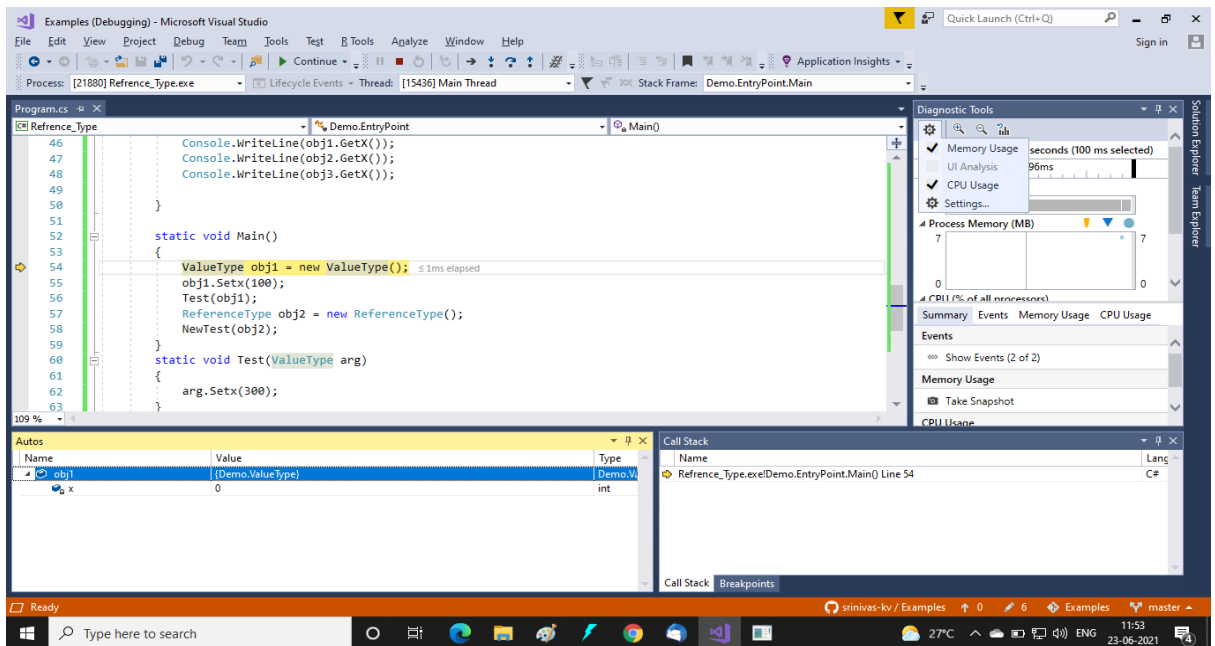
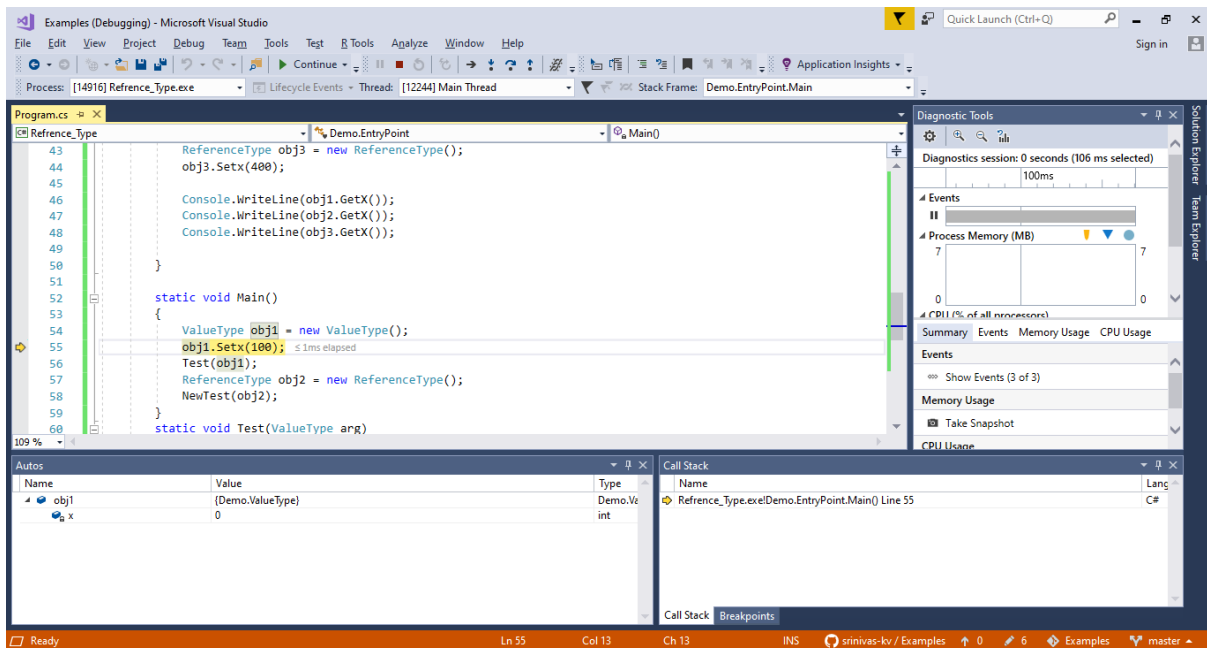


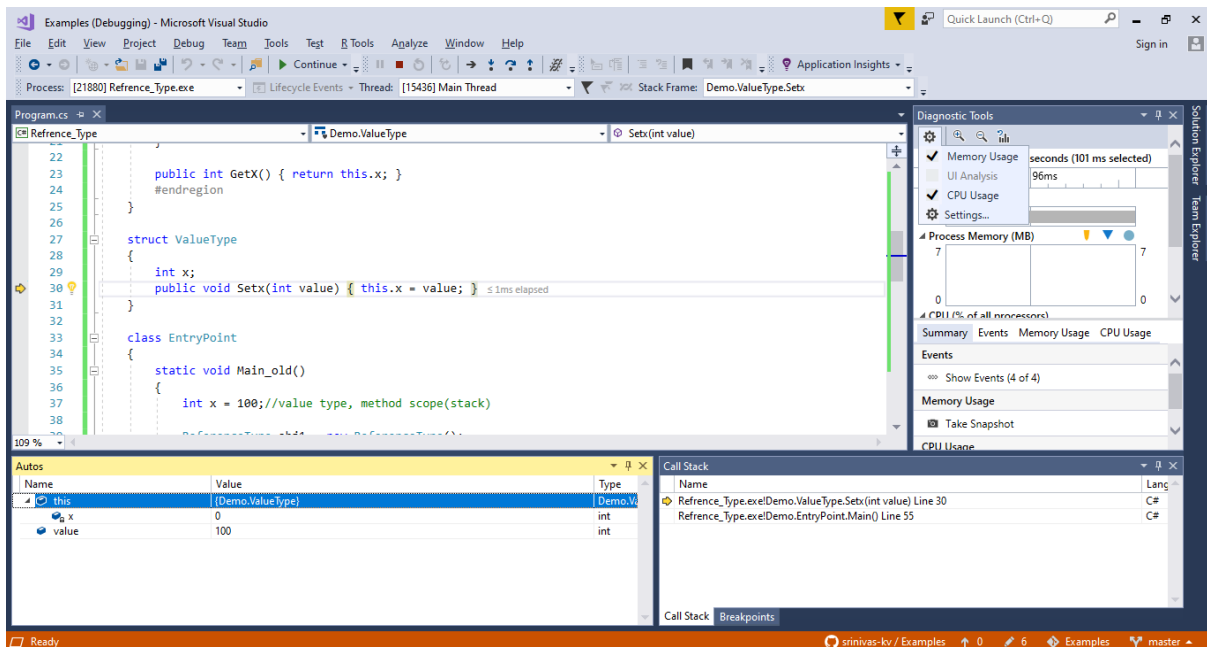
#1 Object obj1 is created which is of value type



#2 Data member x is with value 0.



#3 Still the control is in EntryPoint.Main()



#4 The control now in ValueType.Setx and obj1 address and value 100 is sent as parameter

Visual Studio interface showing the first state of a debug session. The code is at line 30, where `this.x = value;` is being executed. The Autos window shows the current state of variables: `this` (Demo.ValueType), `x` (0), `this.x` (0), and `value` (100). The Call Stack shows the current method `Setx(int value)` and its caller `Main_old()`.

Name	Value	Type
this	(Demo.ValueType)	Demo.Ve
x	0	int
this.x	0	int
value	100	int

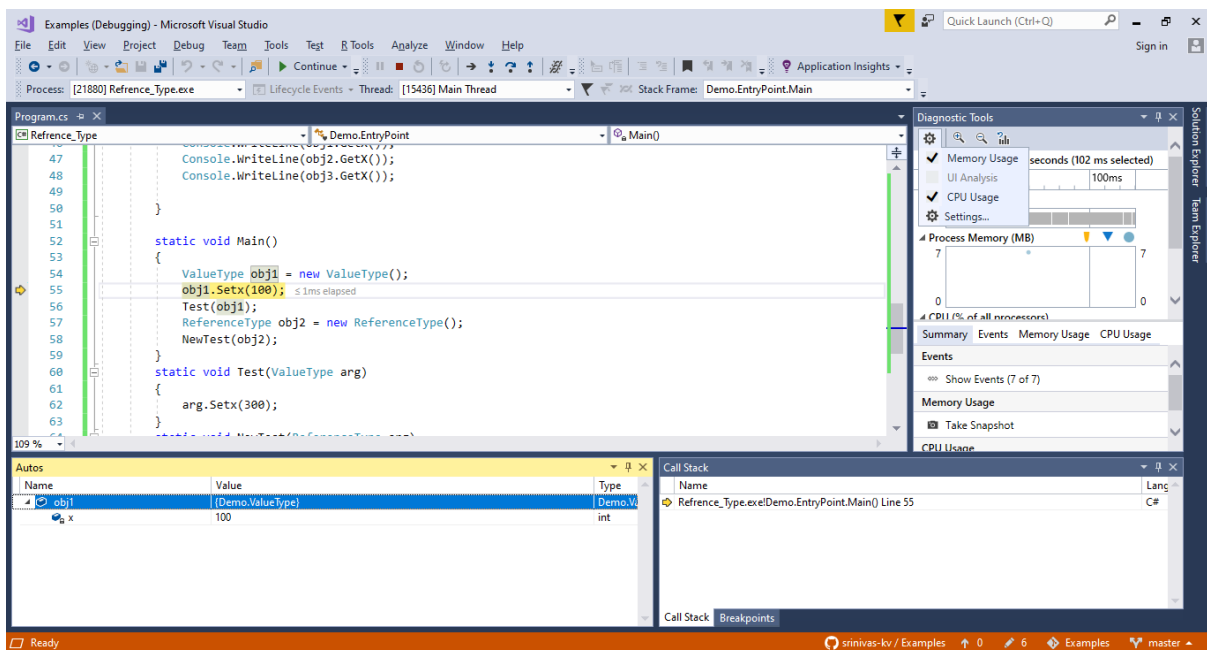
Name	Lang
Reference_Type.exe!Demo.ValueType.Setx(int value) Line 30	C#
Reference_Type.exe!Demo.EntryPoint.Main() Line 55	C#

#5 : The value of x and this.x are 0 and Value=100

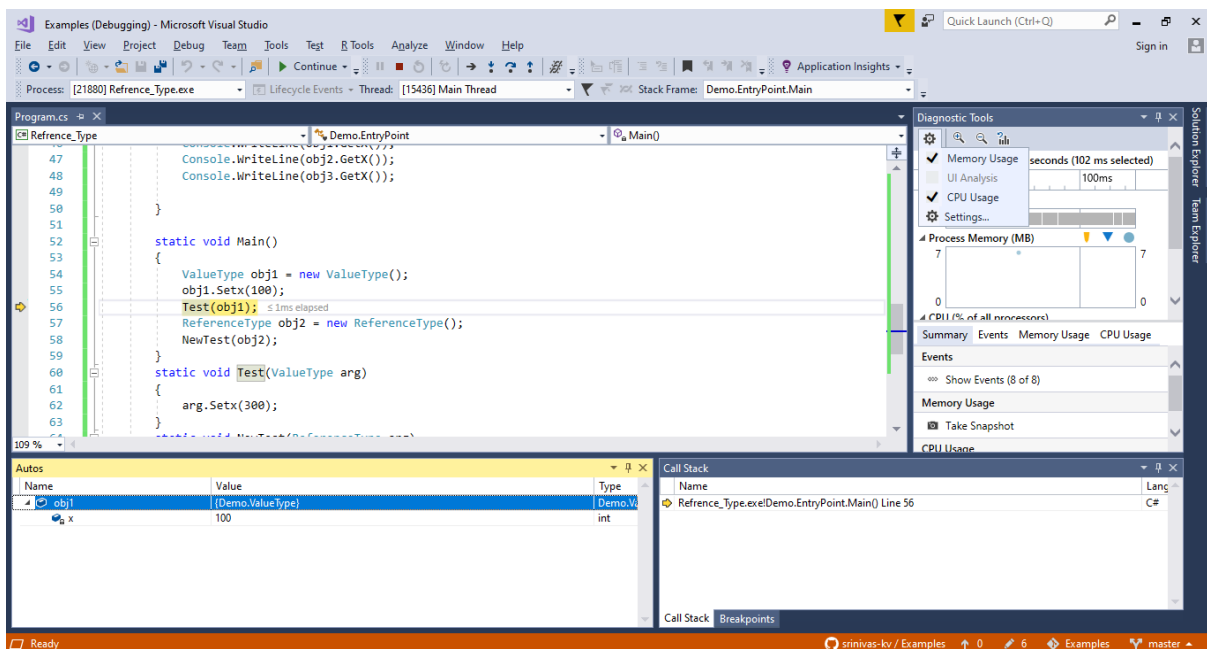
Visual Studio interface showing the second state of a debug session. The code is at line 30, where `this.x = value;` is being executed. The Autos window shows the current state of variables: `this` (Demo.ValueType), `x` (100), `this.x` (100), and `value` (100). The Call Stack shows the current method `Setx(int value)` and its caller `Main_old()`.

Name	Value	Type
this	(Demo.ValueType)	Demo.Ve
x	100	int
this.x	100	int
value	100	int

Name	Lang
Reference_Type.exe!Demo.ValueType.Setx(int value) Line 30	C#
Reference_Type.exe!Demo.EntryPoint.Main() Line 55	C#



#6 Value of x in obj1 is now set to 100



#7 The value of x is sent as an argument along with obj1 address

Examples (Debugging) - Microsoft Visual Studio

Process: [21880] Reference_Type.exe Thread: [119436] Main Thread Stack Frame: Demo.EntryPoint.Test

Program.cs

```
47 Console.WriteLine(obj2.GetX());
48 Console.WriteLine(obj3.GetX());
49
50 }
51
52 static void Main()
53 {
54     ValueType obj1 = new ValueType();
55     obj1.SetX(100);
56     Test(obj1);
57     ReferenceType obj2 = new ReferenceType();
58     NewTest(obj2);
59 }
60 static void Test(ValueType arg)
61 {
62     arg.SetX(300);
63 }
```

Diagnostic Tools

- Memory Usage (seconds (103 ms selected))
- UI Analysis
- CPU Usage
- Settings...
- Process Memory (MB)
- CPU1 (% of all processors)
- Summary Events Memory Usage CPU Usage
- Events
- Show Events (9 of 9)
- Memory Usage
- Take Snapshot
- CPU Usage

Autos

Name	Value	Type
arg	(Demo.ValueType)	Demo.V
x	100	int

Call Stack

Name	Lang
Reference_Type.exe!Demo.EntryPoint.Test(Demo.ValueType arg) Line 61	C#
Reference_Type.exe!Demo.EntryPoint.Main() Line 56	C#

Ready

Examples (Debugging) - Microsoft Visual Studio

Process: [21880] Reference_Type.exe Thread: [119436] Main Thread Stack Frame: Demo.EntryPoint.Test

Program.cs

```
47 Console.WriteLine(obj2.GetX());
48 Console.WriteLine(obj3.GetX());
49
50 }
51
52 static void Main()
53 {
54     ValueType obj1 = new ValueType();
55     obj1.SetX(100);
56     Test(obj1);
57     ReferenceType obj2 = new ReferenceType();
58     NewTest(obj2);
59 }
60 static void Test(ValueType arg)
61 {
62     arg.SetX(300);
63 }
```

Diagnostic Tools

- Memory Usage (seconds (104 ms selected))
- UI Analysis
- CPU Usage
- Settings...
- Process Memory (MB)
- CPU1 (% of all processors)
- Summary Events Memory Usage CPU Usage
- Events
- Show Events (10 of 10)
- Memory Usage
- Take Snapshot
- CPU Usage

Autos

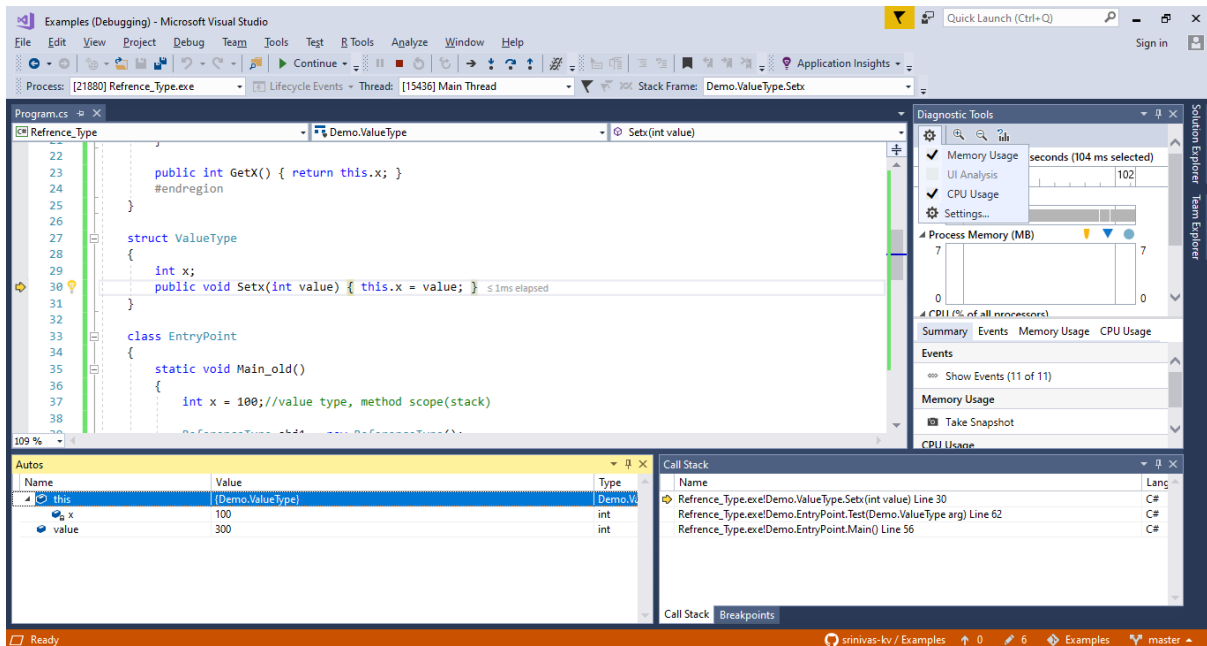
Name	Value	Type
arg	(Demo.ValueType)	Demo.V
x	100	int

Call Stack

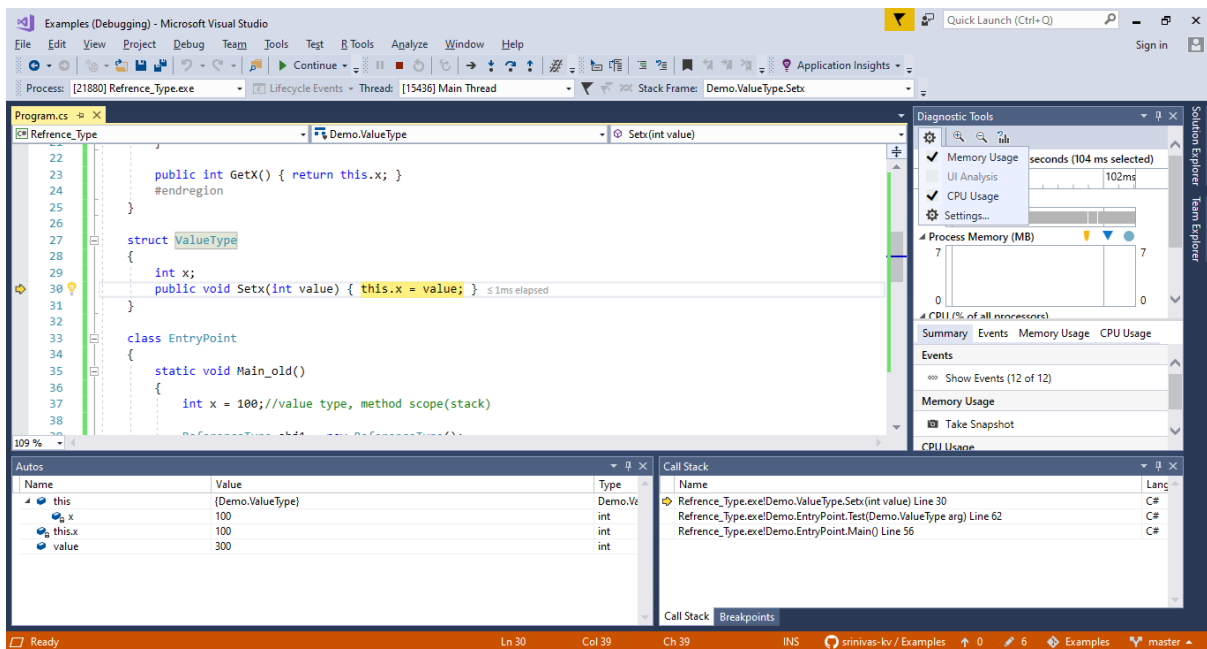
Name	Lang
Reference_Type.exe!Demo.EntryPoint.Test(Demo.ValueType arg) Line 62	C#
Reference_Type.exe!Demo.EntryPoint.Main() Line 56	C#

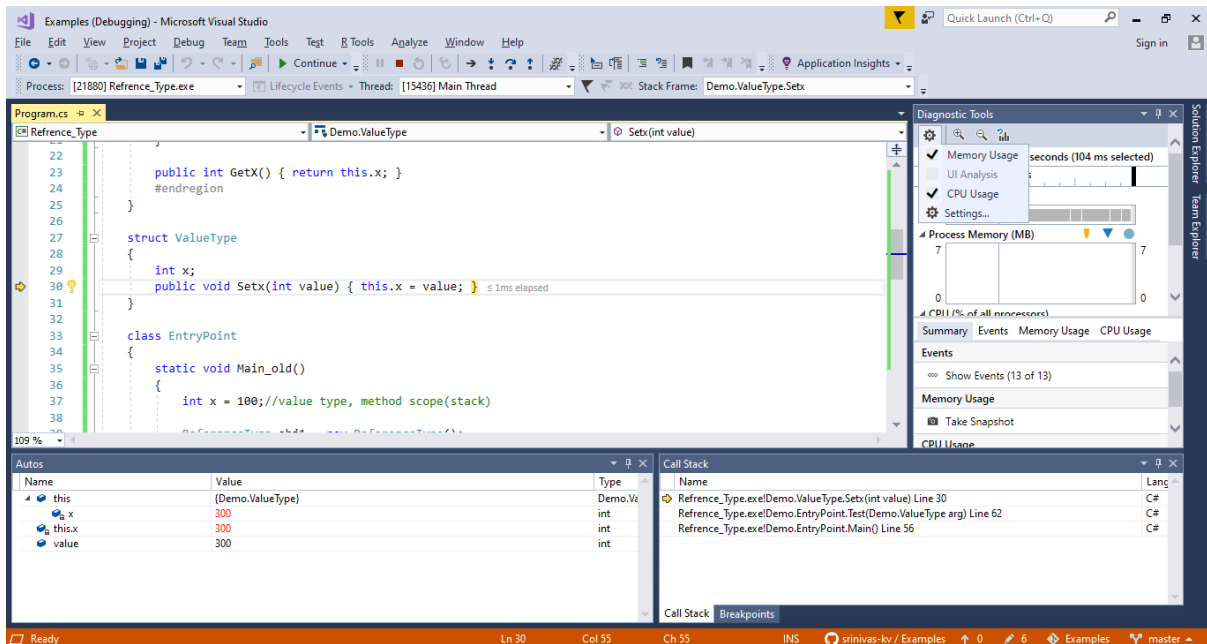
Ready

#8 Calls Setx function

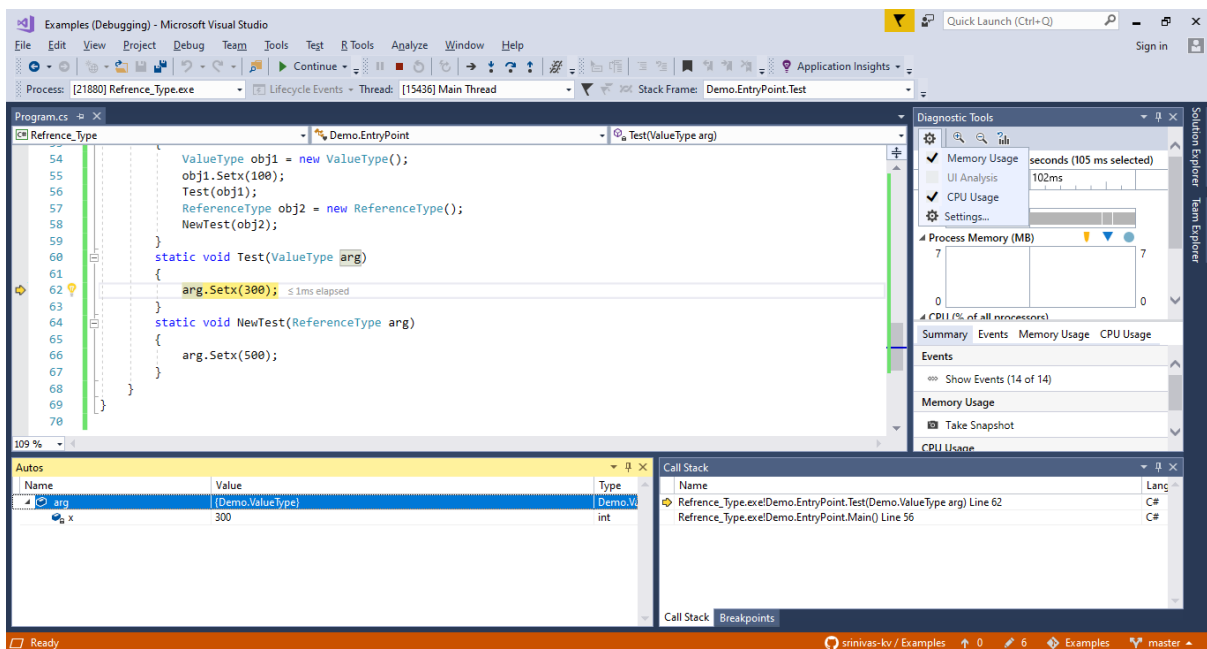


#9 Value sent is 300 along with obj1 address but value of x is 100





#10 : Assign the x value as 300 and this control come back to the EntryPoint.Test().



Examples (Debugging) - Microsoft Visual Studio

File Edit View Project Debug Team Tools Test B Tools Analyze Window Help

Process: [21880] Reference_Type.exe Lifecycle Events Thread: [15436] Main Thread Stack Frame: Demo.EntryPoint.Test

Program.cs Reference_Type Demo.EntryPoint Test(ValueType arg)

```
54 ValueType obj1 = new ValueType();
55 obj1.Setx(100);
56 Test(obj1);
57 ReferenceType obj2 = new ReferenceType();
58 NewTest(obj2);
59
60 static void Test(ValueType arg)
61 {
62     arg.Setx(300);
63 }
64 static void NewTest(ReferenceType arg)
65 {
66     arg.Setx(500);
67 }
68
69
70
```

109 %

Autos

Name	Value	Type
arg	(Demo.ValueType)	Demo.V
x	300	int

Call Stack

Name	Lang
Reference_Type.exe!Demo.EntryPoint.Test(Demo.ValueType arg) Line 63	C#
Reference_Type.exe!Demo.EntryPoint.Main() Line 56	C#

Diagnostic Tools

- Memory Usage: seconds (105 ms selected)
- UI Analysis: 12ms
- CPU Usage
- Settings...
- Process Memory (MB): 7
- CPU (% of all processors)
- Summary Events Memory Usage CPU Usage
- Events: Show Events (15 of 15)
- Memory Usage: Take Snapshot
- CPU Usage

Ready

srinivas-kv / Examples 0 6 Examples master

Examples (Debugging) - Microsoft Visual Studio

File Edit View Project Debug Team Tools Test B Tools Analyze Window Help

Process: [21880] Reference_Type.exe Lifecycle Events Thread: [15436] Main Thread Stack Frame: Demo.EntryPoint.Main

Program.cs Reference_Type Demo.EntryPoint Main()

```
54 ValueType obj1 = new ValueType();
55 obj1.Setx(100);
56 Test(obj1);
57 ReferenceType obj2 = new ReferenceType();
58 NewTest(obj2);
59
60 static void Test(ValueType arg)
61 {
62     arg.Setx(300);
63 }
64 static void NewTest(ReferenceType arg)
65 {
66     arg.Setx(500);
67 }
68
69
70
```

109 %

Autos

Name	Value	Type
obj1	(Demo.ValueType)	Demo.V
x	100	int

Call Stack

Name	Lang
Reference_Type.exe!Demo.EntryPoint.Main() Line 56	C#

Diagnostic Tools

- Memory Usage: seconds (106 ms selected)
- UI Analysis: 104ms
- CPU Usage
- Settings...
- Process Memory (MB): 7
- CPU (% of all processors)
- Summary Events Memory Usage CPU Usage
- Events: Show Events (16 of 16)
- Memory Usage: Take Snapshot
- CPU Usage

Ready

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Examples (Debugging) - Microsoft Visual Studio

Process: [21880] Reference_Type.exe Thread: [15436] Main Thread Stack Frame: Demo.EntryPoint.Main

Program.cs

```
54 ValueType obj1 = new ValueType();
55 obj1.Setx(100);
56 Test(obj1);
57 ReferenceType obj2 = new ReferenceType();
58 NewTest(obj2);
59
60 static void Test(ValueType arg)
61 {
62     arg.Setx(300);
63 }
64 static void NewTest(ReferenceType arg)
65 {
66     arg.Setx(500);
67 }
68
69
70
```

Diagnostic Tools

- Memory Usage (seconds (106 ms selected))
- UI Analysis (104ms)
- CPU Usage
- Settings...
- Process Memory (MB)
- CPU (% of all processors)
- Summary Events Memory Usage CPU Usage
- Events (17 of 17)
- Show Events (17 of 17)
- Memory Usage
- Take Snapshot
- CPU Usage

Autos

Name	Value	Type
obj1	{Demo.ValueType}	Demo.Va
x	100	int
obj2	null	Demo.Re
Static members		
y	0	int

Call Stack

Name	Lang
Reference_Type.exe:Demo.EntryPoint.Main() Line 57	C#

Examples (Debugging) - Microsoft Visual Studio

Process: [21880] Reference_Type.exe Thread: [15436] Main Thread Stack Frame: Demo.EntryPoint.Main

Program.cs

```
54 ValueType obj1 = new ValueType();
55 obj1.Setx(100);
56 Test(obj1);
57 ReferenceType obj2 = new ReferenceType();
58 NewTest(obj2);
59
60 static void Test(ValueType arg)
61 {
62     arg.Setx(300);
63 }
64 static void NewTest(ReferenceType arg)
65 {
66     arg.Setx(500);
67 }
68
69
70
```

Diagnostic Tools

- Memory Usage (seconds (108 ms selected))
- UI Analysis
- CPU Usage
- Settings...
- Process Memory (MB)
- CPU (% of all processors)
- Summary Events Memory Usage CPU Usage
- Events (18 of 18)
- Show Events (18 of 18)
- Memory Usage
- Take Snapshot
- CPU Usage

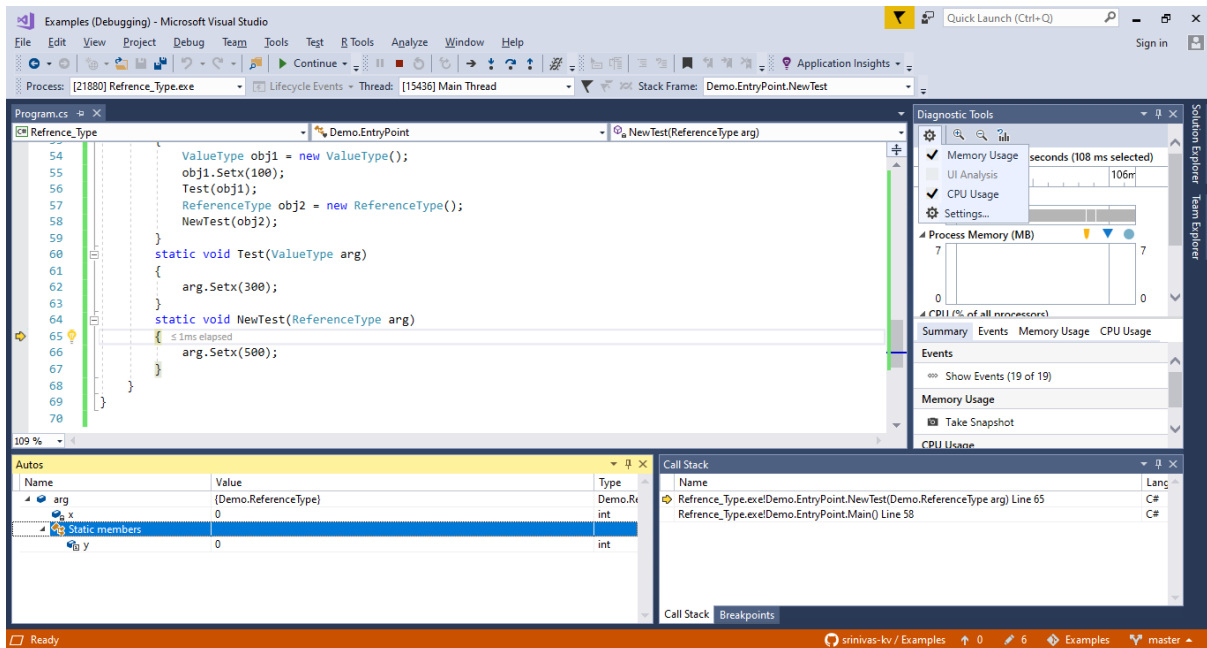
Autos

Name	Value	Type
obj2	{Demo.ReferenceType}	Demo.Re
x	0	int
Static members		
y	0	int

Call Stack

Name	Lang
Reference_Type.exe:Demo.EntryPoint.Main() Line 58	C#

#11 obj1 memory is cleared and new object obj2 is created and the value of x is initialised to 0 by default.



#12 Calls Setx method and sends obj2.

Examples (Debugging) - Microsoft Visual Studio

Process: [21880] Reference_Type.exe Thread: [15436] Main Thread Stack Frame: Demo.ReferenceType.Setx

Program.cs

```
11 //Encapsulate
12 #region Fields
13 private int x;
14 private static int y;
15 #endregion
16 #region Mutators/functions
17 //public void setx(ReferenceType this,int value)
18 public void Setx(int value)
19 {
20     this.x = value;
21 }
22
23 public int GetX() { return this.x; }
24 #endregion
25
26 struct ValueType
27 {
```

Diagnostic Tools

- Memory Usage (seconds (109 ms selected))
- UI Analysis (ms 107ms)
- CPU Usage
- Settings...

Process Memory (MB)

CPU (% of all processors)

Summary Events Memory Usage CPU Usage

Events

- Show Events (21 of 21)

Memory Usage

- Take Snapshot

Autos

Name	Value	Type
this	(Demo.ReferenceType)	Demo.R
x	0	int
Static members		
y	0	int
value	500	int

Call Stack

Name	Lang
Reference_Type.exe!Demo.ReferenceType.Setx(int value) Line 19	C#
Reference_Type.exe!Demo.EntryPoint.NewTest(Demo.ReferenceType arg) Line 66	C#
Reference_Type.exe!Demo.EntryPoint.Main() Line 58	C#

Ready

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Examples (Debugging) - Microsoft Visual Studio

Process: [21880] Reference_Type.exe Thread: [15436] Main Thread Stack Frame: Demo.ReferenceType.Setx

Program.cs

```
1 using System;
2 using System.Collections.Generic;
3 using System.Linq;
4 using System.Text;
5 using System.Threading.Tasks;
6
7 namespace Demo
8 {
9     class ReferenceType
10     {
11         //Encapsulate
12         #region Fields
13         private int x;
14         private static int y;
15         #endregion
16         #region Mutators/functions
17         //public void setx(ReferenceType this,int value)
18         public void Setx(int value)
19         {
```

Diagnostic Tools

- Memory Usage (seconds (109 ms selected))
- UI Analysis (ms 107ms)
- CPU Usage
- Settings...

Process Memory (MB)

CPU (% of all processors)

Summary Events Memory Usage CPU Usage

Events

- Show Events (22 of 22)

Memory Usage

- Take Snapshot

Autos

Name	Value	Type
this	(Demo.ReferenceType)	Demo.R
x	0	int
Static members		
y	0	int
this.x	0	int
value	500	int

Call Stack

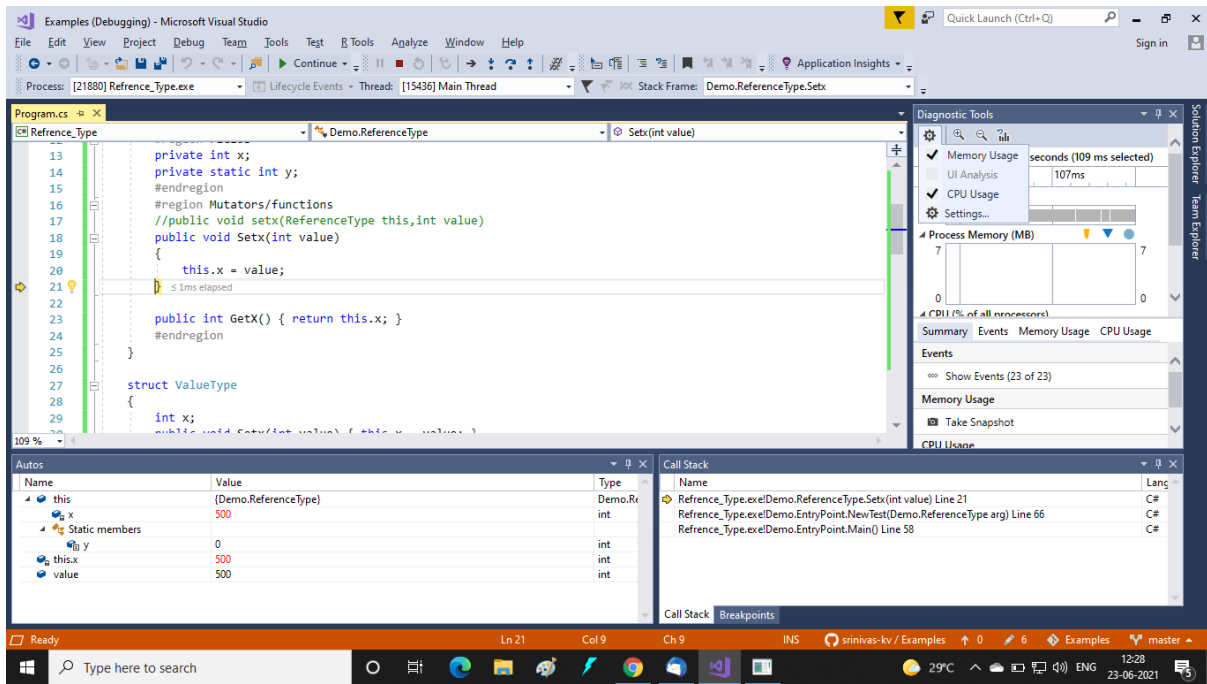
Name	Lang
Reference_Type.exe!Demo.ReferenceType.Setx(int value) Line 20	C#
Reference_Type.exe!Demo.EntryPoint.NewTest(Demo.ReferenceType arg) Line 66	C#
Reference_Type.exe!Demo.EntryPoint.Main() Line 58	C#

Ready

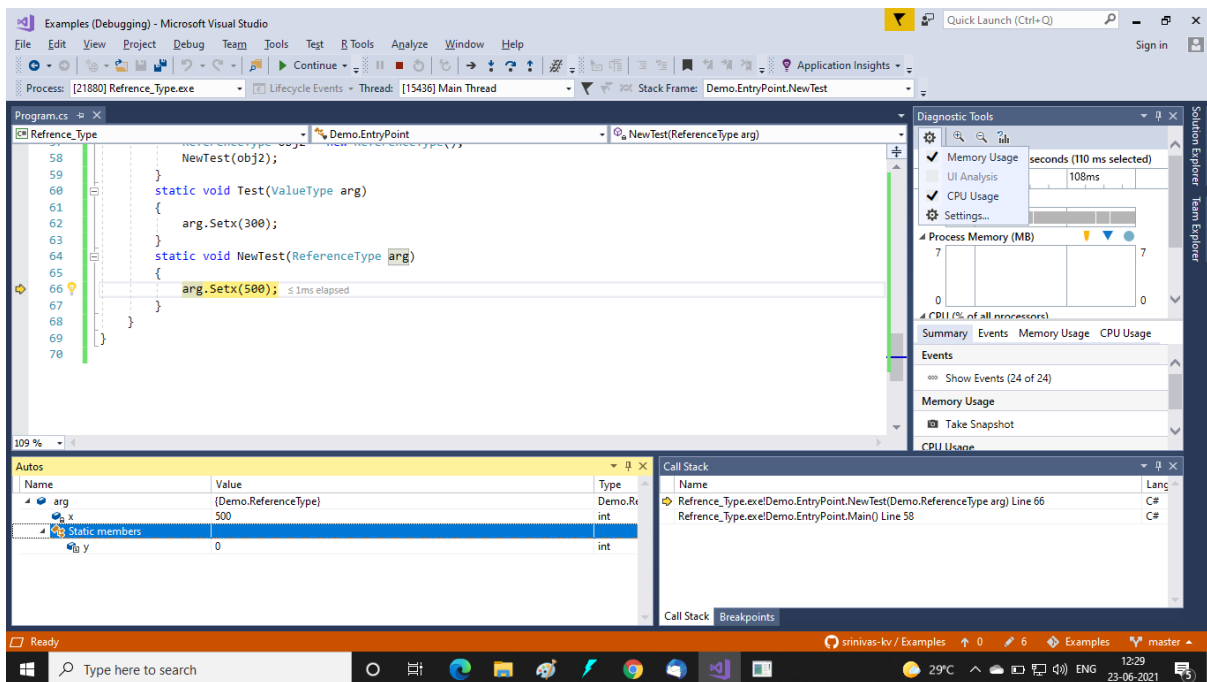
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#13 The value in “value” is assigned to x.



Examples (Debugging) - Microsoft Visual Studio

File Edit View Project Debug Team Tools Test B Tools Analyze Window Help

Process: [21880] Reference_Type.exe Thread: [15436] Main Thread Stack Frame: Demo.EntryPoint.NewTest

Program.cs

```
58 NewTest(obj2);
59 }
60 static void Test(ValueType arg)
61 {
62     arg.Setx(300);
63 }
64 static void NewTest(ReferenceType arg)
65 {
66     arg.Setx(500);
67 }
68 }
69 }
70 }
```

Diagnostic Tools

- Memory Usage: seconds (110 ms selected) 108ms
- UI Analysis
- CPU Usage
- Settings...
- Process Memory (MB): 7
- CPU (% of all processors): 0
- Summary Events Memory Usage CPU Usage
- Events: Show Events (25 of 25)
- Memory Usage: Take Snapshot
- CPU Usage

Autos

Name	Value	Type
arg	{Demo.ReferenceType}	Demo.Re
x	500	int
Static members		
y	0	int

Call Stack

Name	Lang
Reference_Type.exe!Demo.EntryPoint.NewTest(Demo.ReferenceType arg) Line 67	C#
Reference_Type.exe!Demo.EntryPoint.Main() Line 58	C#

Ready

Type here to search

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Examples (Debugging) - Microsoft Visual Studio

File Edit View Project Debug Team Tools Test B Tools Analyze Window Help

Process: [21880] Reference_Type.exe Thread: [15436] Main Thread Stack Frame: Demo.EntryPoint.Main

Program.cs

```
58 NewTest(obj2);
59 }
60 static void Test(ValueType arg)
61 {
62     arg.Setx(300);
63 }
64 static void NewTest(ReferenceType arg)
65 {
66     arg.Setx(500);
67 }
68 }
69 }
70 }
```

Diagnostic Tools

- Memory Usage: seconds (111 ms selected) 109ms
- UI Analysis
- CPU Usage
- Settings...
- Process Memory (MB): 7
- CPU (% of all processors): 0
- Summary Events Memory Usage CPU Usage
- Events: Show Events (26 of 26)
- Memory Usage: Take Snapshot
- CPU Usage

Autos

Name	Value	Type
obj2	{Demo.ReferenceType}	Demo.Re
x	500	int
Static members		
y	0	int

Call Stack

Name	Lang
Reference_Type.exe!Demo.EntryPoint.Main() Line 58	C#

Ready

Type here to search

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Examples (Debugging) - Microsoft Visual Studio

File Edit View Project Debug Team Tools Test Tools Analyze Window Help

Process: [21880] Reference_Type.exe Thread: [119436] Main Thread Stack Frame: Demo.EntryPoint.Main

Program.cs

```
58 NewTest(obj2);
59
60 static void Test(ValueType arg)
61 {
62     arg.Setx(300);
63 }
64 static void NewTest(ReferenceType arg)
65 {
66     arg.Setx(500);
67 }
68
69
70
```

Diagnostic Tools

- Memory Usage
- UI Analysis
- CPU Usage
- Settings...

Process Memory (MB)

CPU (% of all processors)

Summary Events Memory Usage CPU Usage

Events

Show Events (27 of 27)

Memory Usage

Take Snapshot

CPU Usage

Autos

Name	Value	Type
obj2	(Demo.ReferenceType)	Demo.Re
x	500	int
Static members		
y	0	int

Call Stack

Name	Lang
Reference_Type.exe/Demo.EntryPoint.Main() Line 59	C#

Call Stack Breakpoints

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