Graphics

The creating a graphical object

Syntax:

Graphics g=Graphics.FromHwnd(this.Handle);

Graphics – *an object type where we'll draw.*

It may be Windows Form.

g – *name of graphical object;*

Graphics.FromHwnd(this.Handle) – *class method that returns a Handle to Windows Form.*

Pen

The pens are used for graphical figures drawing.

The templates pens:

Pen pen1 = Pens.Black;

Here:

Pen – class “Pen”;

pen1 – name of class Pen object;

Pens – class of pen objects. We select a pen from this class;

Black – a colour of pen that is selected.

***In this case you can select only a* colour.**

A line width equal to one pixel.

A Line style is continuous line.

The pens that are not templates

Their properties may be set up.

```
Pen pen2 = new Pen(Color.Red);
pen2.Width=3;
```

A choice of line style:

Styles*:* Dot, Dash, DashDot, DashDotDot.

***An example to set up line style*:**

```
pen2.DashStyle=
System.Drawing.Drawing2D.DashStyle.DashDotDot;
```

Brush

A brush is used to flood graphical figures.

There are some brush types:

Brush – it's simple brush to flood by one colour;

HatchBrush - to hatch;

LinearGradientBrush - a brush with linear gradient filling up;

PathGradientBrush - a brush with linear gradient in case a colour changes by jumps.

The simple brushes are selected from Brushes class:

Brush brush1=Brushes.Blue;

Brush – class name;

brush1 – object name;

Brushes –class of objects for selecting the brush;

Blue –brush colour.

In this case you can select only a colour.

The brush for hatching may be selected from HatchBrushes class. For accessing to HatchBrushes class and to styles of hatching it's necessary to add:

```
using System.Drawing.Drawing2D;
```

Styles of hatching:

CROSS, DiagonalCross, ForwardDiagonal, BackwardDiagonal.

An example of hatching by CROSS style:

```
HatchBrush brush2 =
    new HatchBrush(HatchStyle.Cross,ForeColor,
    BackColor);
```

It's possible to create a pen that draws by brush:

```
Brush brush1=Brushes.Blue;
 Pen pen1=new Pen(brush1);
```

The method for drawing a text in Windows Form

DrawString(S, Font, Brush, float xleftTop, float yLeftTop);

S- row of symbols;

The Font class is used for selecting font;

float xleftTop, float yLeftTop - the coordinates x, y of left upper corner of rectangle that is used for placing the text. These coordinates are defined by identifiers.

```
Brush brush1=Brushes.Red;
float a=100,b=200;
Font myFont=new Font("Tahoma",14);
g .DrawString("You are\n welcome!", myFont, brush1, a, b);
```

The drawing of rectangles

DrawRectangle(pen, int x1, int y1, int x2, int y2);

*x1, y1, x2, y2 –*the coordinates of left upper corner and right bottom corner of rectangle.

Example:

g.DrawRectangle(pen1,50,50,100,100);

There is a variant with float type coordinates .

DrawRectangle(pen, float xLeft, float yTop, float Height, float Width);

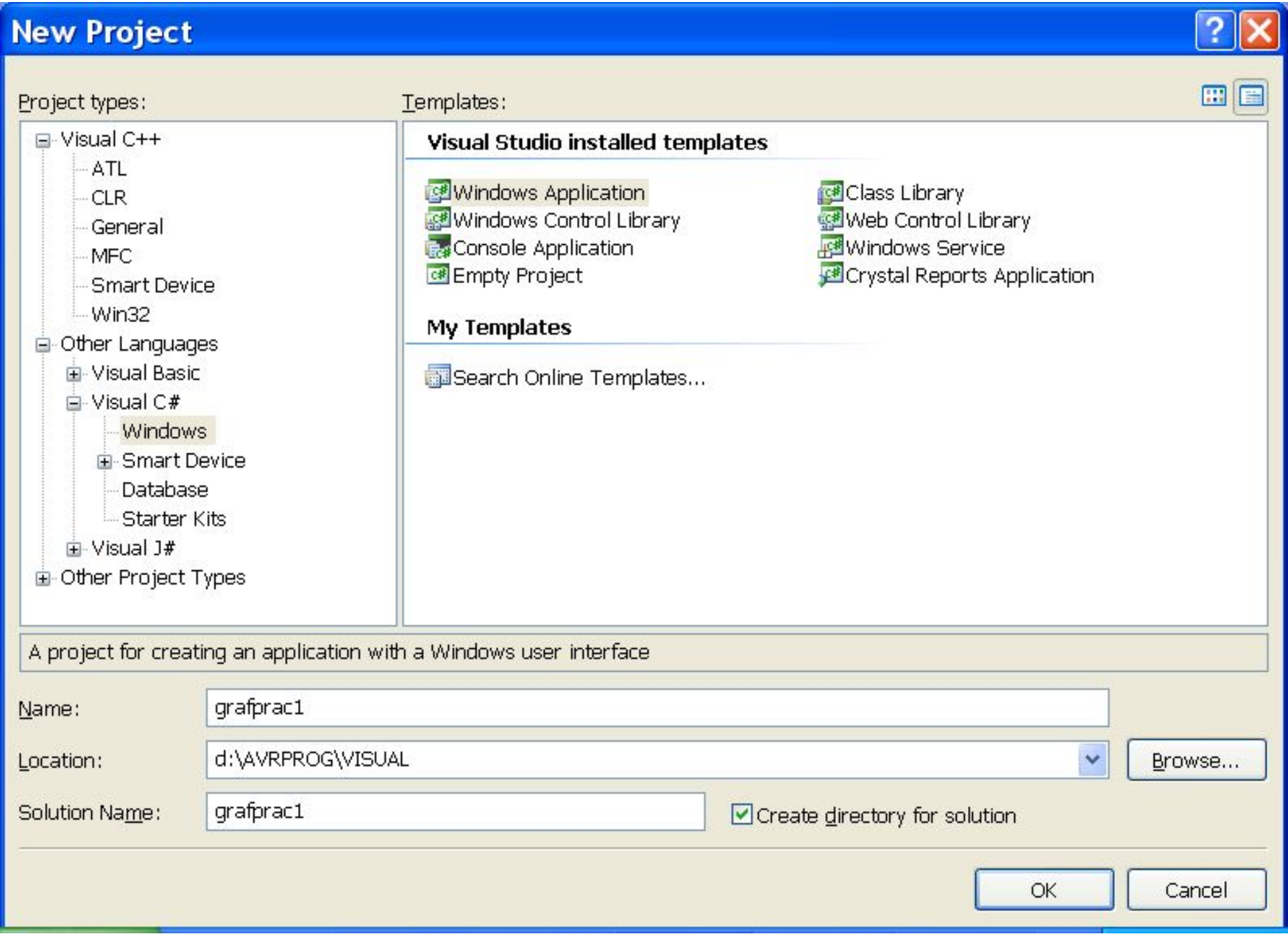
xLeft, yTop- the coordinates x, y of left upper corner.

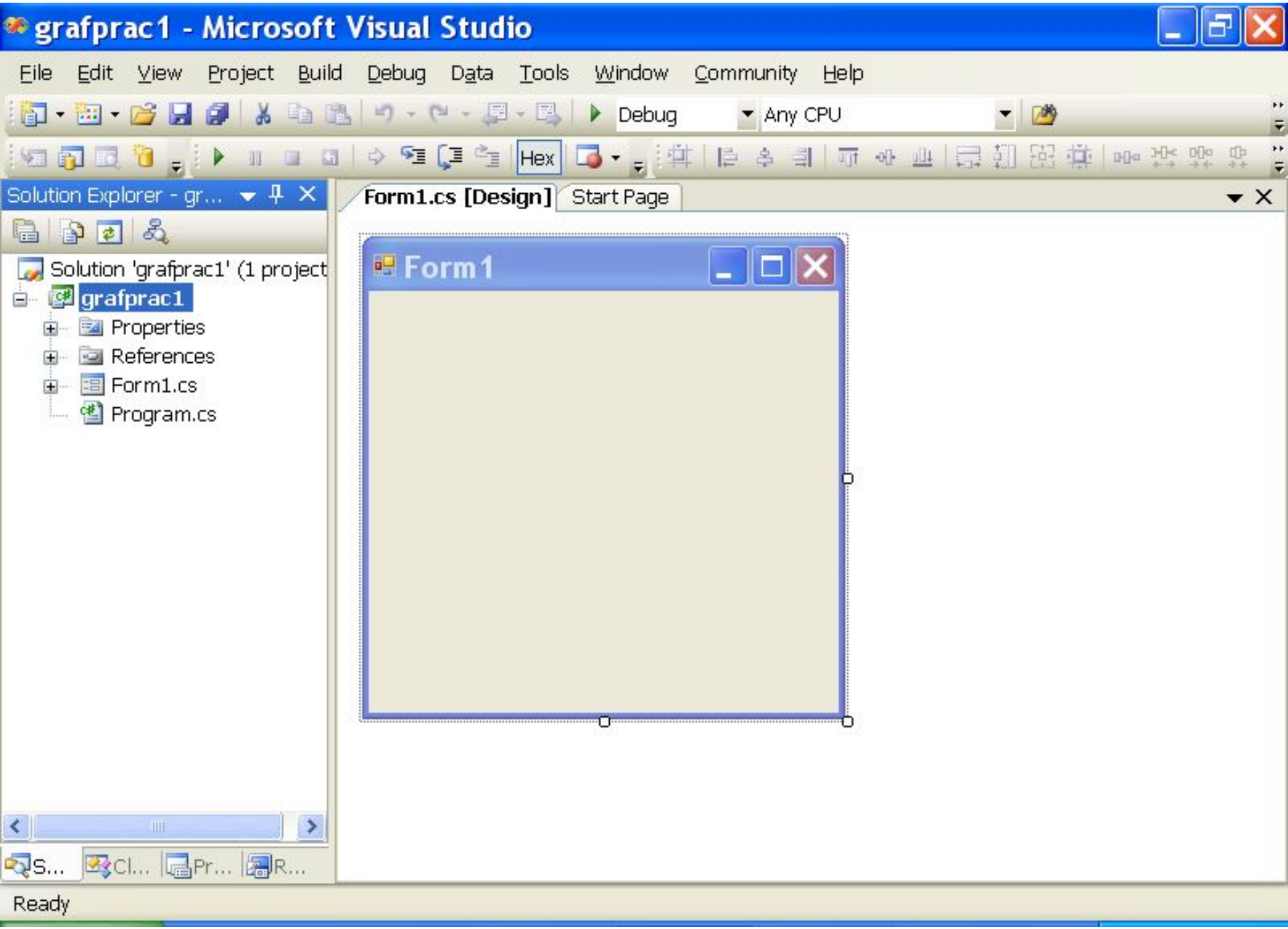
Height, Width - height and width of rectangle.

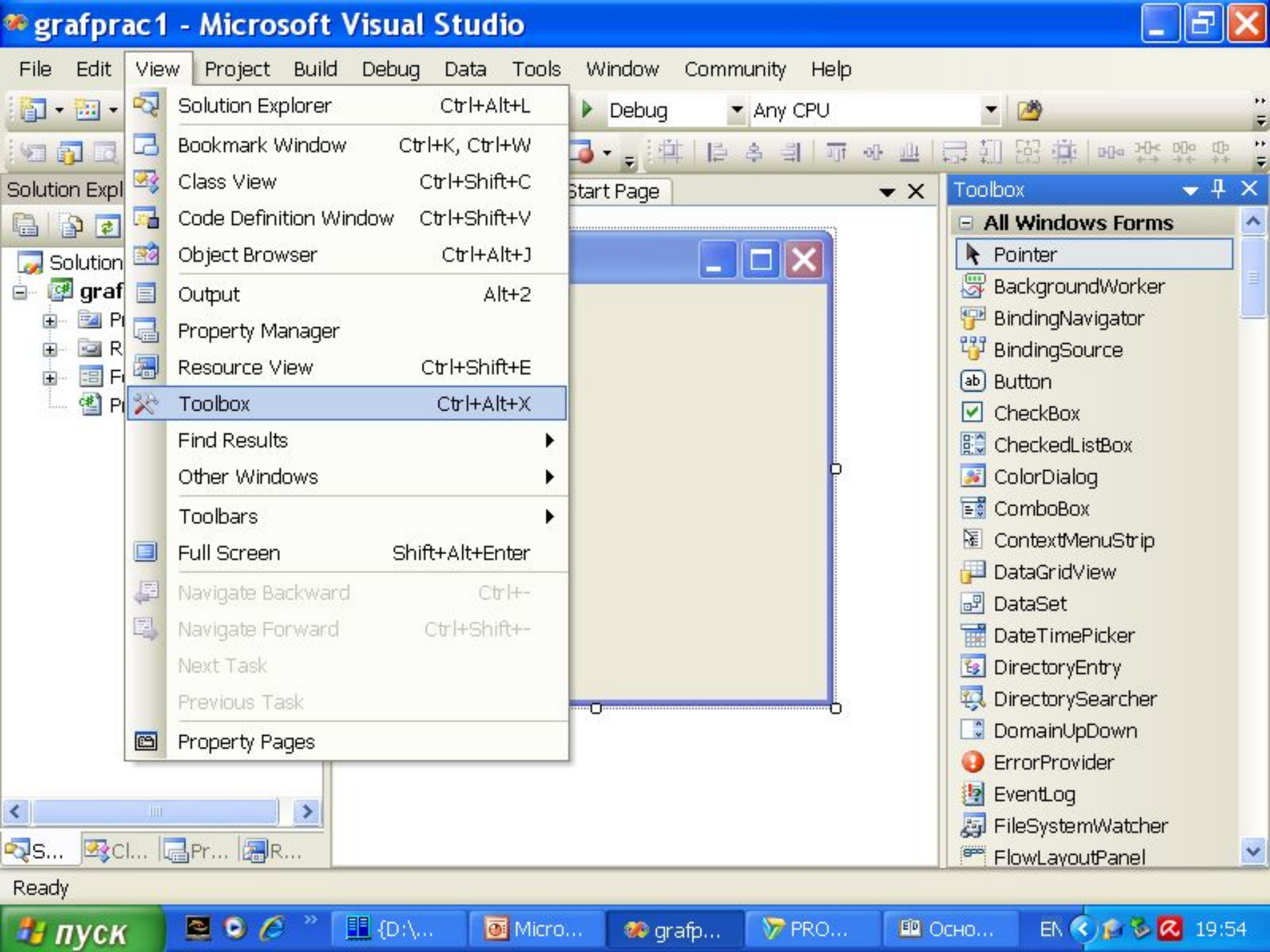
The example of graphics program

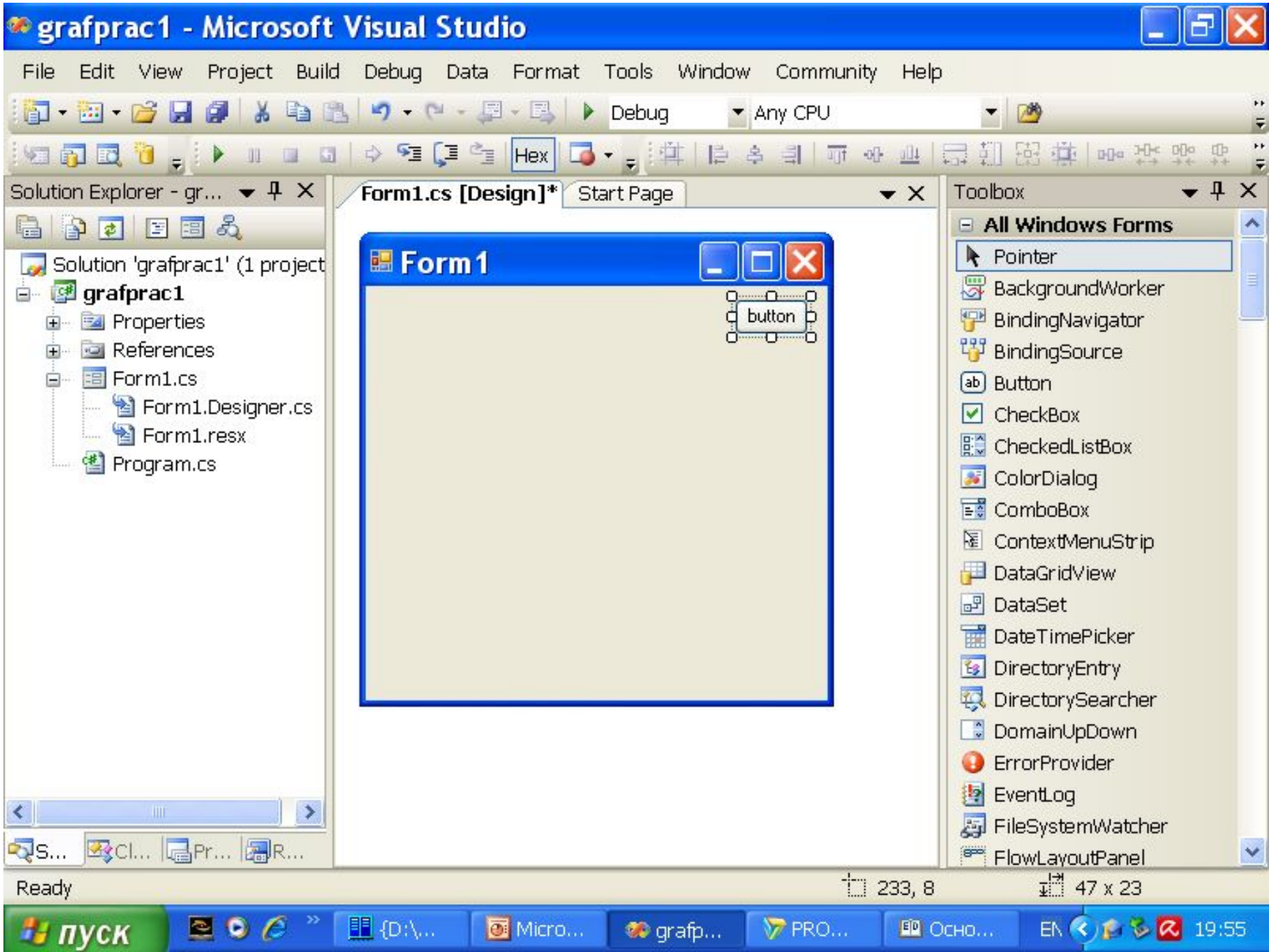
There is a choice of pen and its parameters: Color, Width and Line style. Also a font is set and used to display a symbols string.

Besides of there is HatchBrush that is used to fill a rectangle.


New Project
Project types:
Templates:
Visual C++
ATL
CLR
General
MFC
Smart Device
Win32
Other Languages
Visual Basic
Visual C#
Windows
Smart Device
Database
Starter Kits
Visual J#
Other Project Types
Visual Studio installed templates
Windows Application
Windows Control Library
Console Application
Empty Project
Class Library
Web Control Library
Windows Service
Crystal Reports Application
My Templates
Search Online Templates...
A project for creating an application with a Windows user interface
Name:
grafprac1
Location:
d:\AVRPROG\VISUAL
Browse...
Solution Name:
grafprac1
Create directory for solution
OK
Cancel


grafprac1 - Microsoft Visual Studio
File Edit View Project Build Debug Data Tools Window Community Help
Debug
Any CPU
Hex
Solution Explorer - gr...
Solution 'grafprac1' (1 project
grafprac1
Properties
References
Form1.cs
Program.cs
Form1.cs [Design]
Start Page
Form1
S...
Cl...
Pr...
R...
Ready


grafprac1 - Microsoft Visual Studio
File Edit View Project Build Debug Data Tools Window Community Help
Debug
Any CPU
Solution Explorer Ctrl+Alt+L
Bookmark Window Ctrl+K, Ctrl+W
Class View Ctrl+Shift+C
Code Definition Window Ctrl+Shift+V
Object Browser Ctrl+Alt+J
Output Alt+2
Property Manager
Resource View Ctrl+Shift+E
Toolbox Ctrl+Alt+X
Find Results
Other Windows
Toolbars
Full Screen Shift+Alt+Enter
Navigate Backward Ctrl+-
Navigate Forward Ctrl+Shift+-
Next Task
Previous Task
Property Pages
Start Page
Toolbox
All Windows Forms
Pointer
BackgroundWorker
BindingNavigator
BindingSource
Button
CheckBox
CheckedListBox
ColorDialog
ComboBox
ContextMenuStrip
DataGridView
DataSet
DateTimePicker
DirectoryEntry
DirectorySearcher
DomainUpDown
ErrorProvider
EventLog
FileSystemWatcher
FlowLayoutPanel
Ready
пуск
19:54


grafprac1 - Microsoft Visual Studio
File Edit View Project Build Debug Data Format Tools Window Community Help
Debug
Any CPU
Hex
Solution Explorer - gr...
Solution 'grafprac1' (1 project
grafprac1
Properties
References
Form1.cs
Form1.Designer.cs
Form1.resx
Program.cs
Form1.cs [Design]*
Start Page
Form1
button
Toolbox
All Windows Forms
Pointer
BackgroundWorker
BindingNavigator
BindingSource
Button
CheckBox
CheckedListBox
ColorDialog
ComboBox
ContextMenuStrip
DataGridView
DataSet
DateTimePicker
DirectoryEntry
DirectorySearcher
DomainUpDown
ErrorProvider
EventLog
FileSystemWatcher
FlowLayoutPanel
Ready
233, 8
47 x 23
пуск
19:55

It's necessary to create a Handler for button1.

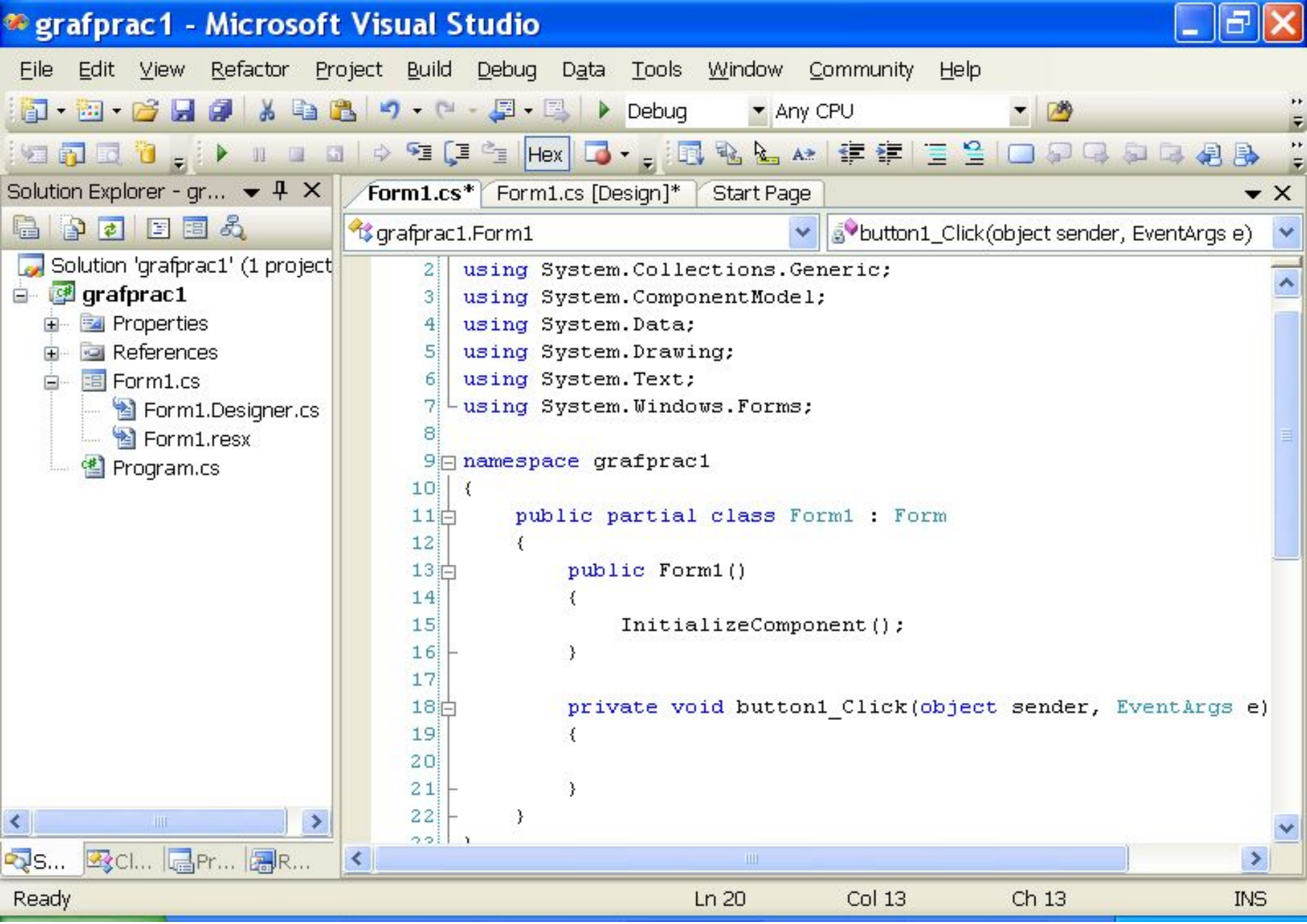
There are two modes how to do it:

1) Select button1/pop up menu/View Code;

2) To do double click on button1.

In any case a handler template will appear.

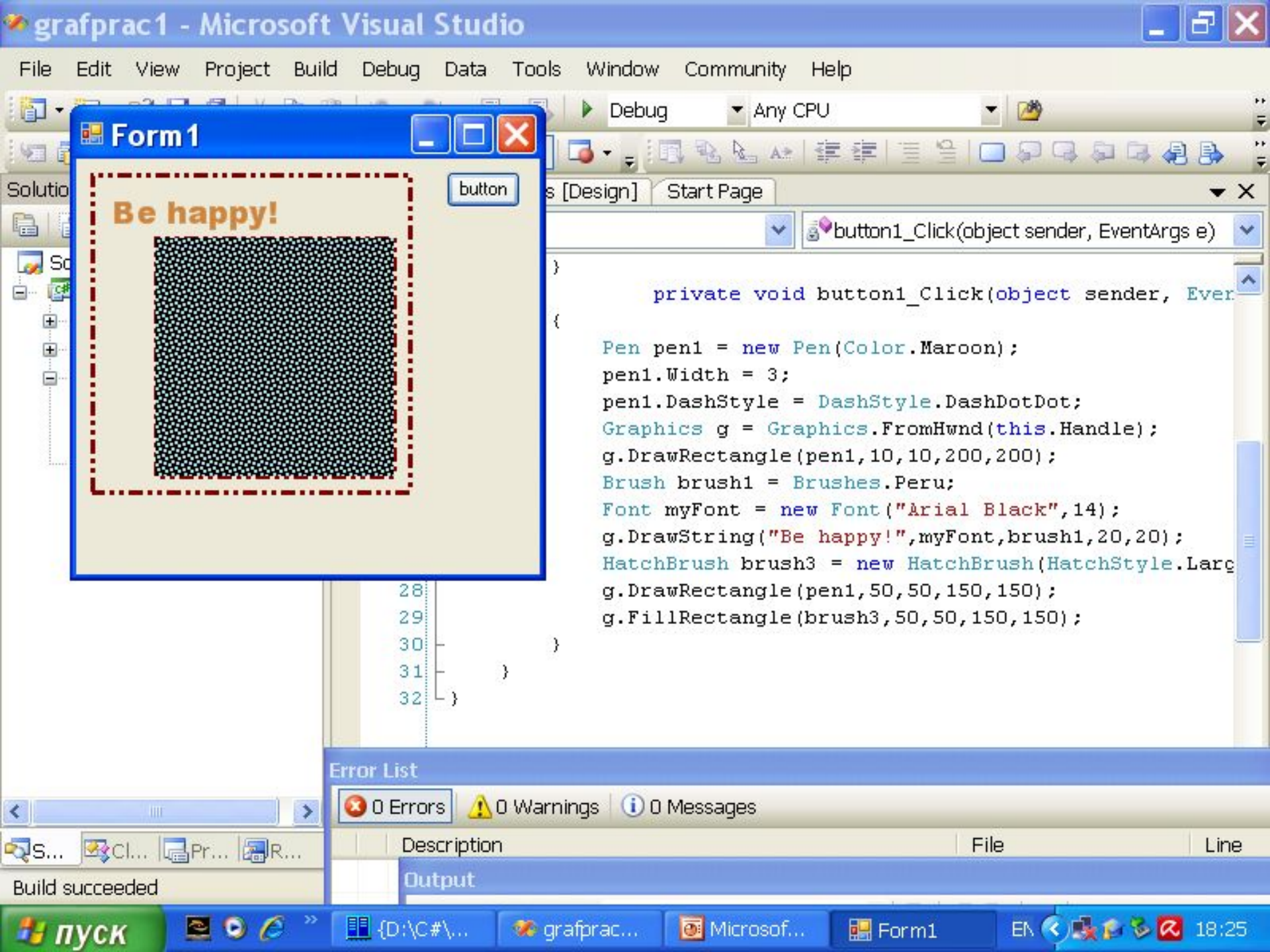
It must be filled


grafprac1 - Microsoft Visual Studio
File Edit View Refactor Project Build Debug Data Tools Window Community Help
Debug
Any CPU
Hex
Solution Explorer - gr...
Solution 'grafprac1' (1 project
grafprac1
Properties
References
Form1.cs
Form1.Designer.cs
Form1.resx
Program.cs
Form1.cs*
Form1.cs [Design]*
Start Page
grafprac1.Form1
button1_Click(object sender, EventArgs e)
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Text;
using System.Windows.Forms;
namespace grafprac1
{
public partial class Form1 : Form
{
public Form1()
{
InitializeComponent();
}
private void button1_Click(object sender, EventArgs e)
{
}
}
Ready
Ln 20
Col 13
Ch 13
INS

You are going to use DashStyle for pen and HatchBrush. So it's necessary to add using System.Drawing.Drawing2D; Don't forget!

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Drawing.Drawing2D;// Don't forget to add !
using System.Text;
using System.Windows.Forms;
namespace grafprac1
{
    public partial class Form1 : Form
    {
        public Form1()
        {
            InitializeComponent();
        }
```

```
private void button1_Click(object sender, EventArgs e)
        {
            Pen pen1 = new Pen(Color.Blue);
            pen1.Width = 3;
            pen1.DashStyle = DashStyle.DashDotDot;
            Graphics g = Graphics.FromHwnd(this.Handle);
            g.DrawRectangle(pen1,10,10,200,200);
            Brush brush1 = Brushes.Black;
            Font myFont = new Font("Tahoma",14);
            g.DrawString("Be happy!",myFont,brush1,20,20);
            HatchBrush brush3 =
new HatchBrush(HatchStyle.Cross,Color.ForestGreen);
            g.DrawRectangle(pen1,50,50,150,150);
            g.FillRectangle(brush3,50,50,150,150);
        }
    }
}
```


grafprac1 - Microsoft Visual Studio
File Edit View Project Build Debug Data Tools Window Community Help
Debug
Any CPU
Form1
button
Be happy!
Start Page
button1_Click(object sender, EventArgs e)
private void button1_Click(object sender, Ever
{
Pen pen1 = new Pen(Color.Maroon);
pen1.Width = 3;
pen1.DashStyle = DashStyle.DashDotDot;
Graphics g = Graphics.FromHwnd(this.Handle);
g.DrawRectangle(pen1,10,10,200,200);
Brush brush1 = Brushes.Peru;
Font myFont = new Font("Arial Black",14);
g.DrawString("Be happy!",myFont,brush1,20,20);
HatchBrush brush3 = new HatchBrush(HatchStyle.Larg
g.DrawRectangle(pen1,50,50,150,150);
g.FillRectangle(brush3,50,50,150,150);
}
}
}
Error List
0 Errors
0 Warnings
0 Messages
Description
File
Line
Output
Build succeeded
пуск
{D:\C#\...
grafprac...
Microsof...
Form1
18:25

Now do the next task:

Create a C# program using Windows Form. Place any text in this Form in any place. A brush is used for drawing. Its color is Blue. Font is " Tahoma". Its size equal 12.