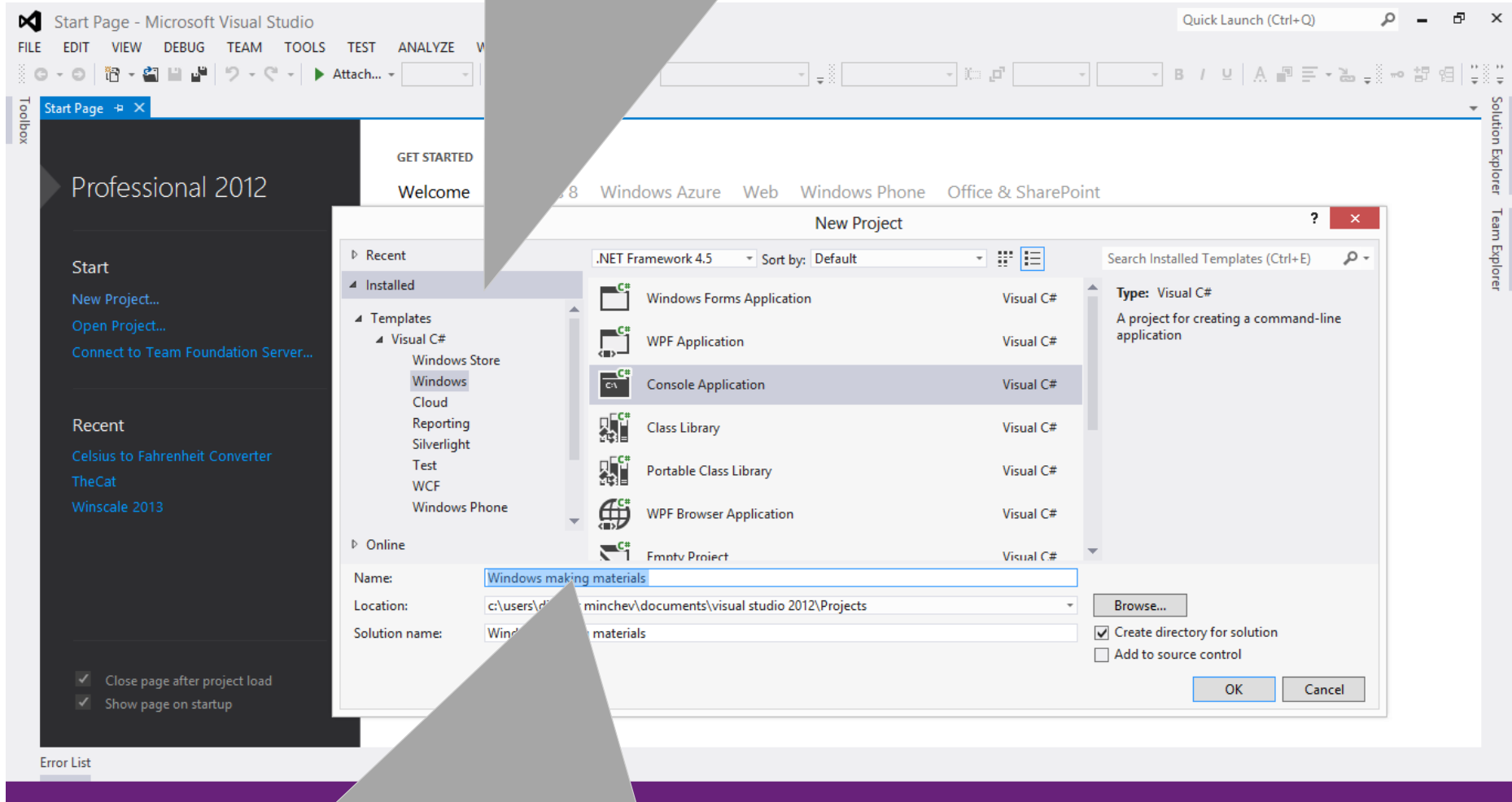


Console App

Windows Making Materials Example ...

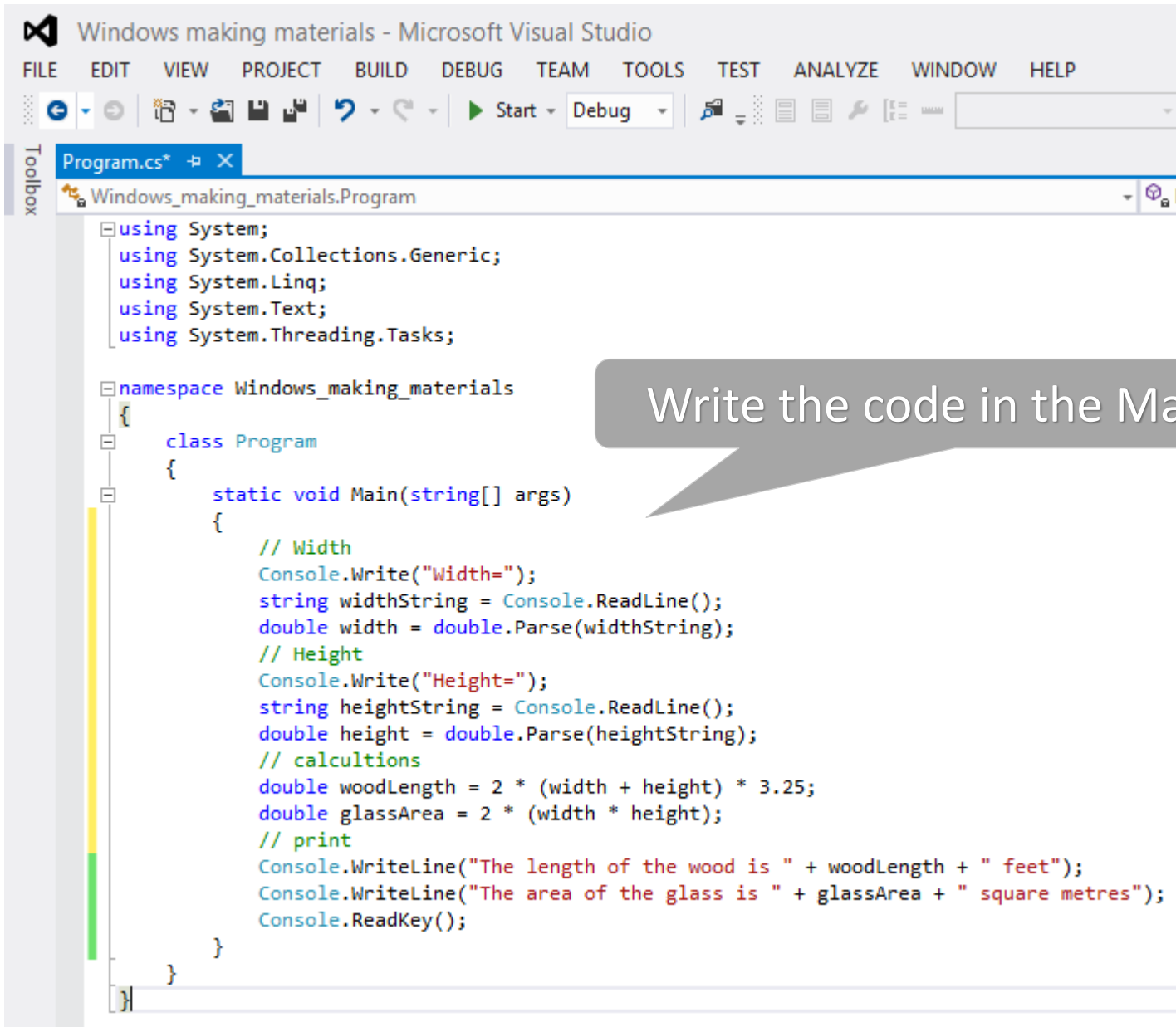
Project = Create It

Visual C#: Windows Console Application



Project name: Windows Making Materials

Functionality = The Code

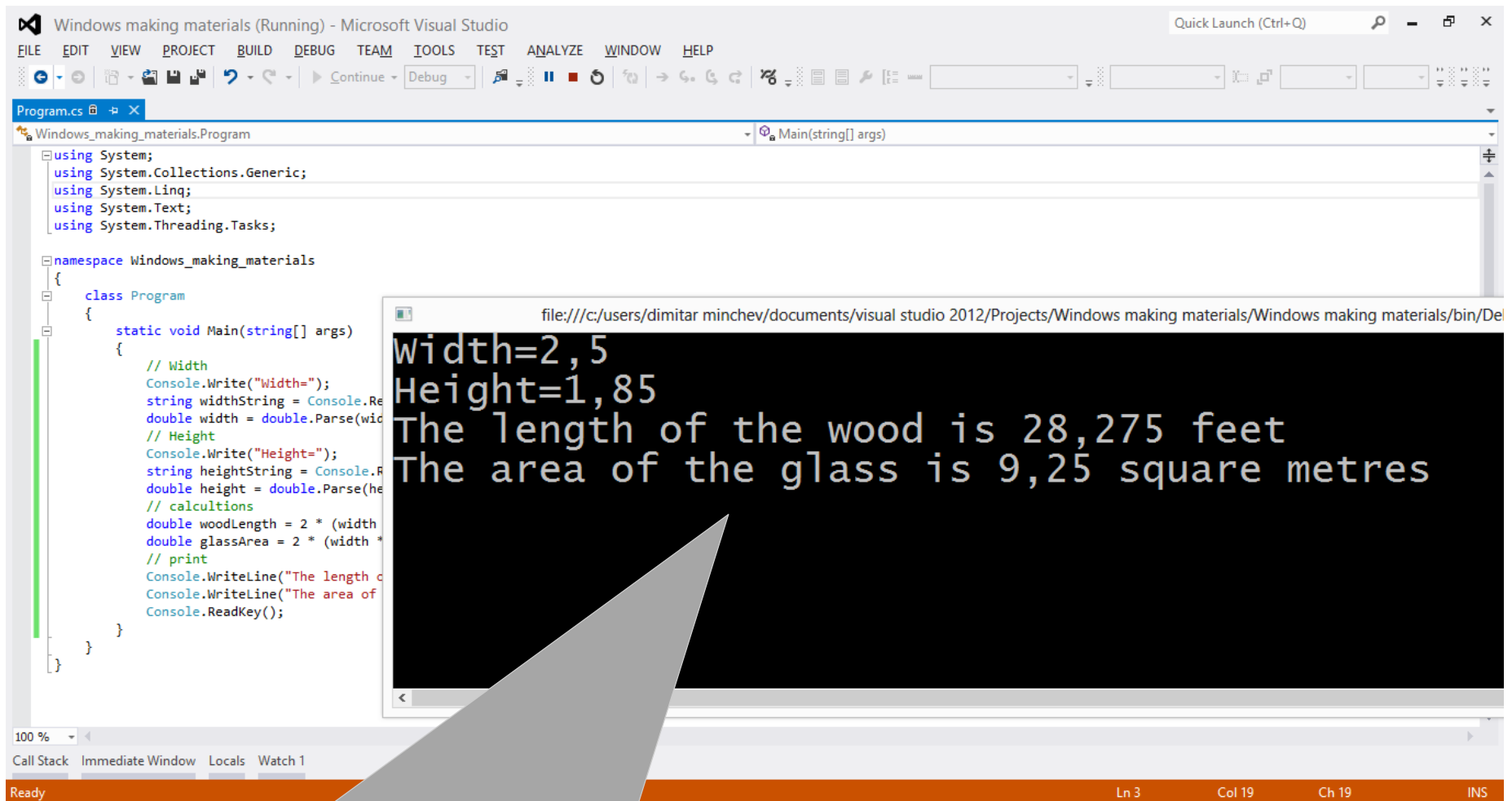


The screenshot shows the Microsoft Visual Studio IDE with a C# file named Program.cs. The code defines a namespace 'Windows_making_materials' and a class 'Program'. Inside the 'Program' class, there is a 'Main' method that takes an array of strings as input. The method prompts the user for width and height, parses the input into doubles, calculates the wood length and glass area, and prints the results. A speech bubble points to the 'Main' method with the text 'Write the code in the Main method'.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace Windows_making_materials
{
    class Program
    {
        static void Main(string[] args)
        {
            // Width
            Console.Write("Width=");
            string widthString = Console.ReadLine();
            double width = double.Parse(widthString);
            // Height
            Console.Write("Height=");
            string heightString = Console.ReadLine();
            double height = double.Parse(heightString);
            // calculations
            double woodLength = 2 * (width + height) * 3.25;
            double glassArea = 2 * (width * height);
            // print
            Console.WriteLine("The length of the wood is " + woodLength + " feet");
            Console.WriteLine("The area of the glass is " + glassArea + " square metres");
            Console.ReadKey();
        }
    }
}
```

Test = Run [F5]



Windows making materials (Running) - Microsoft Visual Studio

Quick Launch (Ctrl+Q)

FILE EDIT VIEW PROJECT BUILD DEBUG TEAM TOOLS TEST ANALYZE WINDOW HELP

Program.cs

Windows_making_materials.Program

Main(string[] args)

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace Windows_making_materials
{
    class Program
    {
        static void Main(string[] args)
        {
            // Width
            Console.Write("Width=");
            string widthString = Console.ReadLine();
            double width = double.Parse(widthString);
            // Height
            Console.Write("Height=");
            string heightString = Console.ReadLine();
            double height = double.Parse(heightString);
            // calculations
            double woodLength = 2 * (width * height);
            double glassArea = 2 * (width * height);
            // print
            Console.WriteLine("The length of the wood is " + woodLength + " feet");
            Console.WriteLine("The area of the glass is " + glassArea + " square metres");
            Console.ReadKey();
        }
    }
}
```

file:///c:/users/dimitar minchev/documents/visual studio 2012/Projects/Windows making materials/Windows making materials/bin/Debug/Windows making materials.exe

width=2,5
Height=1,85
The length of the wood is 28,275 feet
The area of the glass is 9,25 square metres

100 %

Call Stack Immediate Window Locals Watch 1

Ready Ln 3 Col 19 Ch 19 INS

Test the Functionality of Your First C# Console App by Run it

The Code of the Example

```
// width
Console.Write("width=");
string widthString = Console.ReadLine();
double width = double.Parse(widthString);

// Height
Console.Write("Height=");
string heightString = Console.ReadLine();
double height = double.Parse(heightString);

// Calculations
double woodLength = 2 * (width + height) * 3.25;
double glassArea = 2 * (width * height);

// Print
Console.WriteLine("The length of the wood is " +
                  woodLength + " feet");

Console.WriteLine("The area of the glass is " +
                  glassArea + " square metres");

// Pause
Console.ReadKey();
```



C# Classes

Everything in C# is in a Class ...

Create Class

- **Classes have members:**
 - Constructors
 - Data Members
 - Properties
 - Methods
 - Destructors
- **Members have access modifiers:**
 - Public
 - Private
 - Protected

class definition start

```
public class Cat  
{
```

```
    private string name;  
    private string color;
```

data member

```
    public Cat(string name, string color)  
    {  
        this.name = name;  
        this.color = color;  
    }
```

constructor

```
    public string Name  
    {  
        get { return this.name; }  
        set { this.name = value; }  
    }
```

property

property

get/set property

```
public string Color
{
    get { return this.color; }
    set { this.color = value; }
}
```

method

```
public void SayMiau()
{
    Console.WriteLine("{0} cat {1} said: Miau!", color, name);
}
}
```

class definition end

Use Class

- **Create an instance**
 - Initialize its fields
- **Manipulate the instance**
 - Read properties
 - Modify properties
 - Invoke methods
- **Release the occupied resources**
 - Done automatically in most cases

create an instance using default constructor

```
static void Main()  
{
```

```
    Cat Tony = new Cat();
```

read properties

```
    Console.WriteLine("{0} cat {1}", Tony.Color, Tony.Name );
```

```
    Tony.Name = "Tony";
```

```
    Tony.Color = "Green";
```

modify properties

```
    Tony.SayMiaw();
```

invoke method

```
    Cat Pepy = new Cat("Pepy", "White");
```

```
    Pepy.SayMiaw();
```

```
    Console.ReadKey();
```

```
}
```

create an instance using overloaded constructor

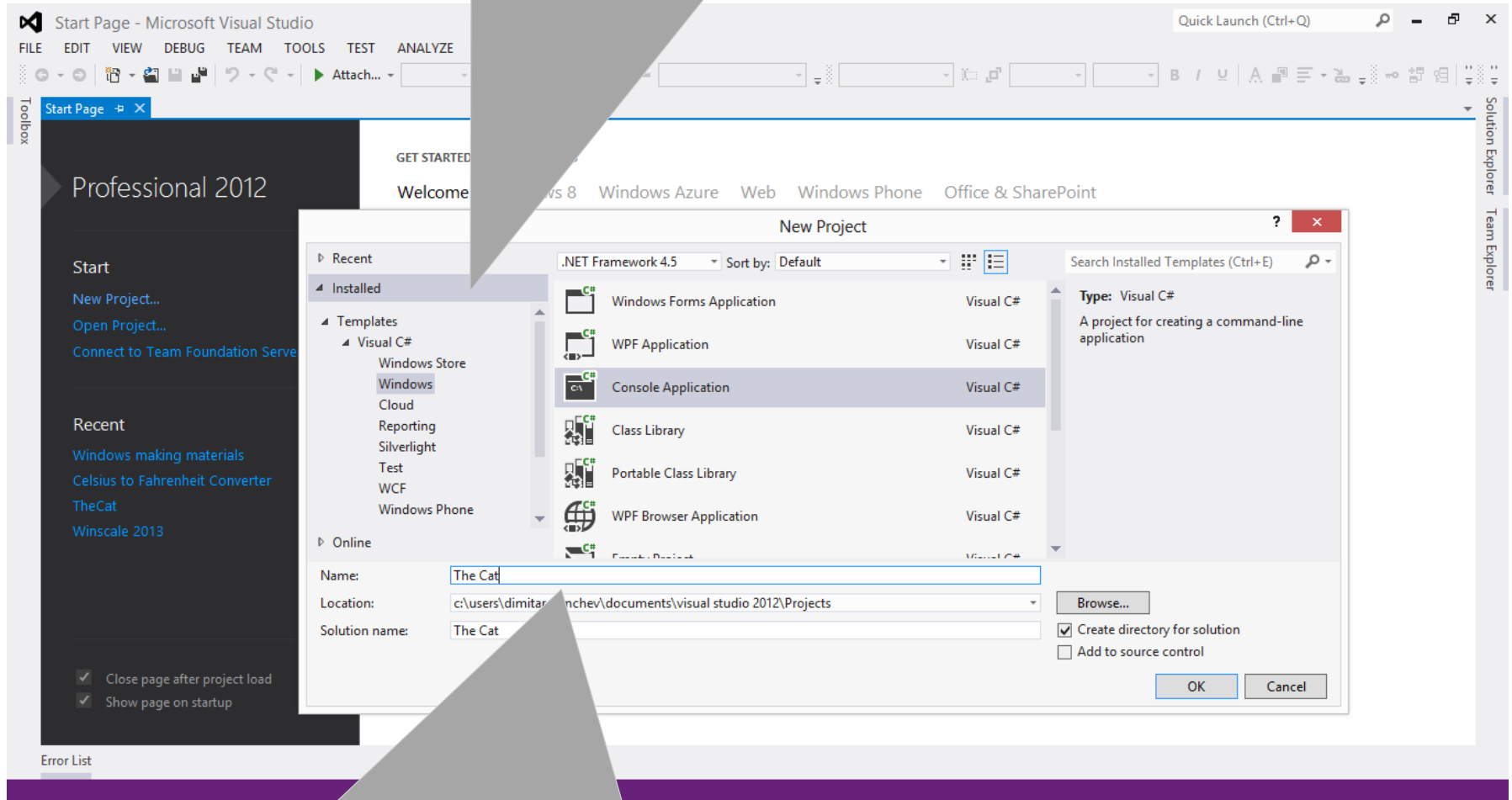


Console App

The Cat Example ...

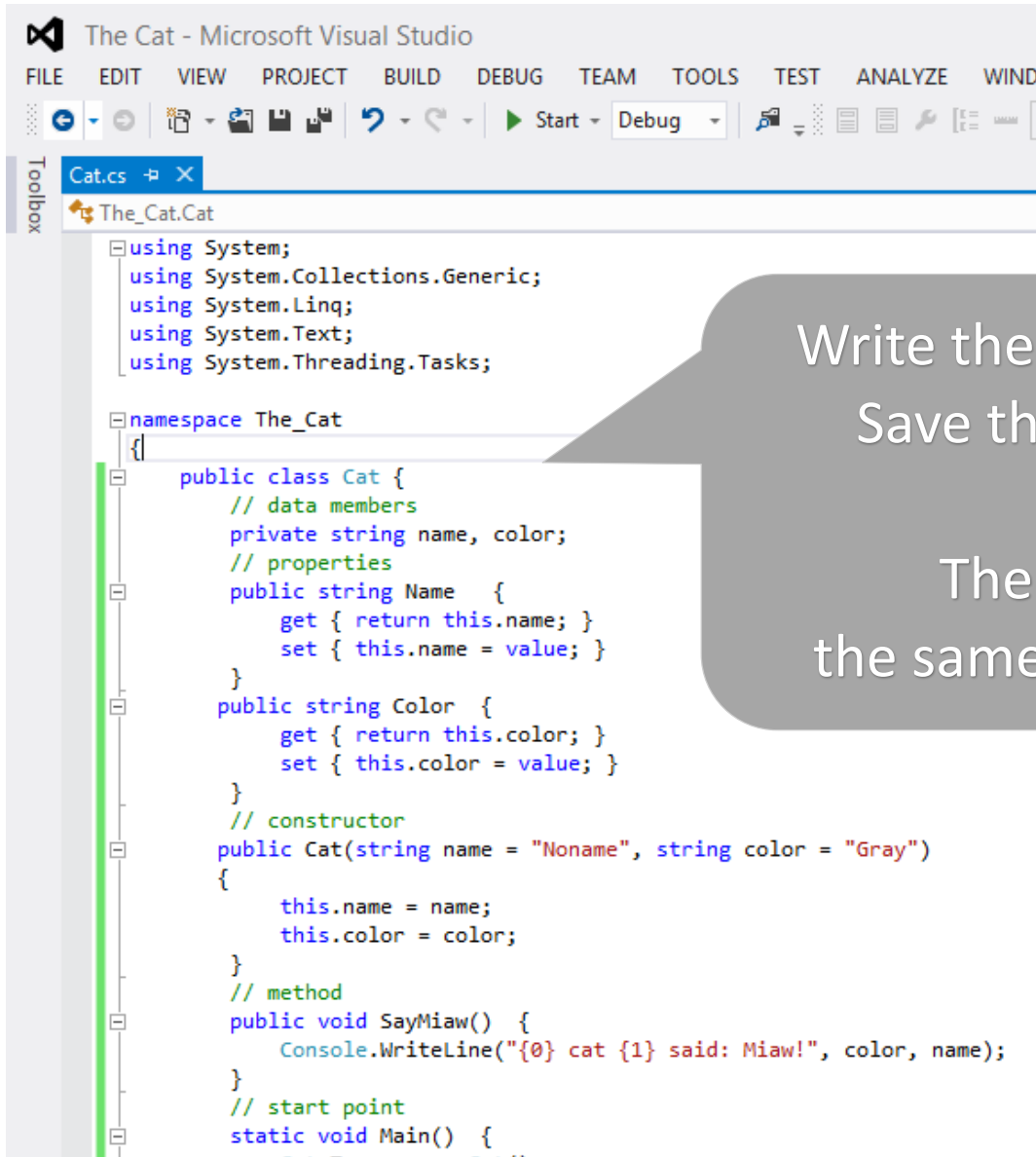
Project = Create It

Visual C#: Windows Console Application



Project name: The Cat

Functionality = The Code



The screenshot shows the Microsoft Visual Studio IDE with a project named 'The Cat'. The file 'Cat.cs' is open, showing the following code:

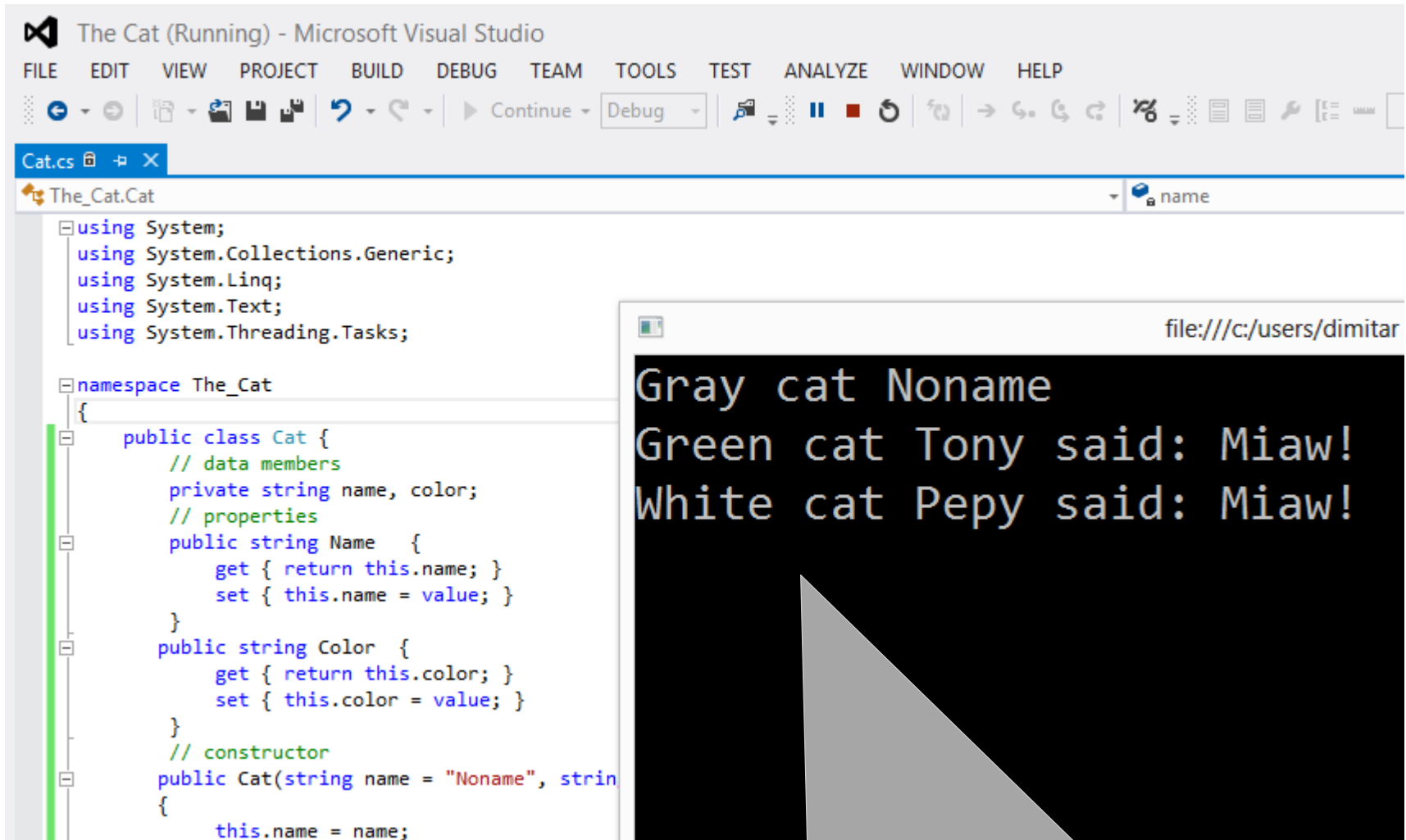
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace The_Cat
{
    public class Cat {
        // data members
        private string name, color;
        // properties
        public string Name {
            get { return this.name; }
            set { this.name = value; }
        }
        public string Color {
            get { return this.color; }
            set { this.color = value; }
        }
        // constructor
        public Cat(string name = "Noname", string color = "Gray")
        {
            this.name = name;
            this.color = color;
        }
        // method
        public void SayMiaw() {
            Console.WriteLine("{0} cat {1} said: Miaw!", color, name);
        }
        // start point
        static void Main() {
```

Write the code of the [Cat] class.
Save the class in file [Cat.cs]

The CS file must have
the same name that the CLASS.

Test it = Run [F5]



The Cat (Running) - Microsoft Visual Studio

FILE EDIT VIEW PROJECT BUILD DEBUG TEAM TOOLS TEST ANALYZE WINDOW HELP

Cat.cs [icon] [icon] X

The_Cat.Cat [icon] name

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace The_Cat
{
    public class Cat {
        // data members
        private string name, color;
        // properties
        public string Name {
            get { return this.name; }
            set { this.name = value; }
        }
        public string Color {
            get { return this.color; }
            set { this.color = value; }
        }
        // constructor
        public Cat(string name = "Noname", string color = "Gray") {
            this.name = name;
            this.color = color;
        }
    }
}
```

file:///c:/users/dimitar

Gray cat Noname
Green cat Tony said: Miaw!
White cat Pepy said: Miaw!

Test the Functionality of Your C# Console App by Run it ...

The Code of the Example

```
public class Cat {  
    // data members  
    private string name, color;  
    // properties  
    public string Name {  
        get { return this.name; }  
        set { this.name = value; }  
    }  
    public string Color {  
        get { return this.color; }  
        set { this.color = value; }  
    }  
    // constructor  
    public Cat(string name = "Noname",  
               string color = "Gray")  
    {  
        this.name = name;  
        this.color = color;  
    }  
    // method  
    public void SayMiaw() {  
        Console.WriteLine("{0} cat {1} said: Miaw!",  
                           color, name);  
    }  
    // start point  
    static void Main() {  
        Cat Tony = new Cat();  
        Console.WriteLine("{0} cat {1}",  
                           Tony.Color, Tony.Name);  
  
        Tony.Name = "Tony";  
        Tony.Color = "Green";  
        Tony.SayMiaw();  
        Cat Pepy = new Cat("Pepy", "White");  
        Pepy.SayMiaw();  
        Console.ReadKey();  
    }  
}
```

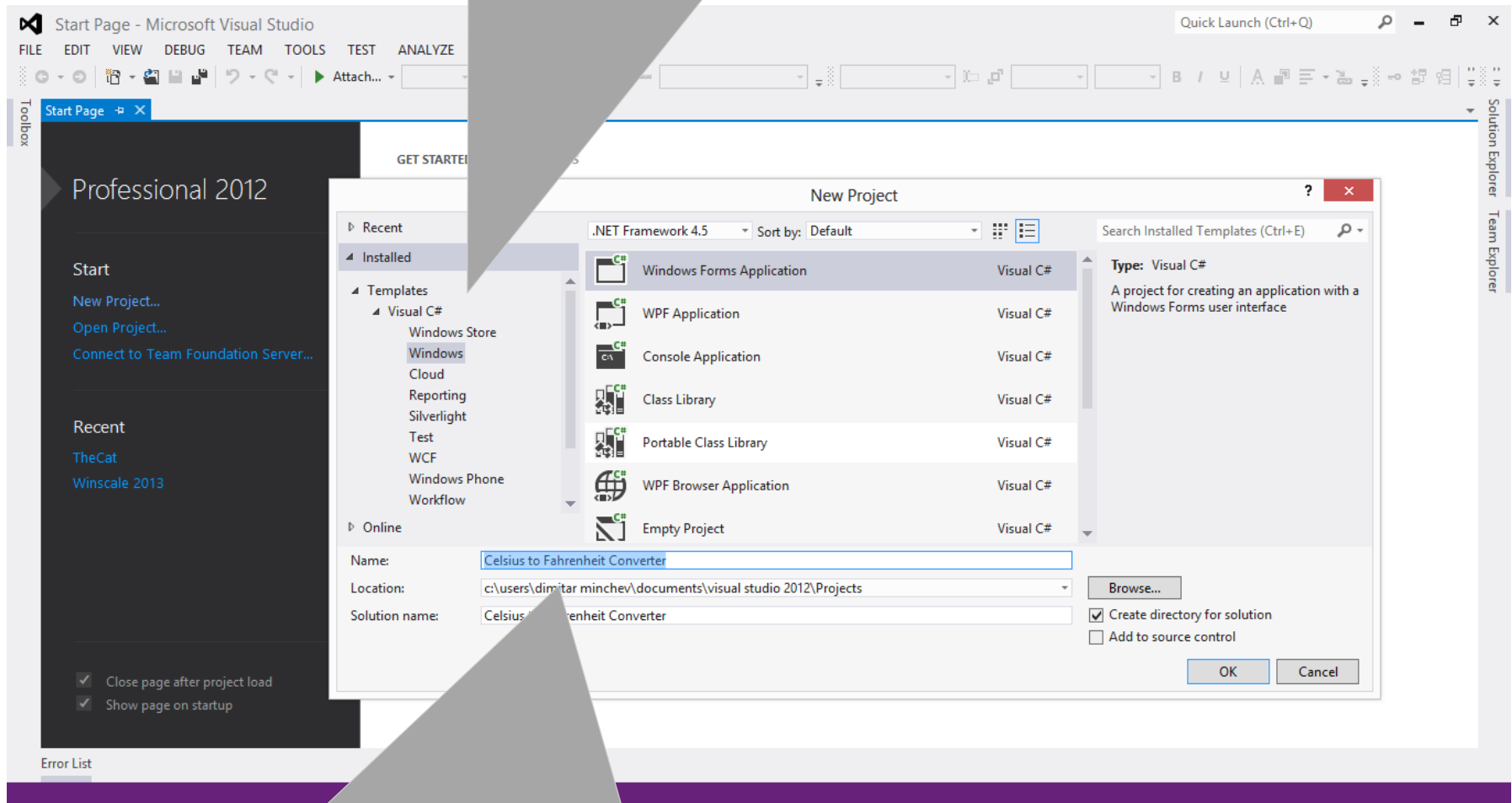


Desktop Apps

Celsius to Fahrenheit Converter Example

Project = Create It

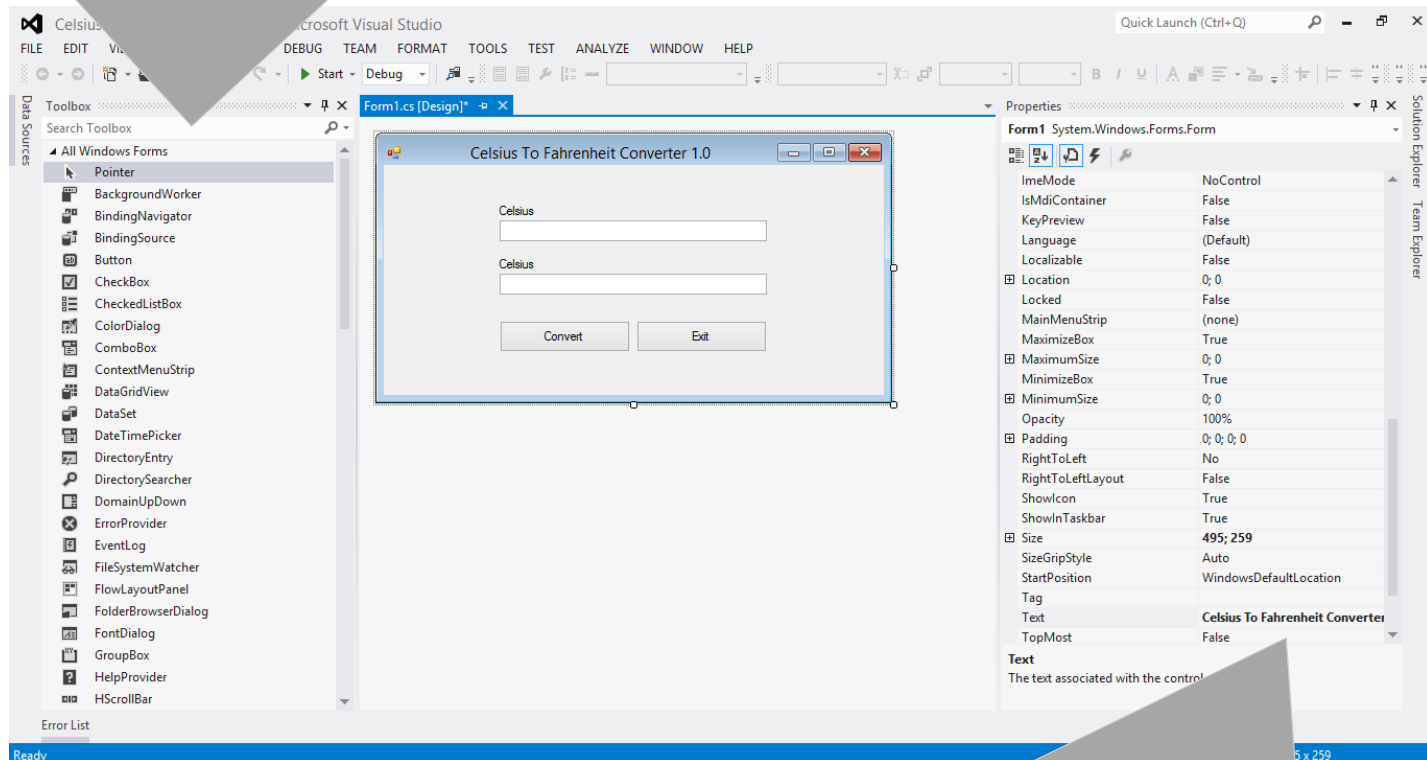
Visual C#: Windows Form Application



Project name: Celsius to Fahrenheit Converter

User Interface = The Form Designer

Using the Toolbox Add:
Labels, TextBoxes and Buttons



Using the Properties:
Change the properties of the objects in the form

Functionality = The Code

Click [Convert] button and write some code

Convert from Celsius to Fahrenheit

The screenshot shows the Microsoft Visual Studio IDE with a project named 'Celsius to Fahrenheit Converter'. The code in Form1.cs is as follows:

```
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using System.Windows.Forms;

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

        // Button Click
        private void button1_Click(object sender, EventArgs e)
        {
            try
            {
                // Celsius to Fahrenheit
                double C = Convert.ToDouble(textBox1.Text);
                double F = (C * (9.0 / 5.0)) + 32;
                textBox2.Text = Convert.ToString(F);
            }
            catch (Exception ex)
            {
                MessageBox.Show(this, "Error!");
            }
        }
    }
}
```

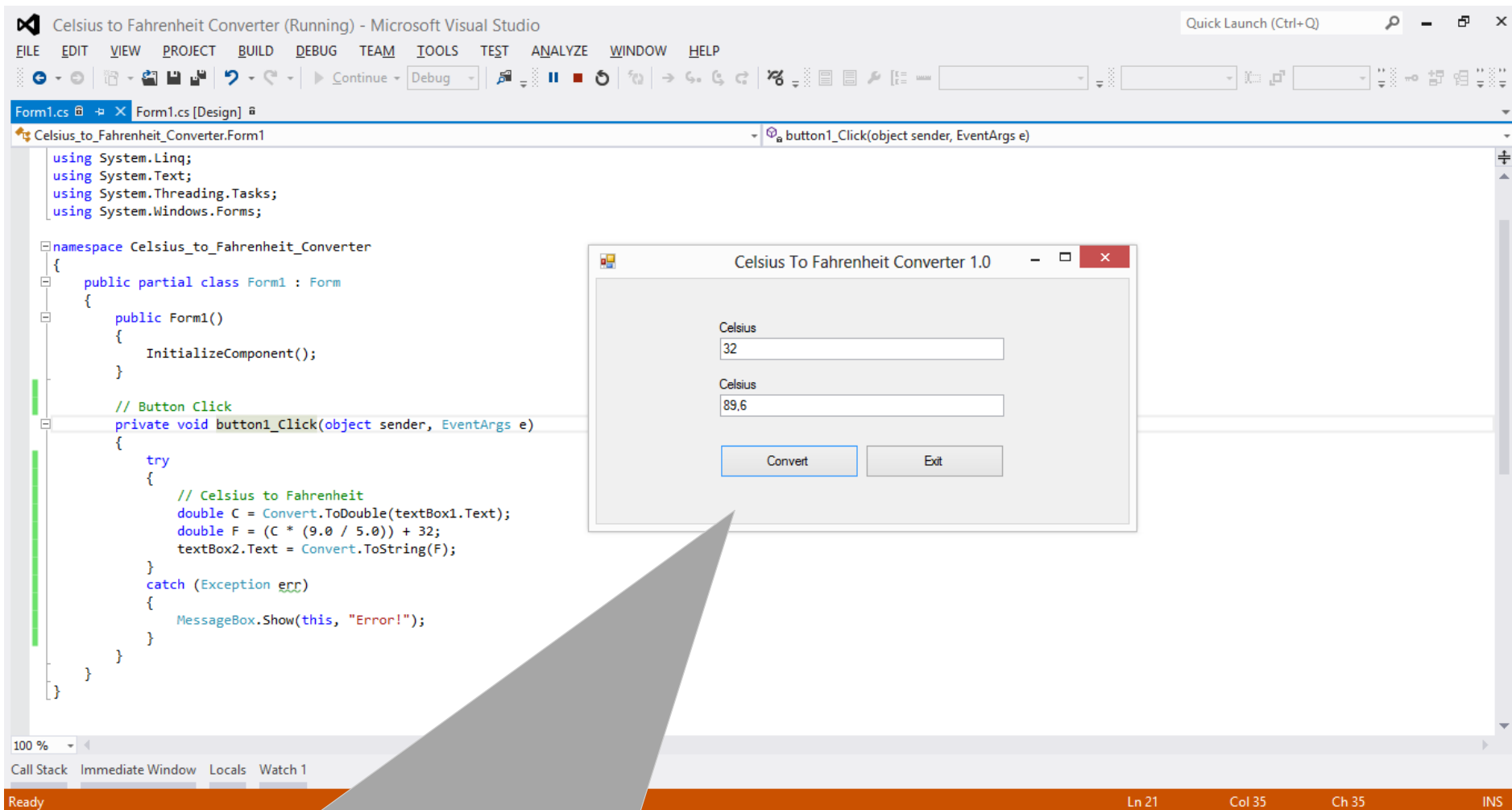
The Notepad window shows the code for converting Celsius to Fahrenheit and Fahrenheit to Celsius:

```
// Celsius to Fahrenheit
double C = Convert.ToDouble(textBox1.Text);
double F = (C * (9.0 / 5.0)) + 32;
textBox2.Text = Convert.ToString(F);

// Fahrenheit to Celsius
double F = Convert.ToDouble(textBox1.Text);
double C = (F - 32) * (5.0 / 9.0);
textBox2.Text = Convert.ToString(C);
```

To convert back from Fahrenheit to Celsius use this code instead ...

Test = Run [F5]



Test the Functionality of Your First C# Desktop App by Run it

The Code of the Example

```
// Celsius to Fahrenheit  
double C = Convert.ToDouble(textBox1.Text);  
double F = (C * (9.0 / 5.0)) + 32;  
textbox2.Text = Convert.ToString(F);
```

```
// Fahrenheit to Celsius  
double F = Convert.ToDouble(textBox1.Text);  
double C = (F - 32) * (5.0 / 9.0);  
textbox2.Text = Convert.ToString(C);
```



Store App

Syndication Feed Reader Example ...

FeedData.cs

```
// Additional Namespaces
using Windows.Web.Syndication;
using System.Collections.ObjectModel;
namespace RSS
{
    // Holds info for a single blog post
    public class FeedItem
    {
        public string Title { get; set; }
        public string Subtitle { get; set; }
        public string Description { get; set; }
        public string Image { get; set; }
    }

    // Holds a collection of blog feeds (FeedData), and contains methods needed to retrieve the feeds.
    public class FeedDataSource
    {
        public ObservableCollection<FeedItem> Feeds = new ObservableCollection<FeedItem>();
        public async Task GetFeedAsync(string link)
        {
            SyndicationClient client = new SyndicationClient();
            client.BypassCacheOnRetrieve = true;
            Uri URI = new Uri(link);
            SyndicationFeed feed = await client.RetrieveFeedAsync(URI);
            // This code is executed after RetrieveFeedAsync returns the SyndicationFeed.
            // Process it and copy the data we want into our FeedData and FeedItem classes.
            foreach (SyndicationItem item in feed.Items)
            {
                FeedItem SingleItem = new FeedItem();
                SingleItem.Title = item.Title.Text;
                SingleItem.Subtitle = item.PublishedDate.ToString();
                SingleItem.Description = item.Summary.Text;
                Feeds.Add(SingleItem);
            }
        }
    }
}
```

MainPage.xaml

```
<Page.Resources>
<CollectionViewSource x:Name="itemsViewSource"
Source="{Binding Feeds}" />
</Page.Resources>

<Grid>
<Grid.RowDefinitions>
<RowDefinition Height="120"/>
<RowDefinition Height="*/>
</Grid.RowDefinitions>

<GridView x:Name="itemGridView" Grid.RowSpan="2"
Padding="100" ItemsSource="{Binding Source={StaticResource
itemsViewSource}}" ItemTemplate="{StaticResource
Standard500x130ItemTemplate}" />

<Grid>
<TextBlock Text="BBC NEWS" Padding="120 0 0 0"
Style="{StaticResource PageHeaderTextStyle}"/>
</Grid>

</Grid>
```

MainPage.xaml.cs

```
public sealed partial class MainPage : Page
{
    private FeedDataSource Data = new FeedDataSource();
    private async void LoadContent()
    {
        List<string> LinkToProcess = new List<string>();
        LinkToProcess.Add("http://feeds.bbc.co.uk/news/world/europe/rss.xml");
        foreach (string Link in LinkToProcess)
        {
            await Data.GetFeedAsync(Link);
            foreach (FeedItem feed in Data.Feeds)
            {
                itemGridView.Items.Add(feed);
            }
        }
    }
    // Constructor
    public MainPage()
    {
        this.InitializeComponent();
        LoadContent();
    }
}
```

Final App Screen

BBC NEWS

Russia to expel 'US CIA agent'

5/14/2013 9:02:07 PM +03:00

Russia says it will expel a US diplomat arrested with a series of disguises for allegedly trying to recruit a Russian intelligence officer as a spy.

Hospital probes E German drug tests

5/14/2013 2:18:15 PM +03:00

A top Berlin hospital plans to investigate drug trials in the former East Germany amid allegations that some patients were used as human guinea pigs.

Six years request

5/13/2013 7:52:59 PM

Italian prosecutors
Prime Minister Silv
underage prostitu

Oil companies raided in EU probe

5/14/2013 10:07:57 PM +03:00

EU officials have raided the offices of several companies involved in the oil market, as part of an investigation into price-fixing.

Violence mars PSG title celebrations

5/14/2013 1:28:59 PM +03:00

The French government bans a trophy presentation to Paris Saint-Germain after their first French football league title in 19 years is marred by clashes between...

Mancini sacked a

5/14/2013 11:49:34 AM

Roberto Mancini b
year to the day sin

Google told to tidy up auto-complete

5/14/2013 7:46:01 PM +03:00

A German federal court has told Google to clean up the auto-complete results its search engine suggests.

France mulls tax on internet devices

5/14/2013 12:30:19 PM +03:00

The French government considers introducing a "culture tax" on the sale of smartphones and tablets to help fund French film, music and images.

Russia arrests for

5/13/2013 11:13:51 PM

Police in the south
three men over a
homophobia.

EU deal on extra 2013 budget funds

5/14/2013 8:35:43 PM +03:00

An extra 7.3bn euros is due to be added to the EU's budget for 2013 under a compromise which the UK continues to oppose.

Tories publish EU referendum bill

5/14/2013 6:40:36 PM +03:00

The Conservatives publish a parliamentary bill setting terms for a referendum by the end of 2017 on whether the UK should leave the European Union.

Georgians killed i

5/13/2013 10:03:47 PM

Three Georgian sc
in southern Afghan
on a base.



Thank You!

Send your questions to e-mail:

dimitar.minchev@gmail.com