Unity Engine Emulation

with C# Windows Forms

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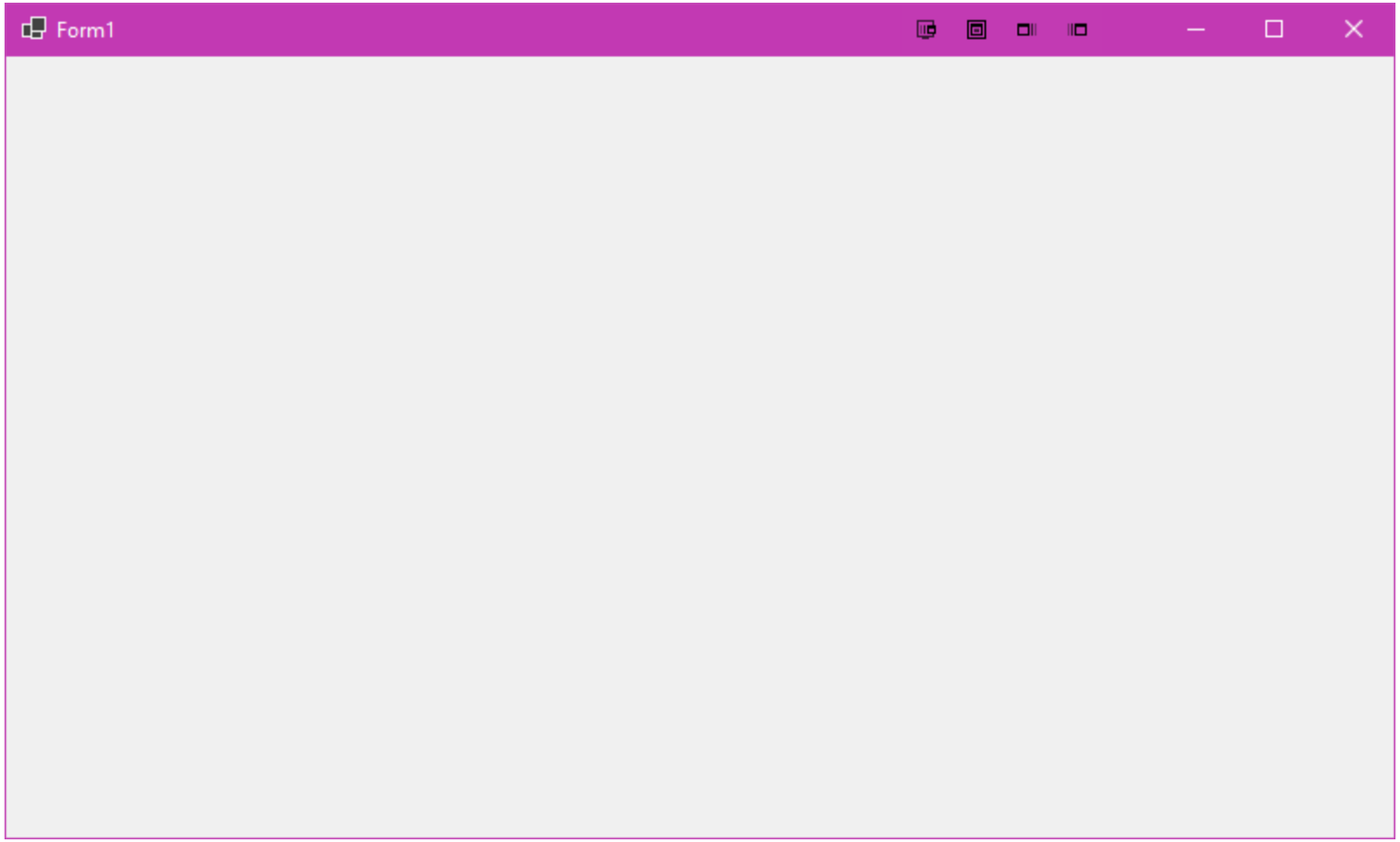
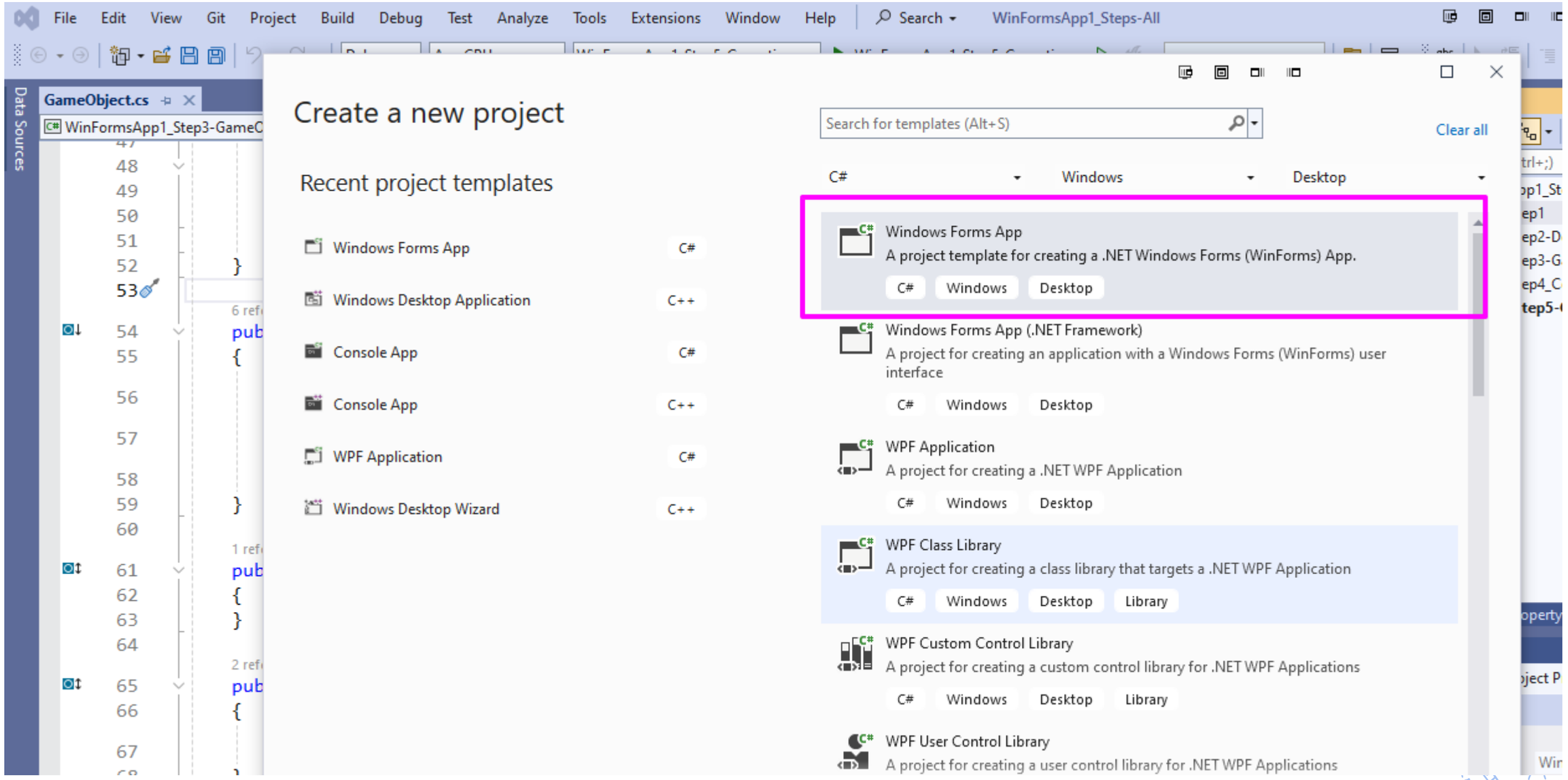
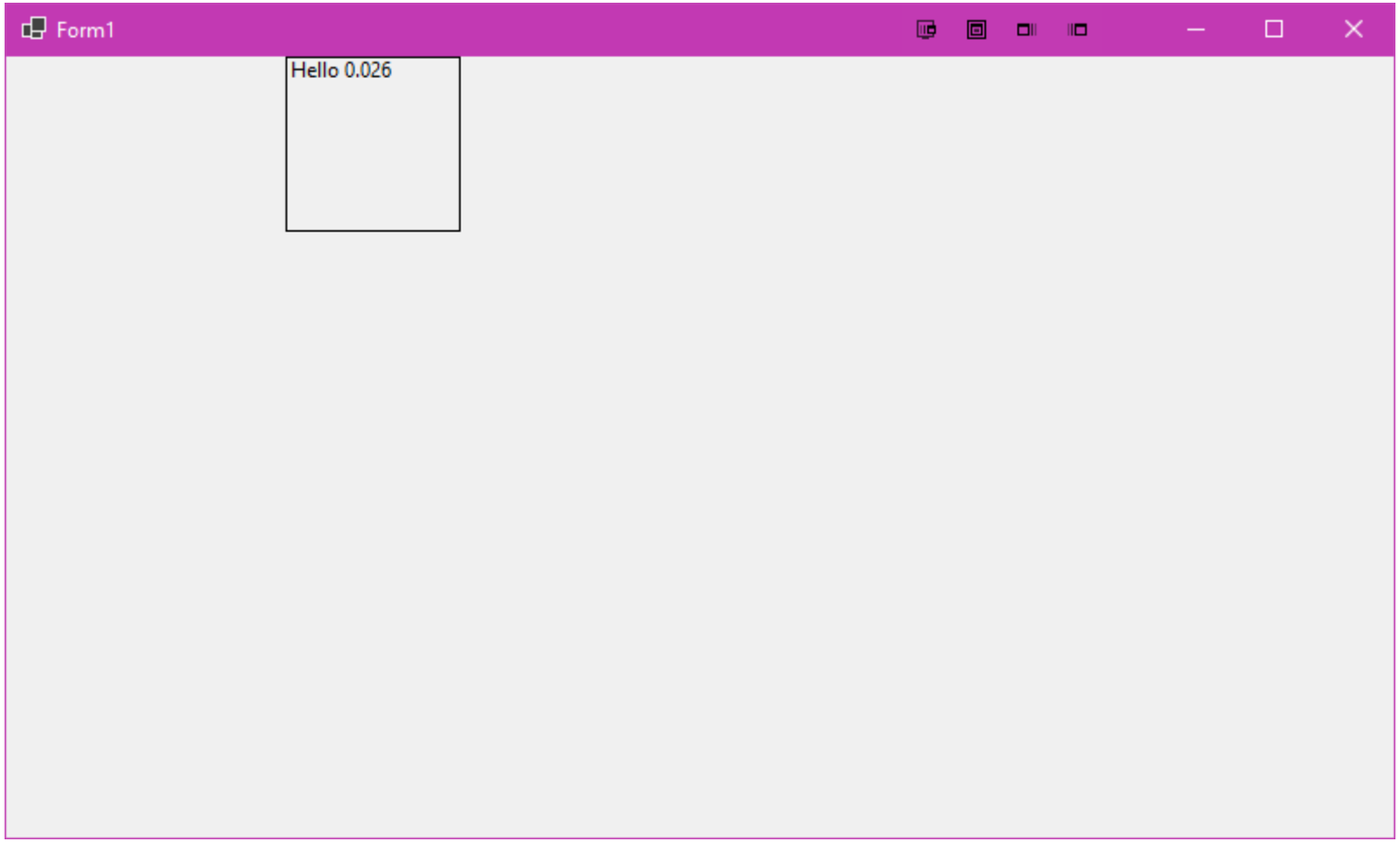
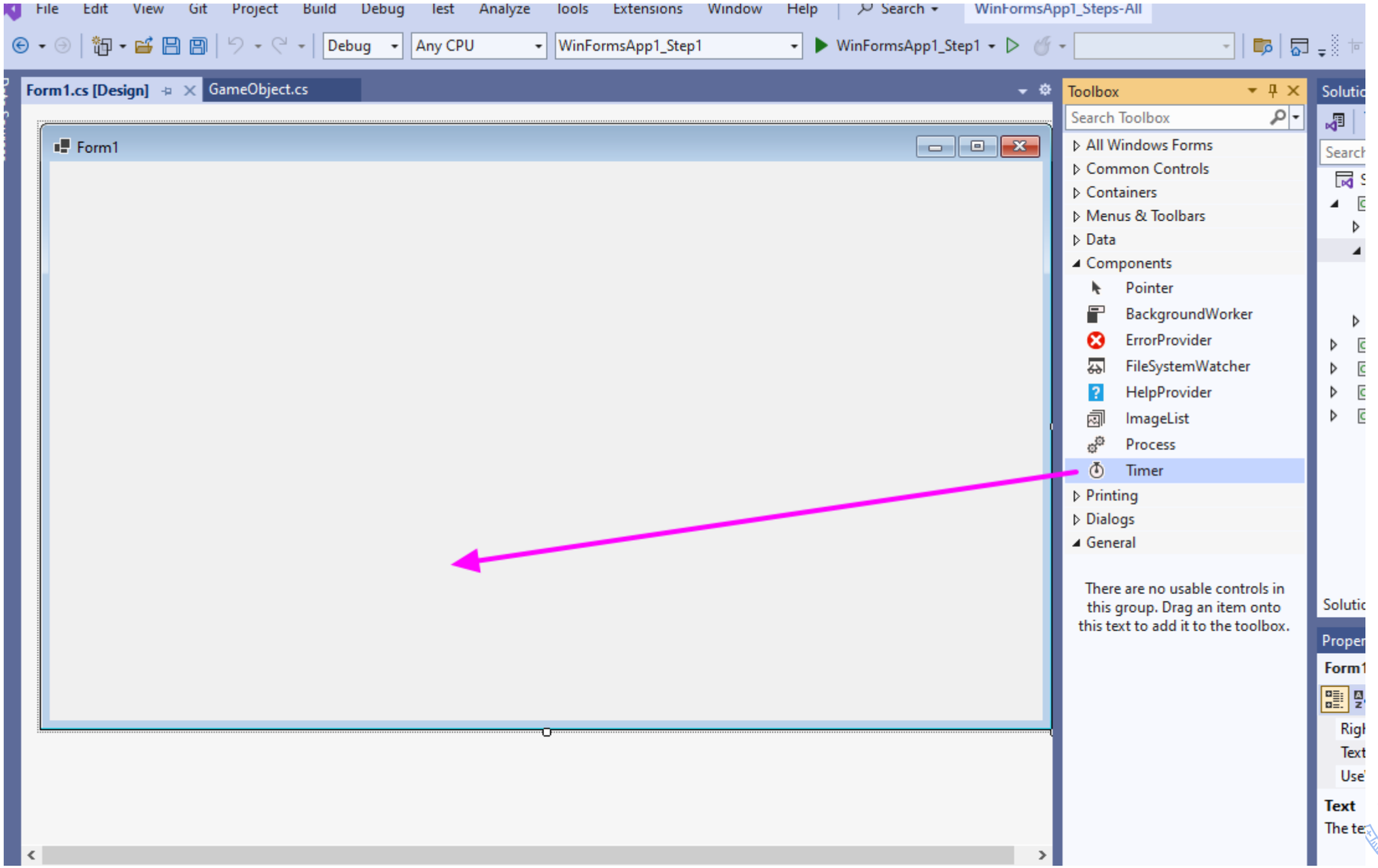
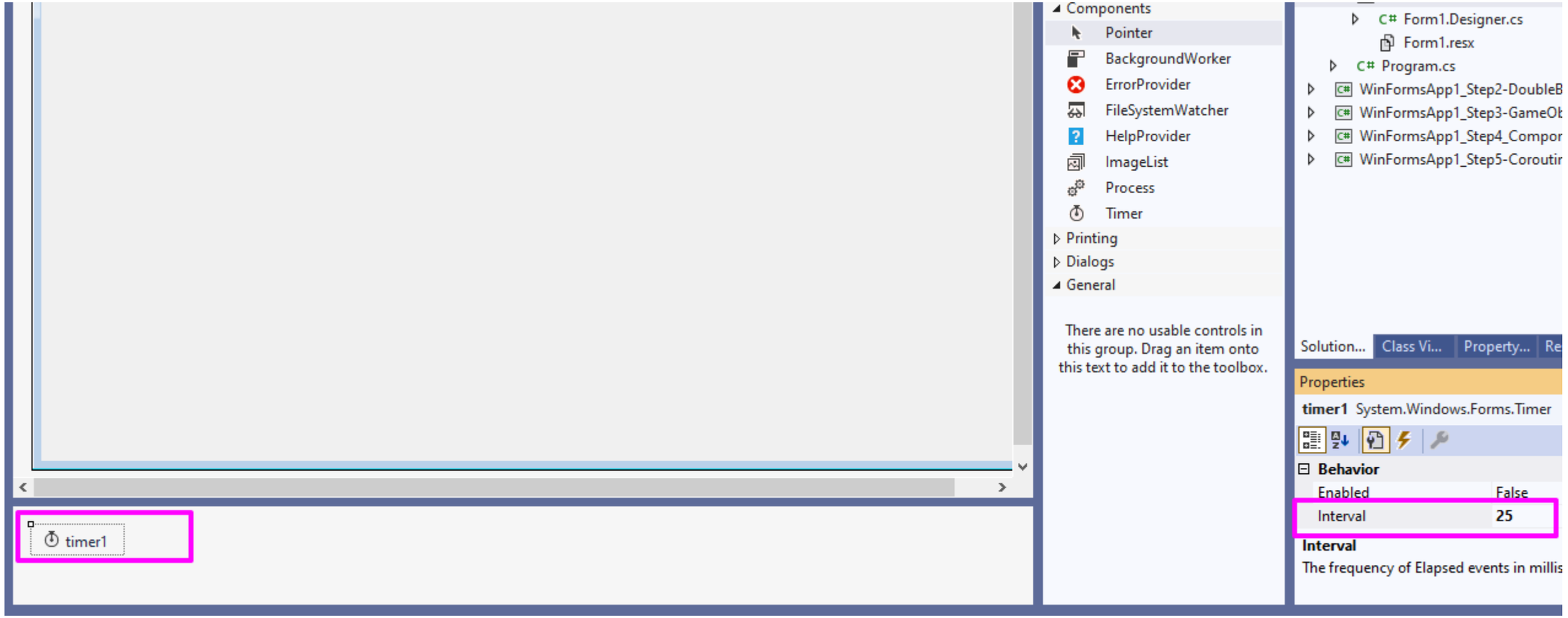

Form1


File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
Search
WinFormsApp1_Steps-All
GameObject.cs
WinFormsApp1_Step3-GameC
Data Sources
Create a new project
Recent project templates
Windows Forms App C#
Windows Desktop Application C++
Console App C#
Console App C++
WPF Application C#
Windows Desktop Wizard C++
Search for templates (Alt+S)
Clear all
C#
Windows
Desktop
Windows Forms App
A project template for creating a .NET Windows Forms (WinForms) App.
C# Windows Desktop
Windows Forms App (.NET Framework)
A project for creating an application with a Windows Forms (WinForms) user interface
C# Windows Desktop
WPF Application
A project for creating a .NET WPF Application
C# Windows Desktop
WPF Class Library
A project for creating a class library that targets a .NET WPF Application
C# Windows Desktop Library
WPF Custom Control Library
A project for creating a custom control library for .NET WPF Applications
C# Windows Desktop Library
WPF User Control Library
A project for creating a user control library for .NET WPF Applications

Step2


Form1
Hello 0.026


File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
Search
WinFormsApp1_Steps-All
Debug
Any CPU
WinFormsApp1_Step1
WinFormsApp1_Step1
Form1.cs [Design]
GameObject.cs
Form1
Toolbox
Search Toolbox
All Windows Forms
Common Controls
Containers
Menus & Toolbars
Data
Components
Pointer
BackgroundWorker
ErrorProvider
FileSystemWatcher
HelpProvider
ImageList
Process
Timer
Printing
Dialogs
General
There are no usable controls in this group. Drag an item onto this text to add it to the toolbox.


Components
Pointer
BackgroundWorker
ErrorProvider
FileSystemWatcher
HelpProvider
ImageList
Process
Timer
Printing
Dialogs
General
There are no usable controls in this group. Drag an item onto this text to add it to the toolbox.
timer1
Form1.Designer.cs
Form1.resx
Program.cs
WinFormsApp1_Step2-DoubleB
WinFormsApp1_Step3-GameOb
WinFormsApp1_Step4_Compor
WinFormsApp1_Step5-Coroutir
Solution...
Class Vi...
Property...
Properties
timer1 System.Windows.Forms.Timer
Behavior
Enabled
False
Interval
25
Interval
The frequency of Elapsed events in millis

class Form1

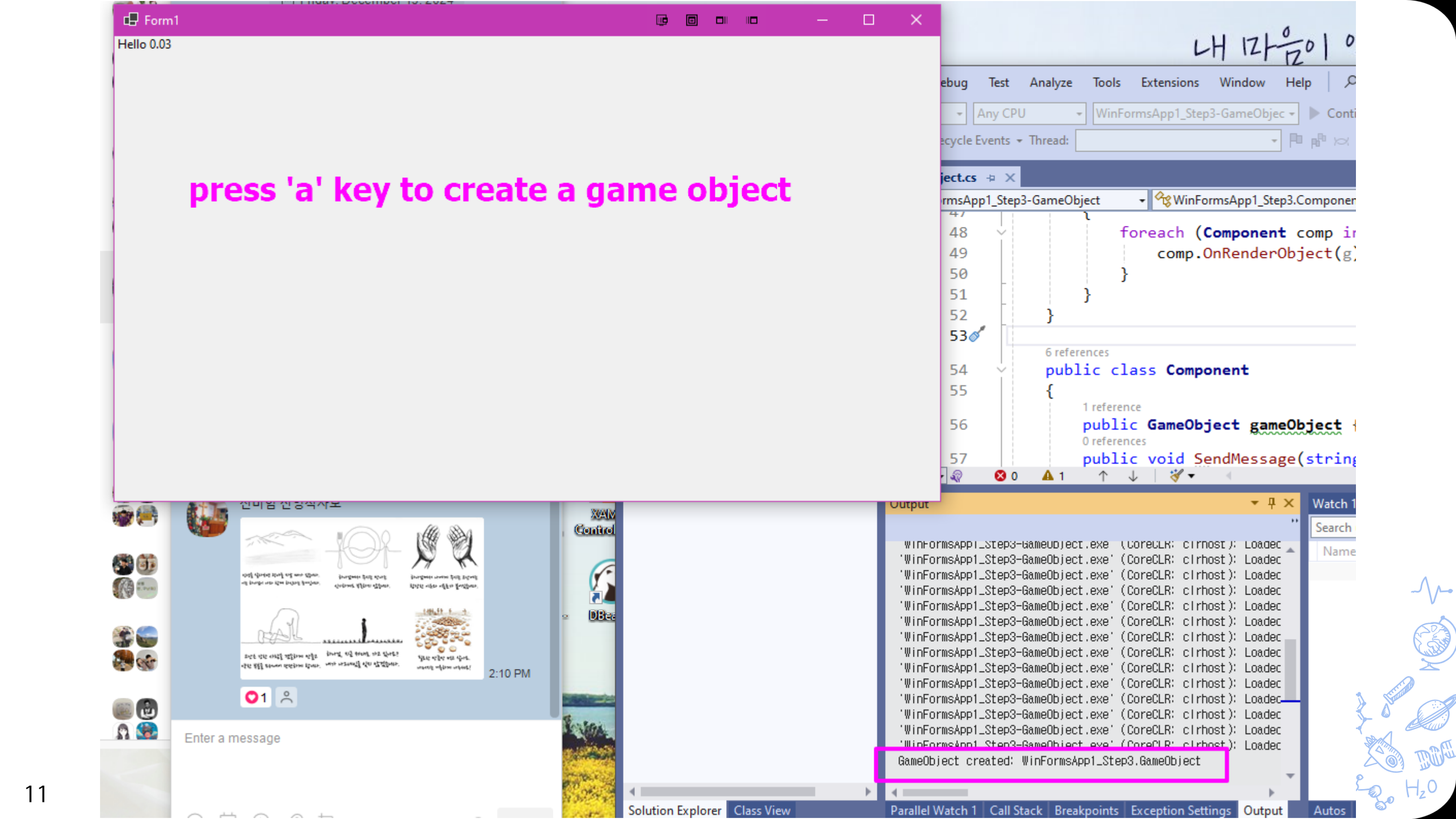
```
namespace WinFormsApp1
{
    public partial class Form1 : Form
    {
        private Stopwatch _stopWatch;
        double _elapsedTime = 0;
        Vector2 _pos=Vector2.Zero;
        double _speed = 50;
        public Form1()
        {
            InitializeComponent();
            _stopWatch = Stopwatch.StartNew();
        }

        private void Form1_Load(object sender, EventArgs e)
        {
            this.DoubleBuffered = true;
            this.Paint += new PaintEventHandler(Form1_Paint);
            _stopWatch.Start();
            timer1.Start();
        }
```

```
        private void Form1_Paint(object? sender, PaintEventArgs e)
        {
            Point pos =new Point((int)_pos.X, (int)_pos.Y);
            Rectangle rect = new Rectangle(pos.X, pos.Y, 100, 100);
            e.Graphics.DrawRectangle(Pens.Black,rect);
            TextRenderer.DrawText(e.Graphics, $"Hello {_elapsedTime}"
                , this.Font, pos, Color.Black);
        }

        private void timer1_Tick(object sender, EventArgs e)
        {
            _stopWatch.Stop();
            _elapsedTime = _stopWatch.ElapsedMilliseconds / 1000.0;
            _stopWatch.Restart();
            Form1_Update(_elapsedTime);
            this.Refresh();
        }
        private void Form1_Update(double _elapsedTime)
        {
            _pos.X += (float)_elapsedTime * (float)_speed;
        }
    }
}
```

Step3


Form1
Hello 0.03
press 'a' key to create a game object
Any CPU
WinFormsApp1_Step3-GameObjec
Test
Analyze
Tools
Extensions
Window
Help
WinFormsApp1_Step3.Componer
foreach (Component comp in
comp.OnRenderObject(g)
public class Component
public GameObject gameObject
public void SendMessage(string
GameObject created: WinFormsApp1_Step3.GameObject
Solution Explorer
Class View
Parallel Watch 1
Call Stack
Breakpoints
Exception Settings
Output
Autos
Watch 1
Search
Enter a message
2:10 PM

class GameObject

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Reflection;
using System.Text;
using System.Threading.Tasks;
using static System.Net.Mime.MediaTypeNames;

namespace WinFormsApp1_Step3
{
    public class GameObject
    {
        private List<Component> m_components;

        public GameObject()
        {
            m_components = new List<Component>();
        }

        public T AddComponent<T>() where T : Component, new()
        {
            T component = new T();
            component.gameObject = this;
            m_components.Add(component);
            return component;
        }
```


```
    public T? GetComponent<T>() where T : Component
    {
        foreach (var comp in m_components) {
            if (comp.GetType() == typeof(T)) {
                return (T)comp;
            }
        }
        return default(T);
    }

    public void BroadcastMessage(string methodName)
    {
        foreach (var comp in m_components) {
            Type t = comp.GetType();
            MethodInfo? minfo = t.GetMethod(methodName);
            minfo?.Invoke(comp, null);
        }
    }
    public void OnRenderObject(Graphics g)
    {
        foreach (Component comp in m_components) {
            comp.OnRenderObject(g);
        }
    }
}
```


class Component

```
    public class Component
    {
        public GameObject gameObject { get; set; }
        public void SendMessage(string methodName) { }
        public virtual void OnRenderObject(Graphics g) { }
    }

    public class Behavior : Component
    {
    }

    public class MonoBehavior : Behavior
    {
        public void Invoke(string methodName) { }
    }
    public class BoxCollider : MonoBehavior
    {
        public void GetCollider() { }
    }

    public class MeshRenderer : MonoBehavior
    {
        public void GetMaterial() { }
    }
}
```

class Time

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

namespace WinFormsApp1_Step3
{
    internal static class Time
    {
        public static double deltaTime = 0.0;
    }
}
```

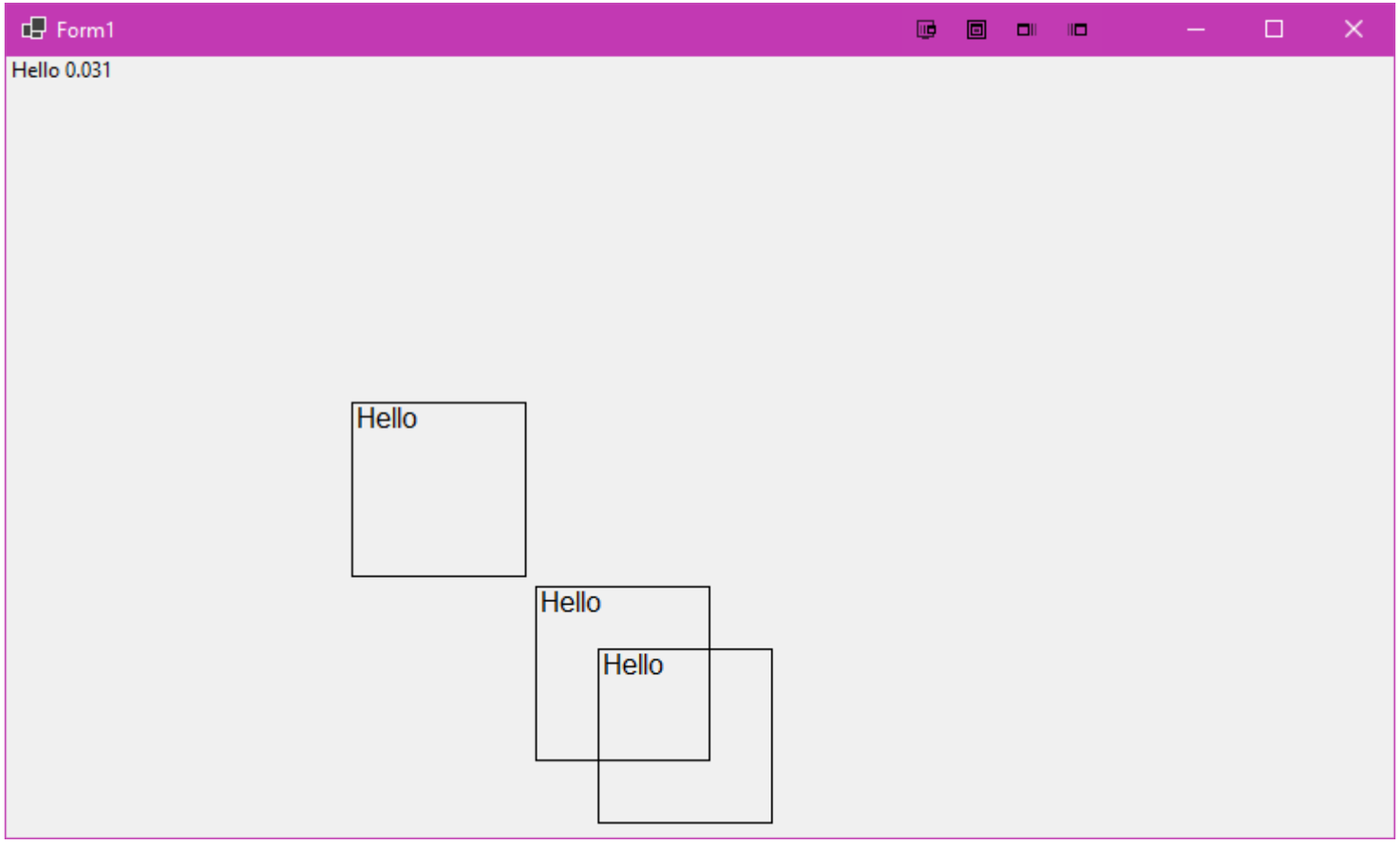
class Form1

```
public partial class Form1 : Form
{
    private Stopwatch _stopWatch;
    double _elapsedTime = 0;
    string _message = "Hello";
    List<GameObject> _gameObjects = new List<GameObject>();

    public Form1()
    {
        InitializeComponent();
        _stopWatch = Stopwatch.StartNew();
    }
```

```
private void Form1_KeyPress(object? sender, KeyPressEventArgs e)
{
    if (e.KeyChar == 'a')
    {
        GameObject go = CreateGameObject();
        //go.AddComponent<Test>();
        go.BroadcastMessage("Start");
        Debug.WriteLine($"GameObject created: {go}");
    }
    else if (e.KeyChar == 's')
    {
        _message = "World";
    }
}
```


Step4


Form1
Hello 0.031
Hello
Hello
Hello

class Test : MonoBehavior

```
namespace WinFormsApp1_Step3
{
    class Test : MonoBehavior
    {
        Rectangle rect = new Rectangle(0, 0, 100, 100);
        Vector2 _pos = Vector2.Zero;
        double _speed = 50;
        string _message = "Hello";
        Font? _font;

        public void Start()
        {
            FontFamily fontFamily = new FontFamily("Arial");
            _font = new Font(fontFamily,16,FontStyle.Regular,GraphicsUnit.Pixel);
        }
```

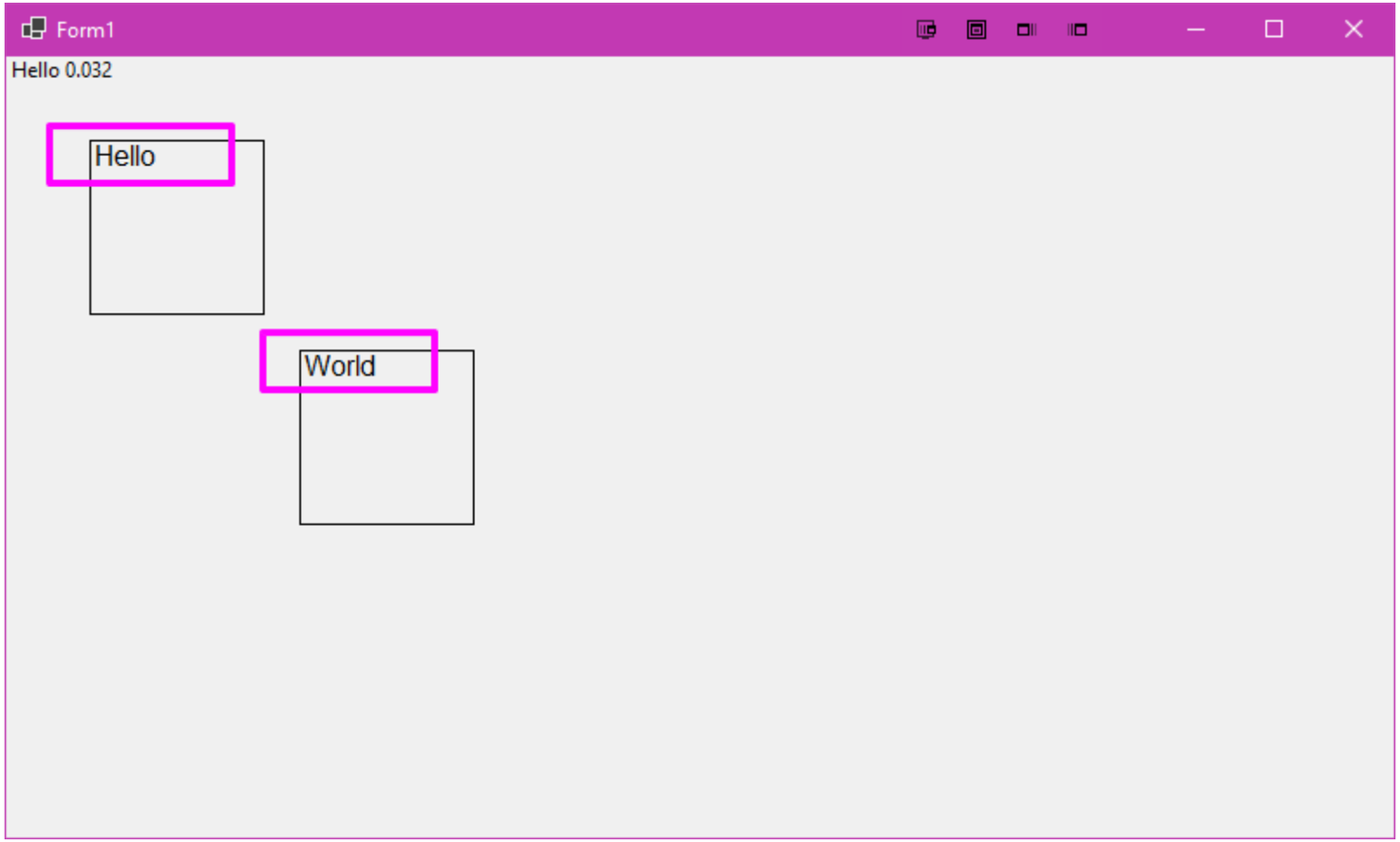
```
        public void Update()
        {
            float offset = (float)Time.deltaTime * (float)_speed;
            _pos = _pos + new Vector2(offset,offset);
        }

        public override void OnRenderObject(Graphics g)
        {
            Rectangle rect = new Rectangle((int)_pos.X, (int)_pos.Y, 100, 100);
            g.DrawRectangle(Pens.Black, rect);
            TextRenderer.DrawText(g, $"{_message}"
                , _font, new Point((int)_pos.X, (int)_pos.Y), Color.Black);
        }
    }
}
```


class Form1

```
private void Form1_KeyPress(object? sender, KeyPressEventArgs e)
{
    if (e.KeyChar == 'a')
    {
        GameObject go = CreateGameObject();
        go.AddComponent<Test>();
        go.BroadcastMessage("Start");
    }
    else if (e.KeyChar == 's')
    {
        _message = "World";
    }
}
```

Step5


Form1
Hello 0.032
Hello
World

class GameObject

```
public class GameObject
{
    private List<Component> m_components;
    List<IEnumerator<object>> m_coroutines;

    public GameObject()
    {
        m_components = new List<Component>();
        m_coroutines = new List<IEnumerator<object>>();
    }
```

```
public void StartCoroutine(IEnumerator<object> routine)
{
    m_coroutines.Add(routine);
}

public void UpdateCoroutine()
{
    int numRoutines = m_coroutines.Count;
    foreach (var routine in m_coroutines) {
        if (routine.MoveNext()) {
            object item = routine.Current;
        }
    }
}
```

class Form1 : Form

```
private void Form1_Update(double _elapsedTime)
{
    foreach (GameObject go in  gameObjects) {
        go.BroadcastMessage("Update");
        go.UpdateCoroutine();
    }
}
```

class Test

```
double _timer = 0;

public void Start()
{
    gameObject.StartCoroutine(GetNextValue2());
    FontFamily fontFamily = new FontFamily("Arial");
    _font = new Font(fontFamily,16,FontStyle.Regular,GraphicsUnit.Pixel);
}

public void Update()
{
    float offset = (float)Time.deltaTime * (float)_speed;
    _pos = _pos + new Vector2(offset,offset);
}

IEnumerator<object> GetNextValue2()
{
    _message = "Hello";
    while (_timer < 1.0) {
        _timer += Time.deltaTime;
        yield return _message;
    }
    _message = "World";
}
```

MY **BRIGHT** FUTURE

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