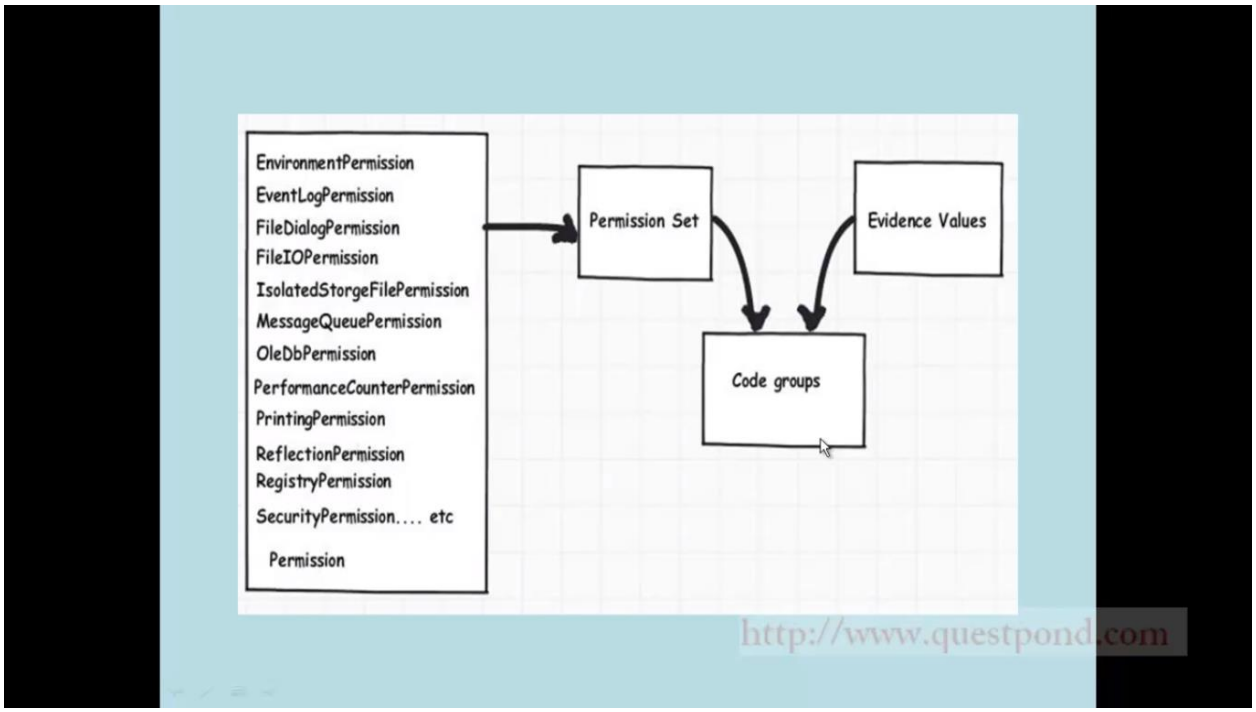
What is CAS

Code Access Security nothing but security it grants or deny permission to exe or dll depending on the evidences (where it is come from internet or valid publishers)

We need to know 3 important concepts

- Permisson set
- Evidence values
- Code Groups



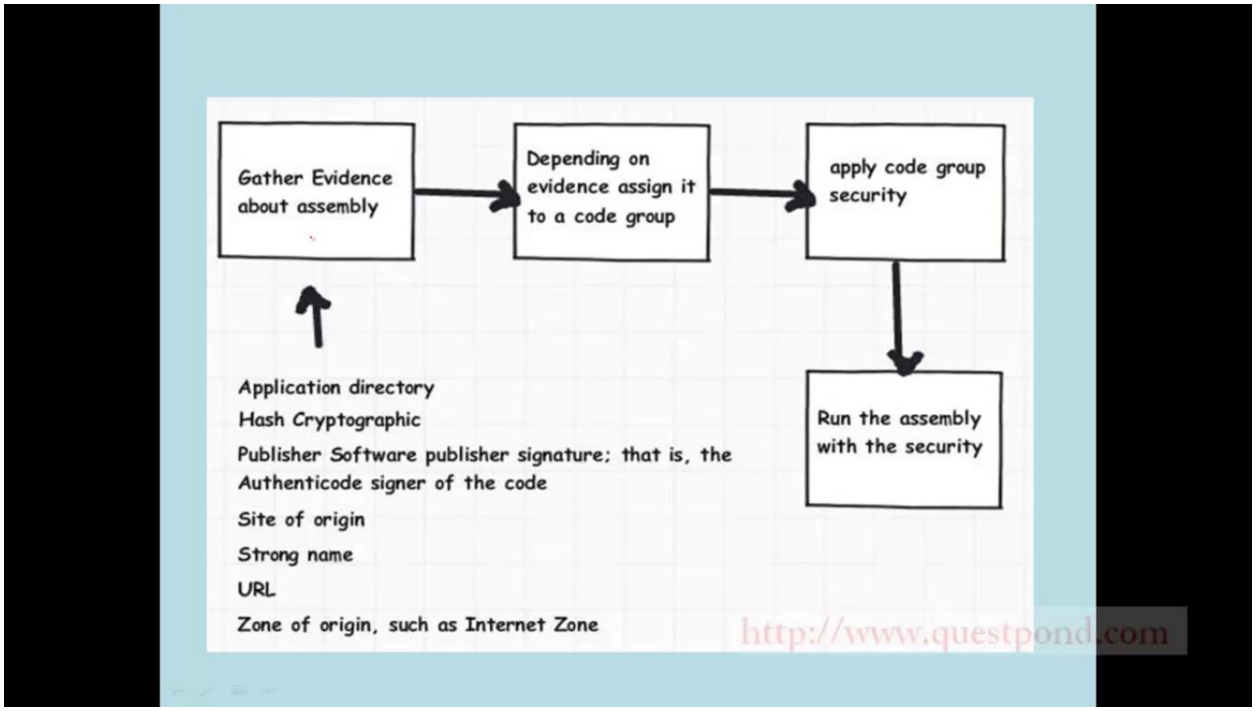
Evidence Values:

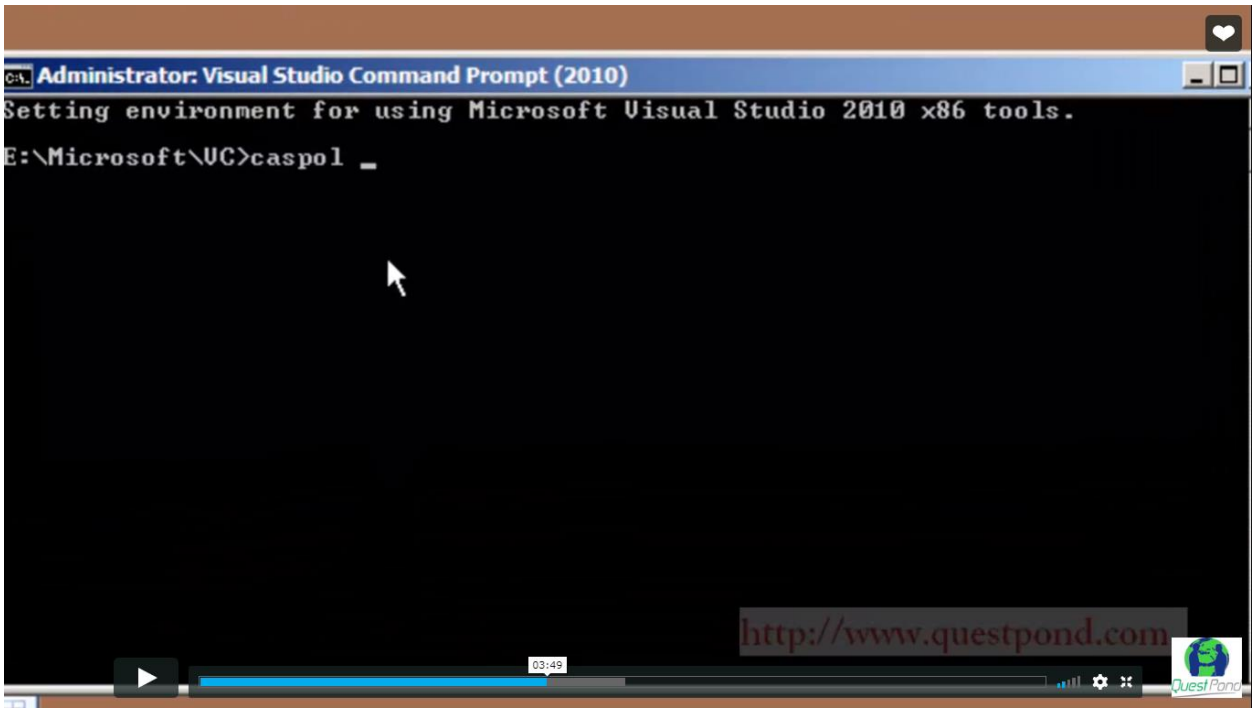
CAS collect the evidences where it is come from, does it have strong name, what is originator of the dll or exe , it is come from internet or same computer

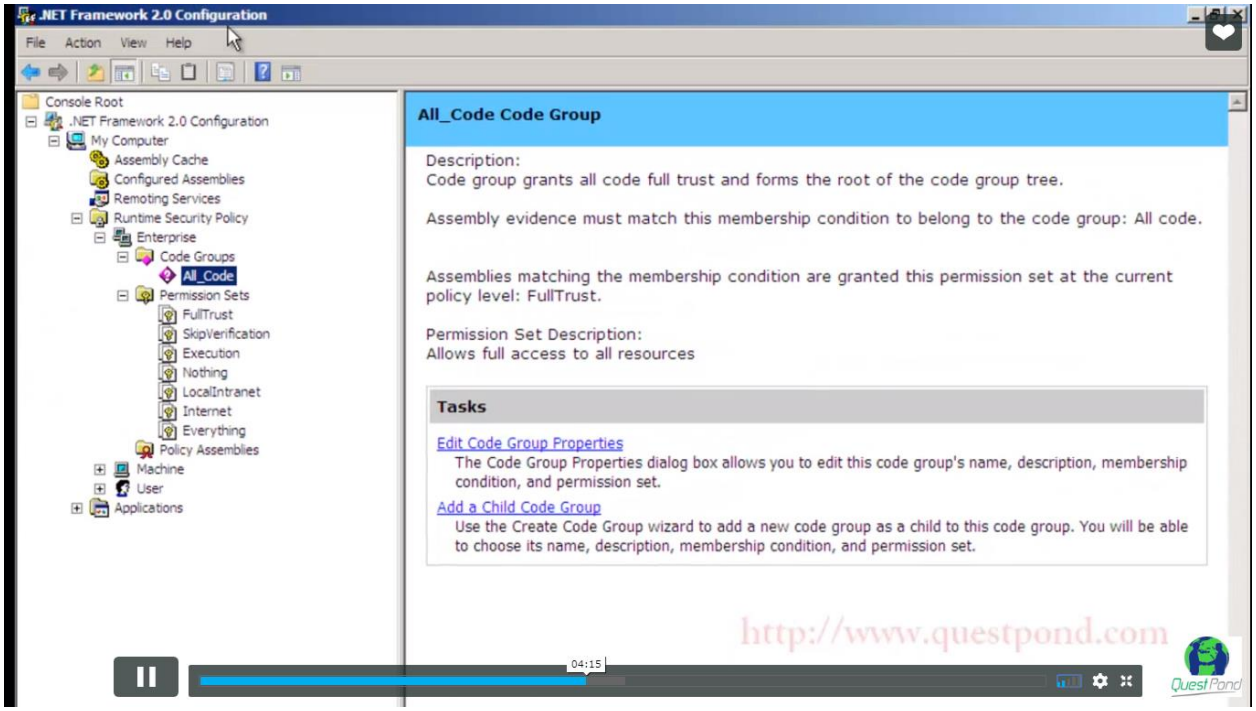
Depending on the evidences it is allocated permission the above permission allocated via permission set

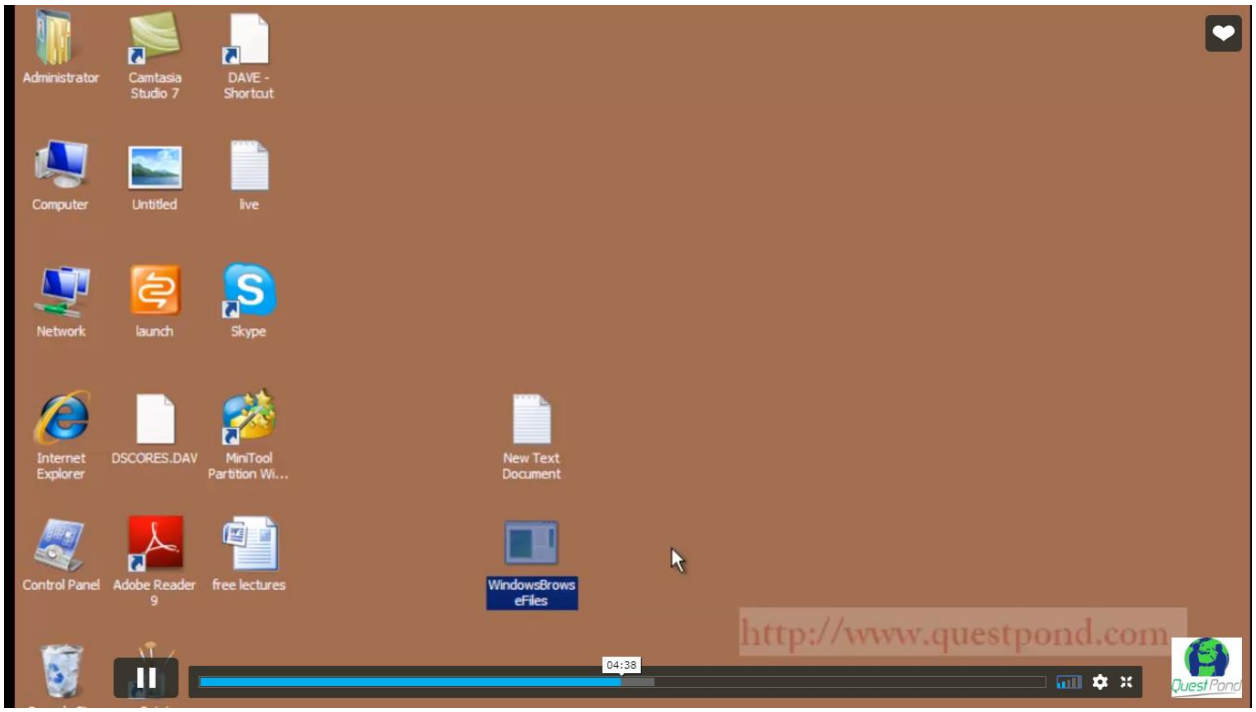
Permission set and evidence defines Code Group

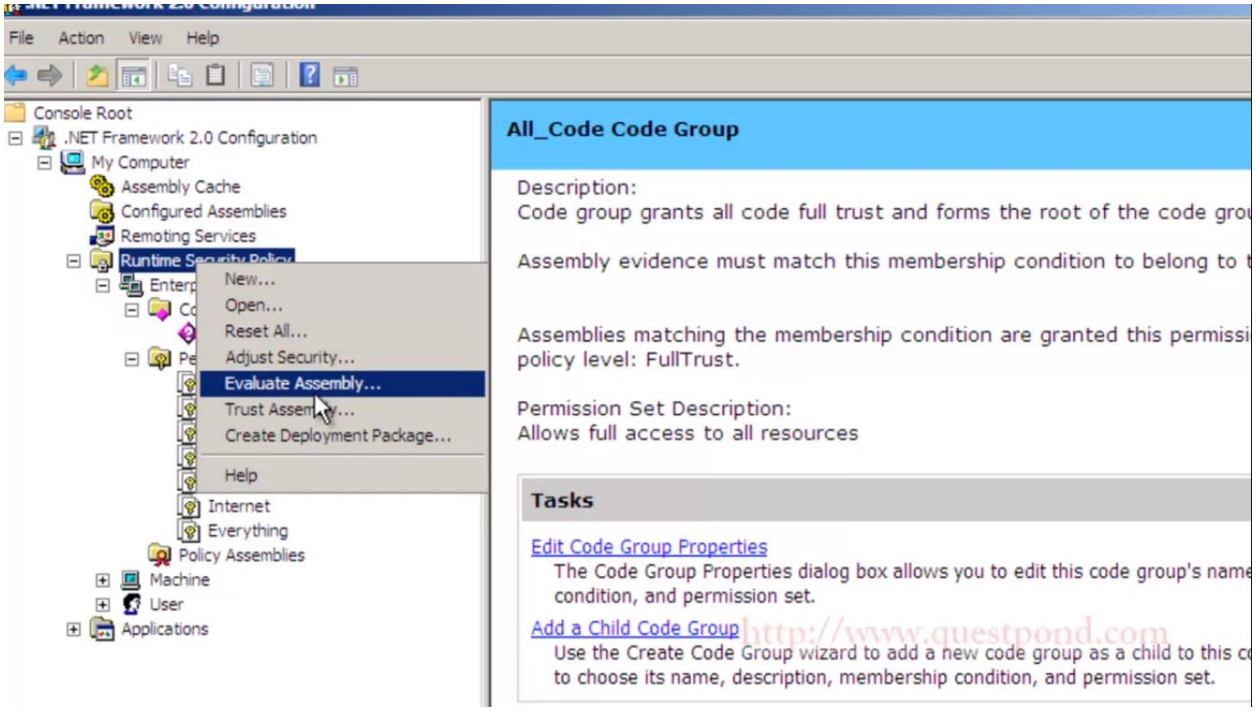
Code groups nothing but collection of permission which are dll depending on evidence values


Gather Evidence about assembly
Depending on evidence assign it to a code group
apply code group security
Run the assembly with the security
Application directory
Hash Cryptographic
Publisher Software publisher signature; that is, the Authenticode signer of the code
Site of origin
Strong name
URL
Zone of origin, such as Internet Zone
http://www.questpond.com


Administrator: Visual Studio Command Prompt (2010)
Setting environment for using Microsoft Visual Studio 2010 x86 tools.
E:\Microsoft\VC>caspol
http://www.questpond.com
03:49


.NET Framework 2.0 Configuration
File Action View Help
Console Root
.NET Framework 2.0 Configuration
My Computer
Assembly Cache
Configured Assemblies
Remoting Services
Runtime Security Policy
Enterprise
Code Groups
All_Code
Permission Sets
FullTrust
SkipVerification
Execution
Nothing
LocalIntranet
Internet
Everything
Policy Assemblies
Machine
User
Applications
All_Code Code Group
Description:
Code group grants all code full trust and forms the root of the code group tree.
Assembly evidence must match this membership condition to belong to the code group: All code.
Assemblies matching the membership condition are granted this permission set at the current policy level: FullTrust.
Permission Set Description:
Allows full access to all resources
Tasks
Edit Code Group Properties
The Code Group Properties dialog box allows you to edit this code group's name, description, membership condition, and permission set.
Add a Child Code Group
Use the Create Code Group wizard to add a new code group as a child to this code group. You will be able to choose its name, description, membership condition, and permission set.
http://www.questpond.com
04:15
QuestPond


Administrator
Camtasia Studio 7
DAVE - Shortcut
Computer
Untitled
live
Network
launch
Skype
Internet Explorer
DSCORES.DAV
MiniTool Partition Wi...
New Text Document
Control Panel
Adobe Reader 9
free lectures
WindowsBrowseFiles
http://www.questpond.com
04:38
QuestPond


File Action View Help
Console Root
.NET Framework 2.0 Configuration
My Computer
Assembly Cache
Configured Assemblies
Remoting Services
Runtime Security Policy
New...
Open...
Reset All...
Adjust Security...
Evaluate Assembly...
Create Deployment Package...
Help
Internet
Everything
Policy Assemblies
Machine
User
Applications
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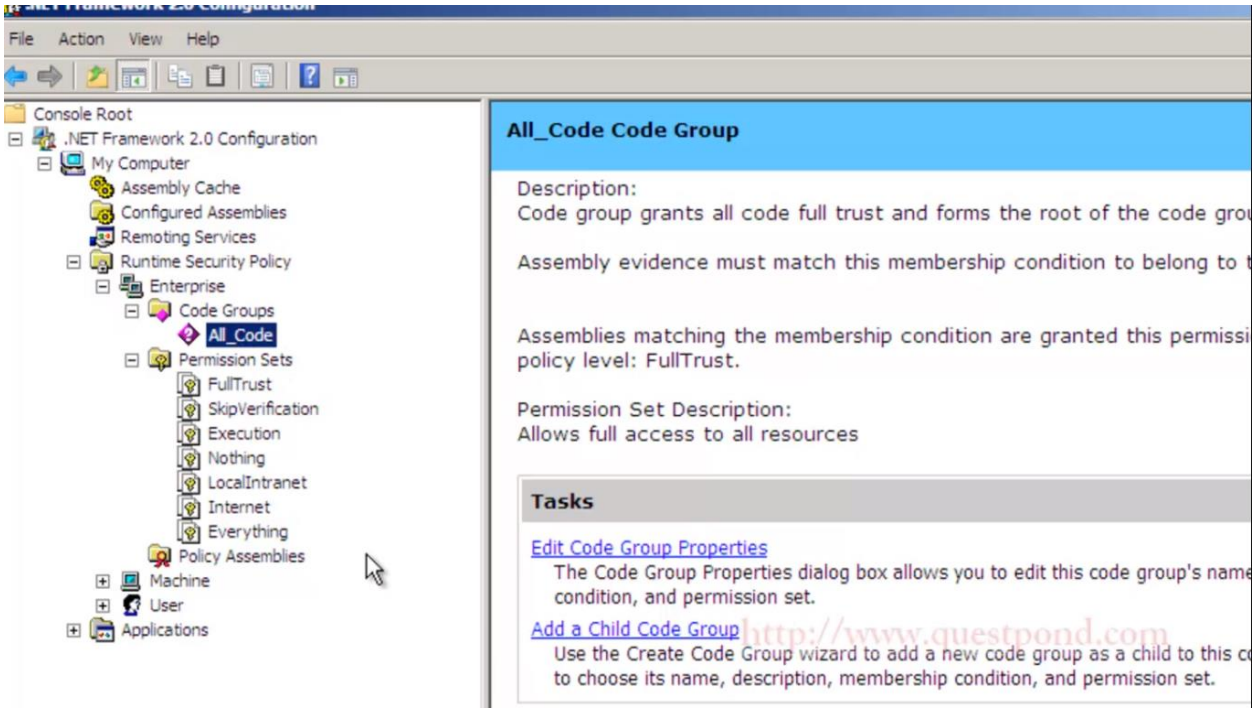
to choose its name, description, membership condition, and permission set.


File Action View Help
Console Root
.NET Framework 2.0 Configuration
My Computer
Assembly Cache
Configured Assemblies
Remoting Services
Runtime Security Policy
Enterprise
Code Groups
All_Code
Permission Sets
FullTrust
SkipVerification
Execution
Nothing
LocalIntranet
Internet
Everything
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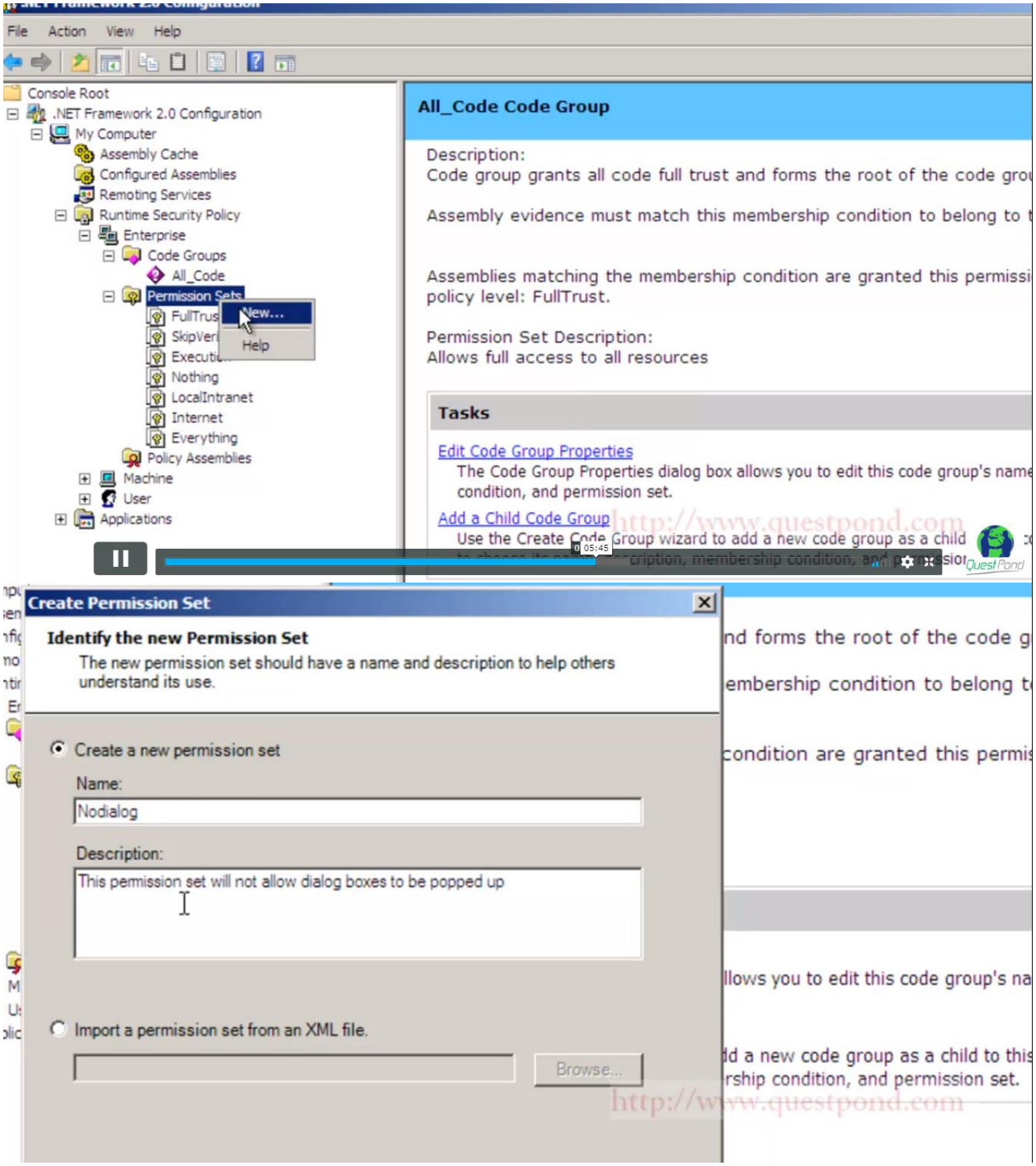
File Action View Help
Console Root
.NET Framework 2.0 Configuration
My Computer
Assembly Cache
Configured Assemblies
Remoting Services
Runtime Security Policy
Enterprise
Code Groups
All_Code
Permission Sets
New...
Help
FullTrust
Nothing
LocalIntranet
Internet
Everything
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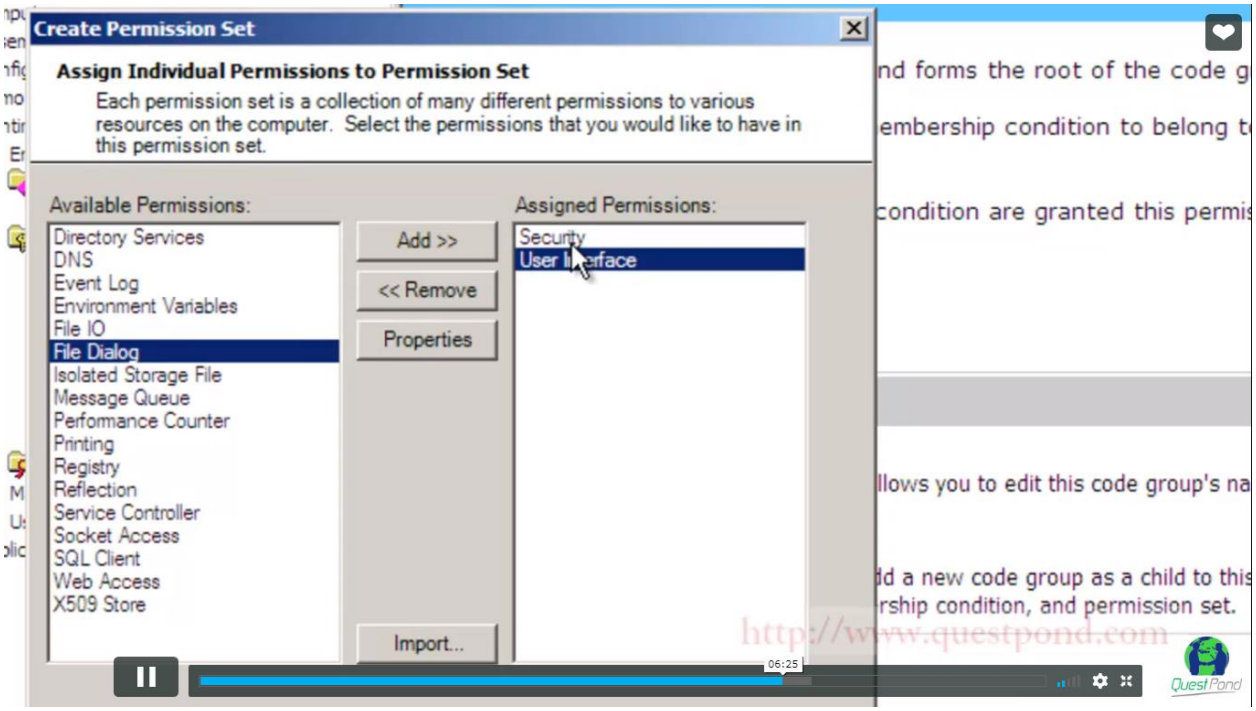
Allows full access to all resources
Tasks
Edit Code Group Properties
The Code Group Properties dialog box allows you to edit this code group's name
condition, and permission set.
Add a Child Code Group
Use the Create Code Group wizard to add a new code group as a child
http://www.questpond.com
Create Permission Set
Identify the new Permission Set
The new permission set should have a name and description to help others
understand its use.
Create a new permission set
Name:
Nodialog
Description:
This permission set will not allow dialog boxes to be popped up
Import a permission set from an XML file.
Browse...
http://www.questpond.com


Create Permission Set
Assign Individual Permissions to Permission Set
Each permission set is a collection of many different permissions to various resources on the computer. Select the permissions that you would like to have in this permission set.
Available Permissions:
Directory Services
DNS
Event Log
Environment Variables
File IO
File Dialog
Isolated Storage File
Message Queue
Performance Counter
Printing
Registry
Reflection
Service Controller
Socket Access
SQL Client
Web Access
X509 Store
Add >>
<< Remove
Properties
Import...
Assigned Permissions:
Security
User Interface
06:25
http://www.questpond.com
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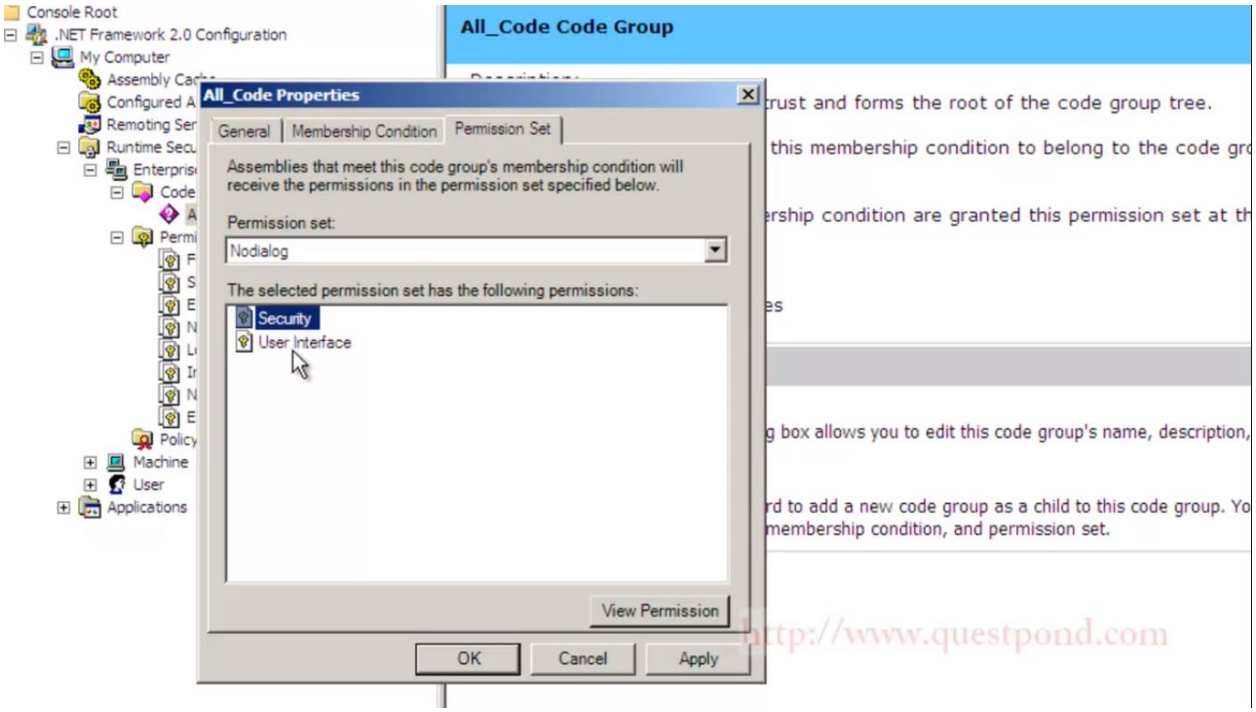
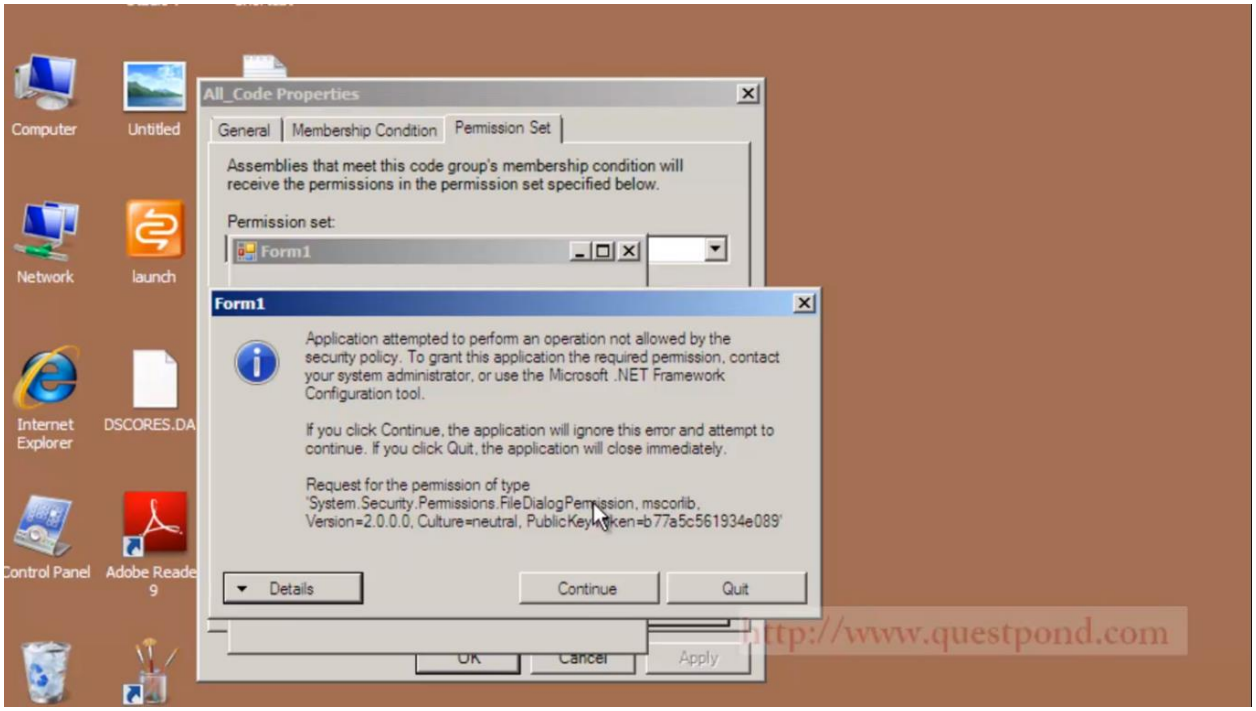
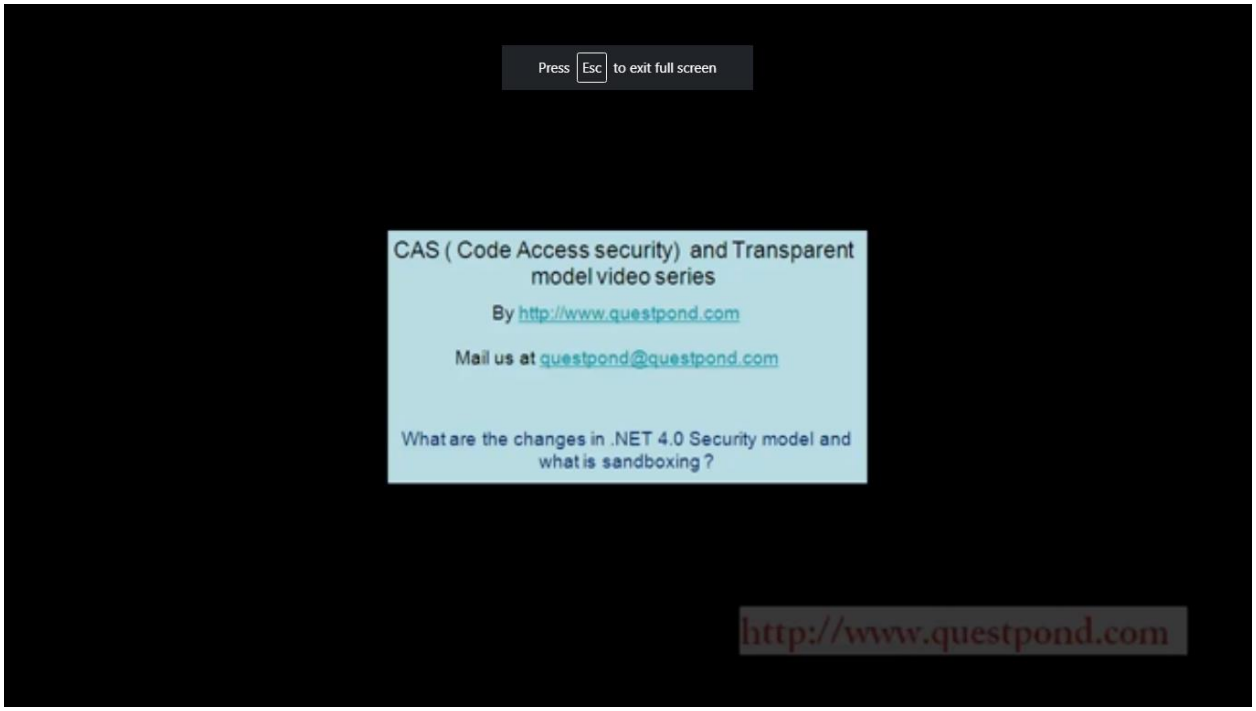
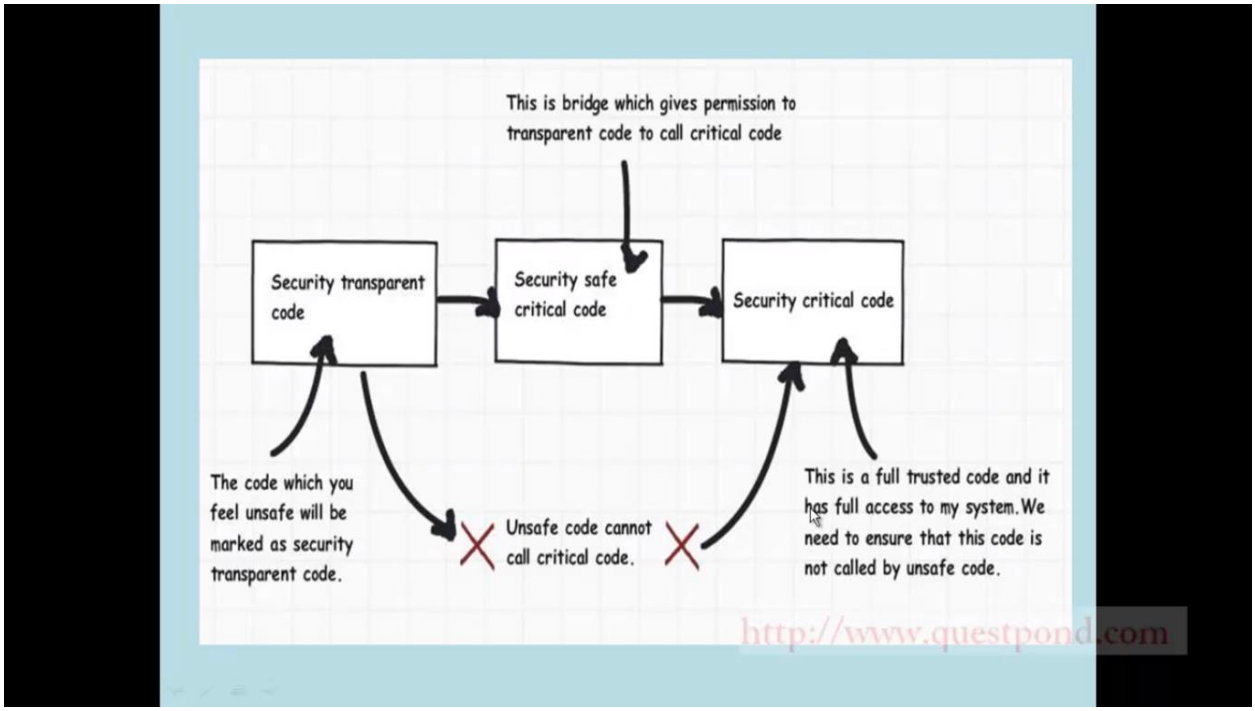

Console Root
.NET Framework 2.0 Configuration
My Computer
Runtime Security Policy
Machine
User
Applications
All_Code Code Group
All_Code Properties
General
Membership Condition
Permission Set
Assemblies that meet this code group's membership condition will receive the permissions in the permission set specified below.
Permission set:
Nodialog
The selected permission set has the following permissions:
Security
User Interface
View Permission
OK
Cancel
Apply
http://www.questpond.com



CAS not easy develop it does not work on unmanaged code and if change the exe other computer it will again set the permission and all




This is bridge which gives permission to transparent code to call critical code
Security transparent code
Security safe critical code
Security critical code
The code which you feel unsafe will be marked as security transparent code.
Unsafe code cannot call critical code.
This is a full trusted code and it has full access to my system. We need to ensure that this code is not called by unsafe code.
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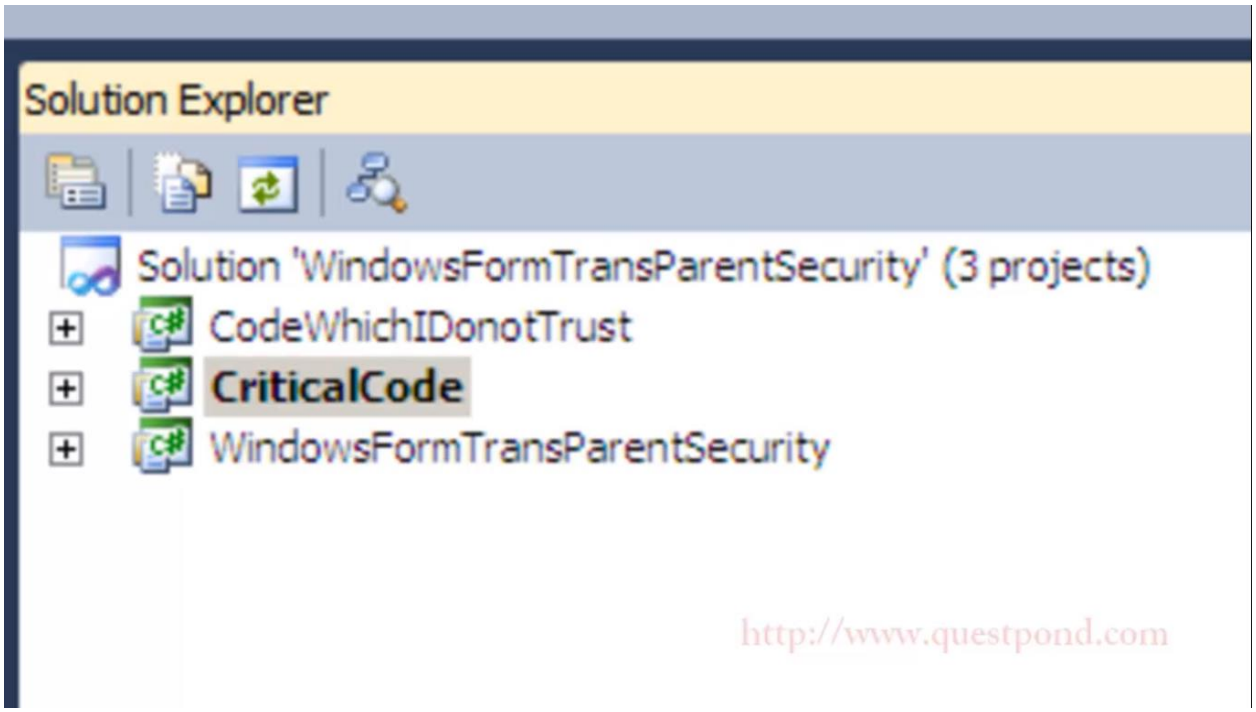
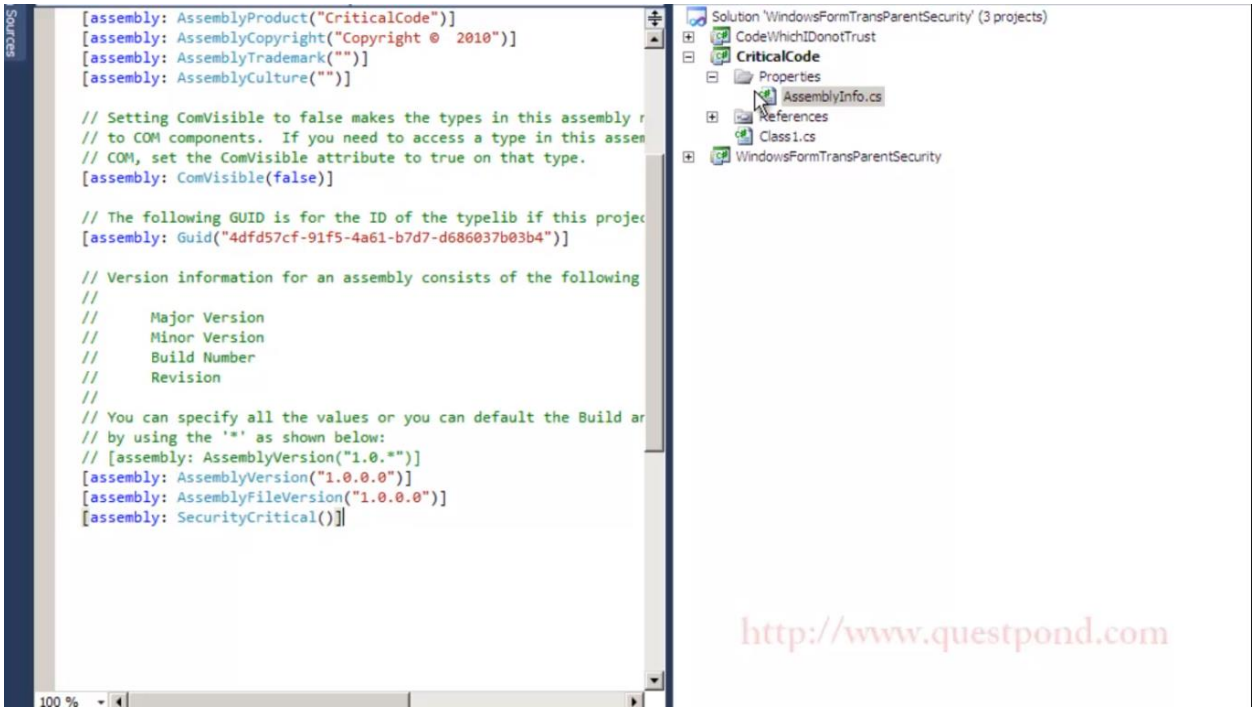
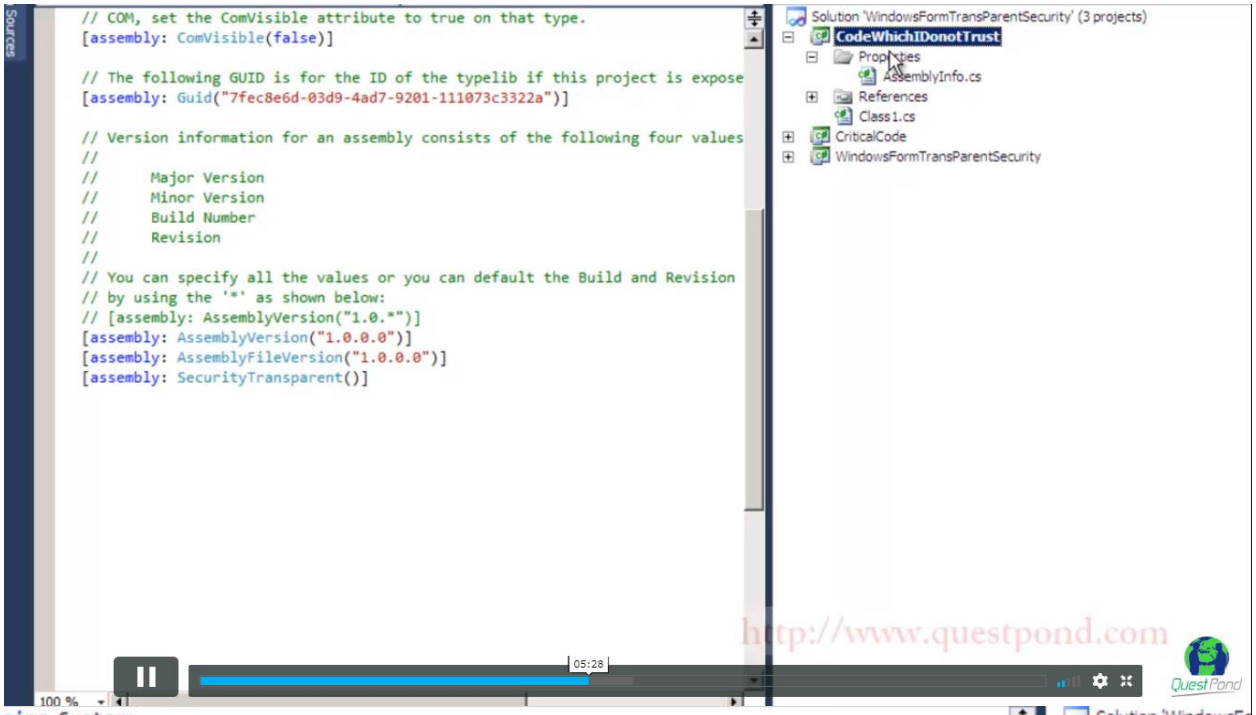
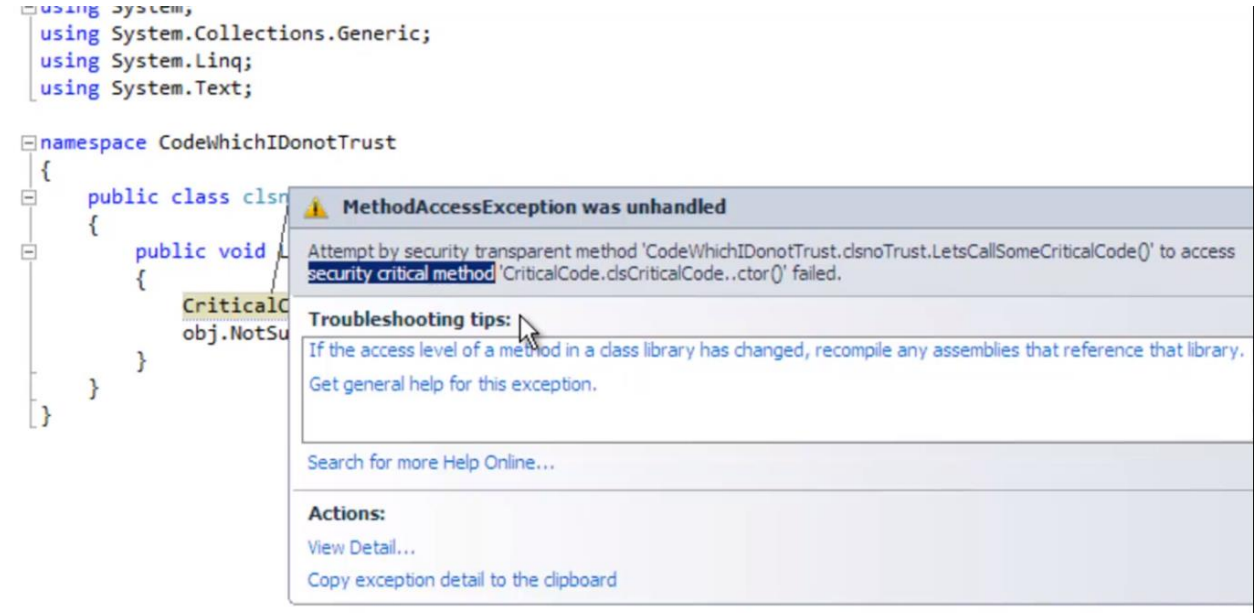

Solution Explorer
Solution 'WindowsFormTransParentSecurity' (3 projects)
CodeWhichIDonotTrust
CriticalCode
WindowsFormTransParentSecurity
http://www.questpond.com


[assembly: AssemblyProduct("CriticalCode")]
[assembly: AssemblyCopyright("Copyright © 2010")]
[assembly: AssemblyTrademark("")]
[assembly: AssemblyCulture("")]
// Setting ComVisible to false makes the types in this assembly
// to COM components. If you need to access a type in this asse
// COM, set the ComVisible attribute to true on that type.
[assembly: ComVisible(false)]
// The following GUID is for the ID of the typelib if this proje
[assembly: Guid("4dfd57cf-91f5-4a61-b7d7-d686037b03b4")]
// Version information for an assembly consists of the following
// Major Version
// Minor Version
// Build Number
// Revision
// You can specify all the values or you can default the Build a
// by using the '*' as shown below:
// [assembly: AssemblyVersion("1.0.*")]
[assembly: AssemblyVersion("1.0.0.0")]
[assembly: AssemblyFileVersion("1.0.0.0")]
[assembly: SecurityCritical()]
100 %
Solution 'WindowsFormTransParentSecurity' (3 projects)
CodeWhichIDonotTrust
CriticalCode
Properties
AssemblyInfo.cs
References
Class1.cs
WindowsFormTransParentSecurity
http://www.questpond.com


// COM, set the ComVisible attribute to true on that type.
[assembly: ComVisible(false)]
// The following GUID is for the ID of the typelib if this project is expose
[assembly: Guid("7fec8e6d-03d9-4ad7-9201-111073c3322a")]
// Version information for an assembly consists of the following four values
//
//   Major Version
//   Minor Version
//   Build Number
//   Revision
//
// You can specify all the values or you can default the Build and Revision
// by using the '*' as shown below:
// [assembly: AssemblyVersion("1.0.*")]
[assembly: AssemblyVersion("1.0.0.0")]
[assembly: AssemblyFileVersion("1.0.0.0")]
[assembly: SecurityTransparent()]
Solution 'WindowsFormTransParentSecurity' (3 projects)
CodeWhichIDonotTrust
Properties
AssemblyInfo.cs
References
Class1.cs
CriticalCode
WindowsFormTransParentSecurity
http://www.questpond.com
05:28
100 %
QuestPond

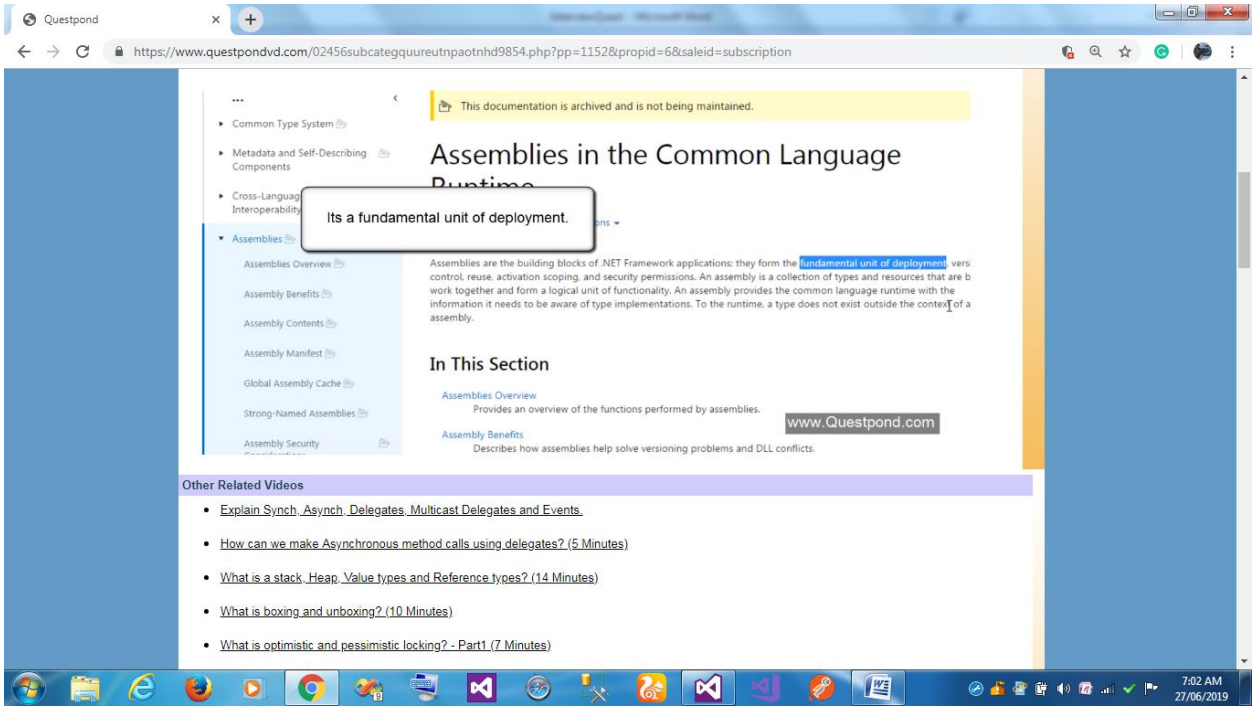

sing System;
sing System.Collections.Generic;
sing System.Linq;
sing System.Text;
amespace CodeWhichIDonotTrust
public class clsnoTrust
{
public void LetsCallSomeCriticalCode()
{
CriticalCode.clsCriticalCode obj = new CriticalCode.clsCriticalCode();
obj.NotSureWhatHeWillDo();
}
}
Solution 'WindowsFo
CodeWhichID
Properties
Assembl
References
CriticalC
Microsof
System
System.
System.
System.
System.
System.
Class1.cs
CriticalCode
Properties
Assembl
References
Class1.cs
WindowsFormTr
http://www.questpond.com

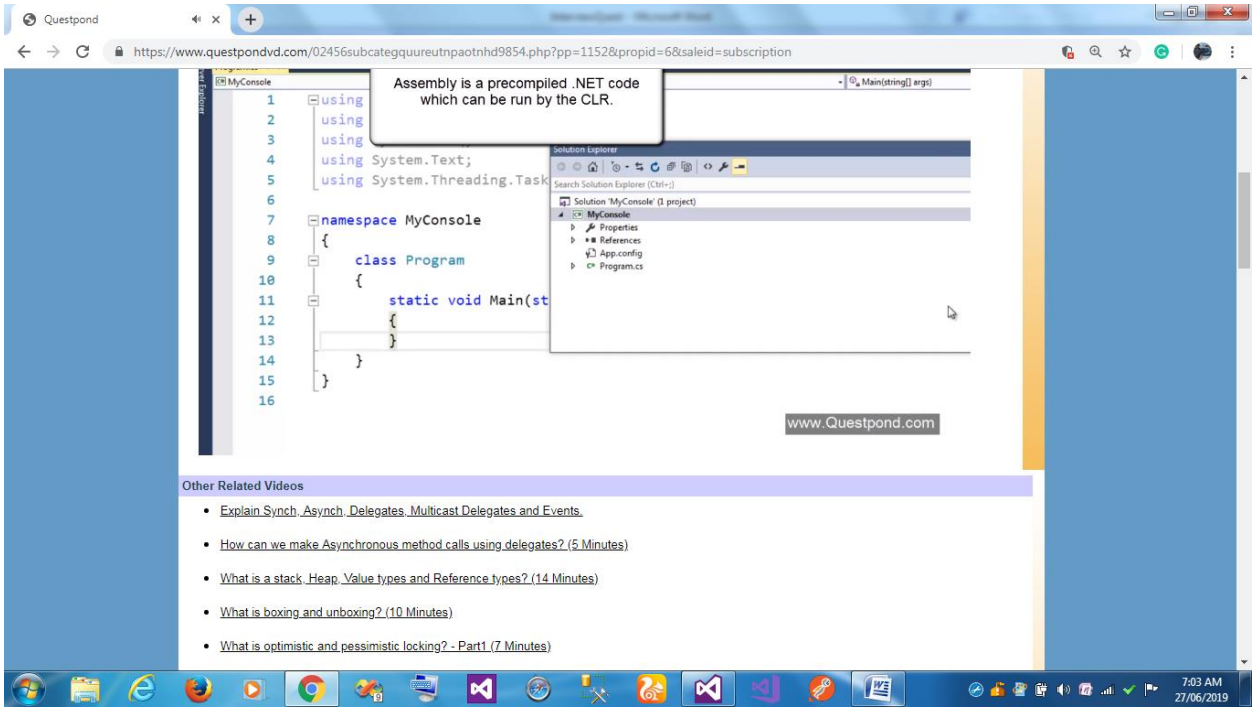


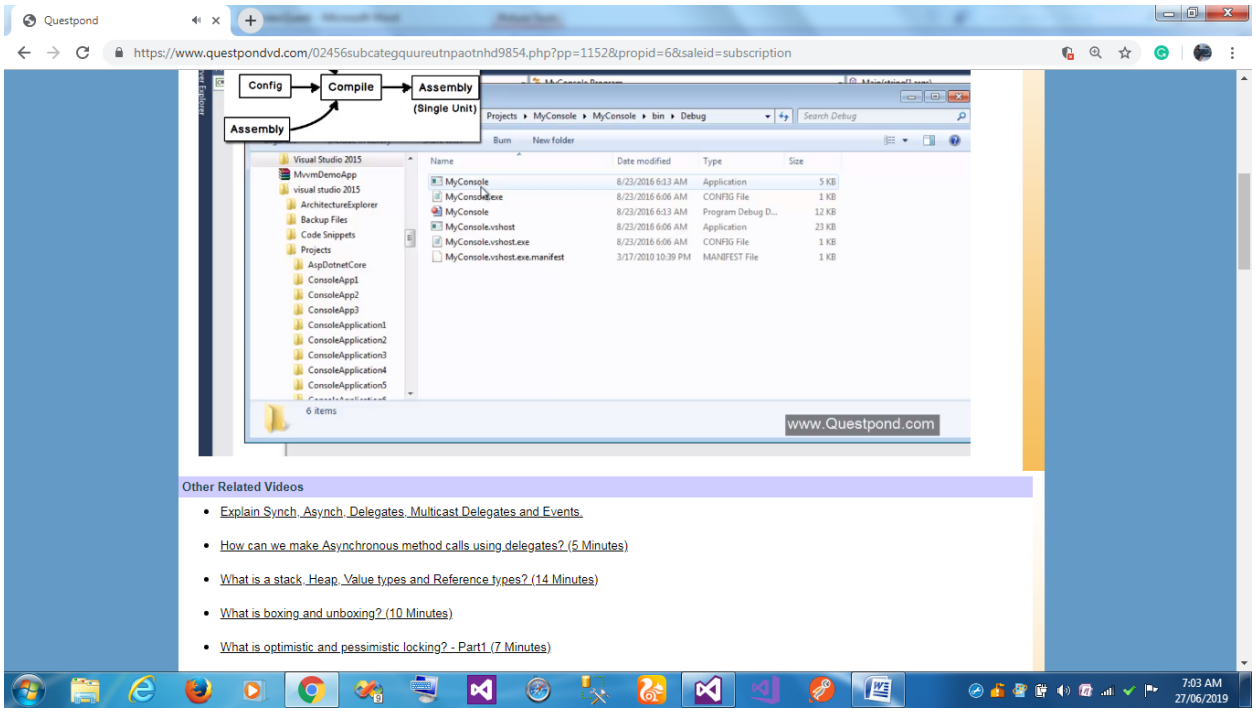

```
ivate void button1_Click(object sender, EventArgs e)

  // create new AppDomain

  PermissionSet permset = new PermissionSet(PermissionState.None);
  permset.AddPermission(new SecurityPermission(SecurityPermissionFlag.Execution));
  permset.AddPermission(new UIPermission(UIPermissionWindow.AllWindows));
  //permset.AddPermission(new FileDialogPermission(FileDialogPermissionAccess.Open));

  AppDomainSetup objSetup = new AppDomainSetup();
  objSetup.ApplicationBase = AppDomain.CurrentDomain.SetupInformation.ApplicationBase;
  AppDomain domain = AppDomain.CreateDomain("New domain name", AppDomain.CurrentDomain.Evidence, objSetup, permset);
  Interface1 i1 = (ClassLibrary1.Class1)domain.CreateInstanceAndUnwrap("ClassLibrary1", "ClassLibrary1.Class1");
  i1.ShowDialog();

ivate void button2_Click(object sender, EventArgs e)
```

Sandboxing is nothing but create app domain and give limited security to dll or exe.

Explain assembly and dll?





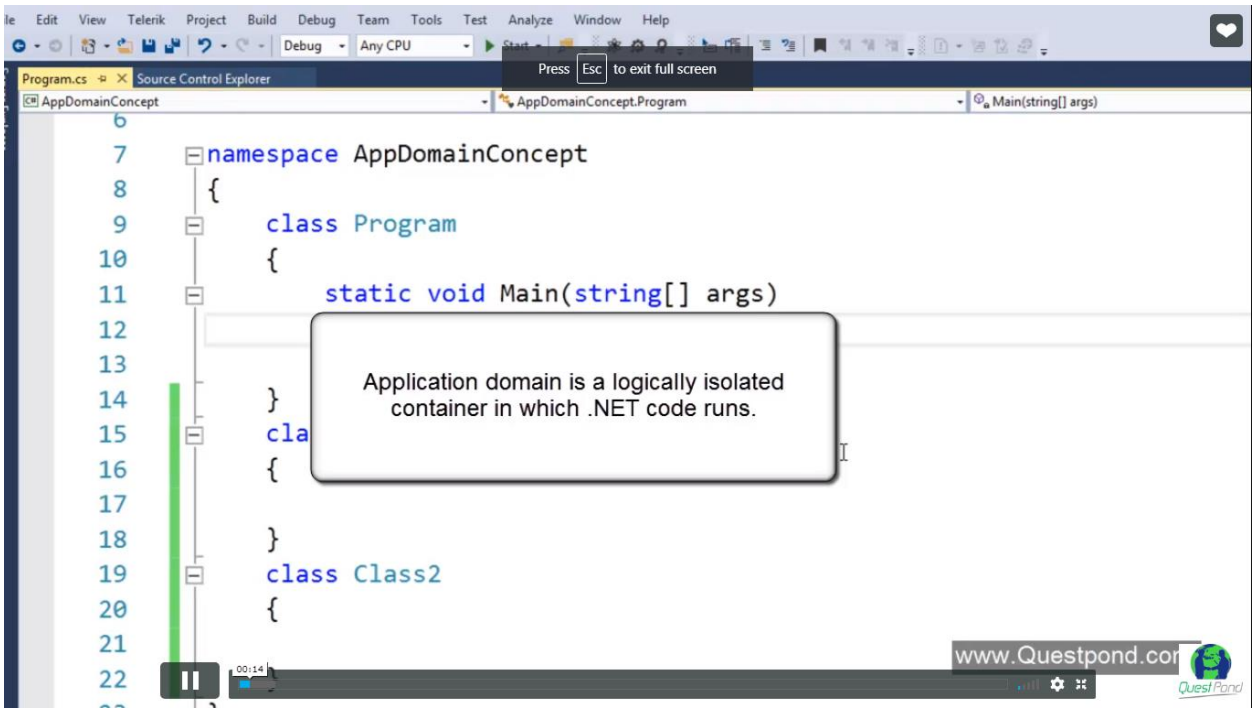


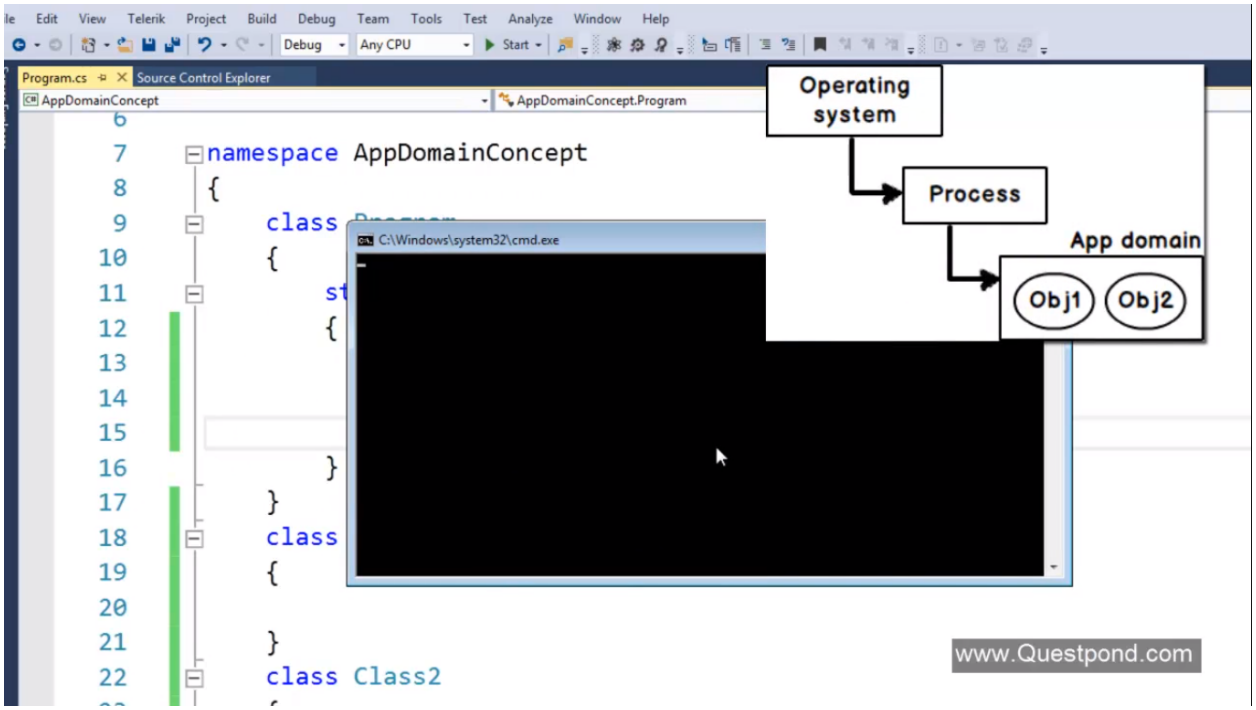
Exe nothing but single unit deployment or pre compiled chunk of code which can be executed on CLR

Exe runs it own memory address/ space and dll needs run its need some host/consumer to invoke.

Dll is used for reusability

Explain App Domain.





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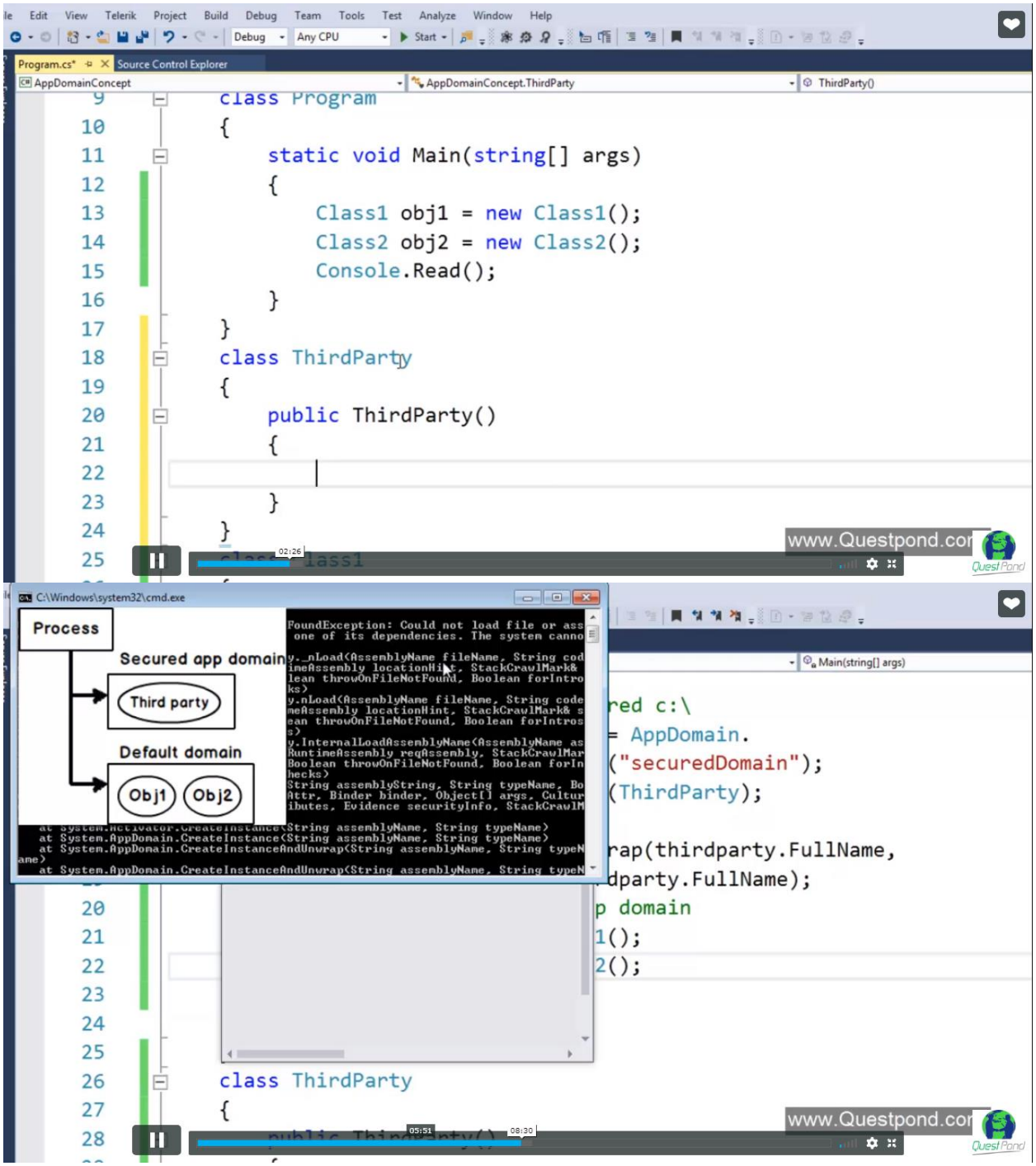
Edit View Telerik Project Build Debug Team Tools Test Analyze Window Help
Debug Any CPU Start
Program.cs* Source Control Explorer
AppDomainConcept
AppDomainConcept.ThirdParty
ThirdParty()
class Program
{
static void Main(string[] args)
{
Class1 obj1 = new Class1();
Class2 obj2 = new Class2();
Console.Read();
}
}
class ThirdParty
{
public ThirdParty()
{
}
}
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Questpond
C:\Windows\system32\cmd.exe
Process
Secured app domain
Third party
Default domain
Obj1
Obj2
FoundException: Could not load file or assembly
one of its dependencies. The system cannot
at System.AppDomain.CreateInstance(String assemblyName, String typeName)
at System.AppDomain.CreateInstance(String assemblyName, String typeName)
at System.AppDomain.CreateInstanceAndUnwrap(String assemblyName, String typeName)
at System.AppDomain.CreateInstanceAndUnwrap(String assemblyName, String typeN
Main(string[] args)
red c:\
= AppDomain.
("securedDomain");
(ThirdParty);
rap(thirdparty.FullName,
dparty.FullName);
p domain
1();
2();
class ThirdParty
{
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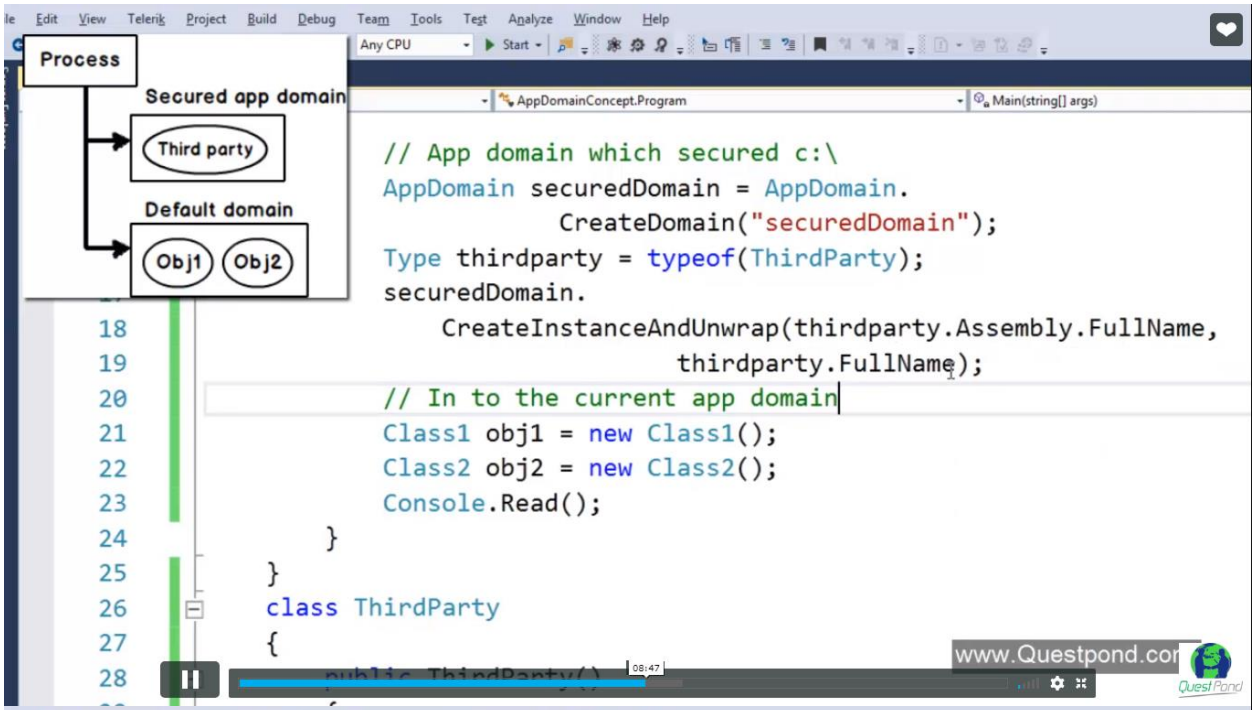
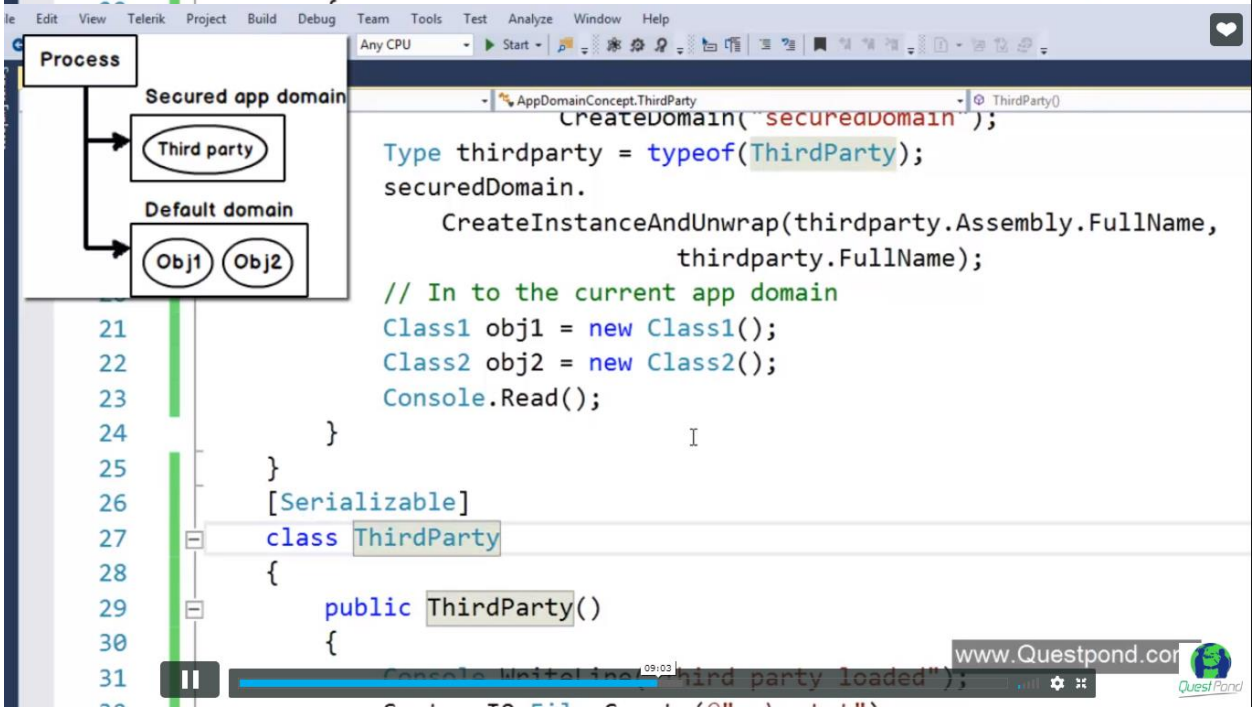
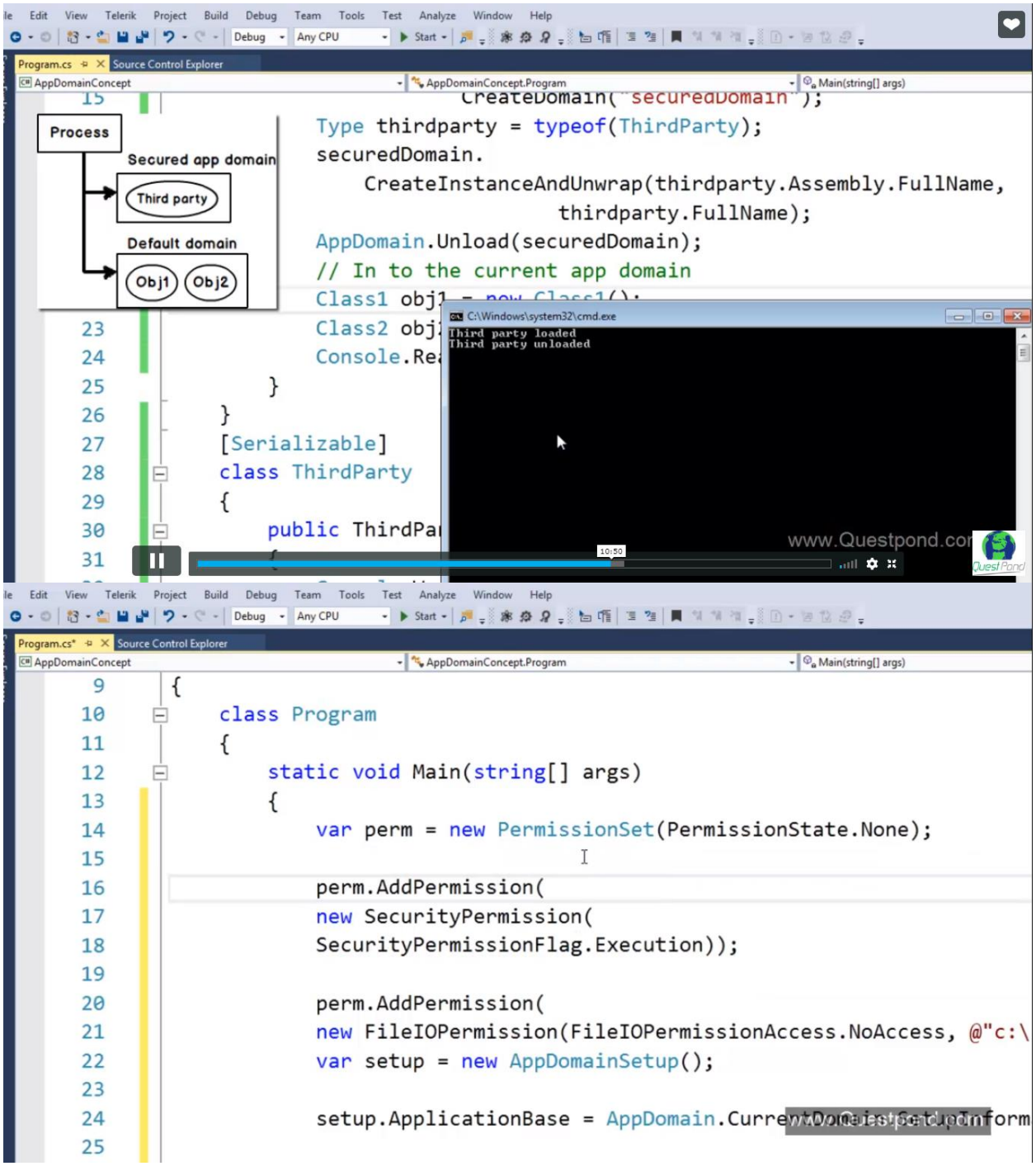
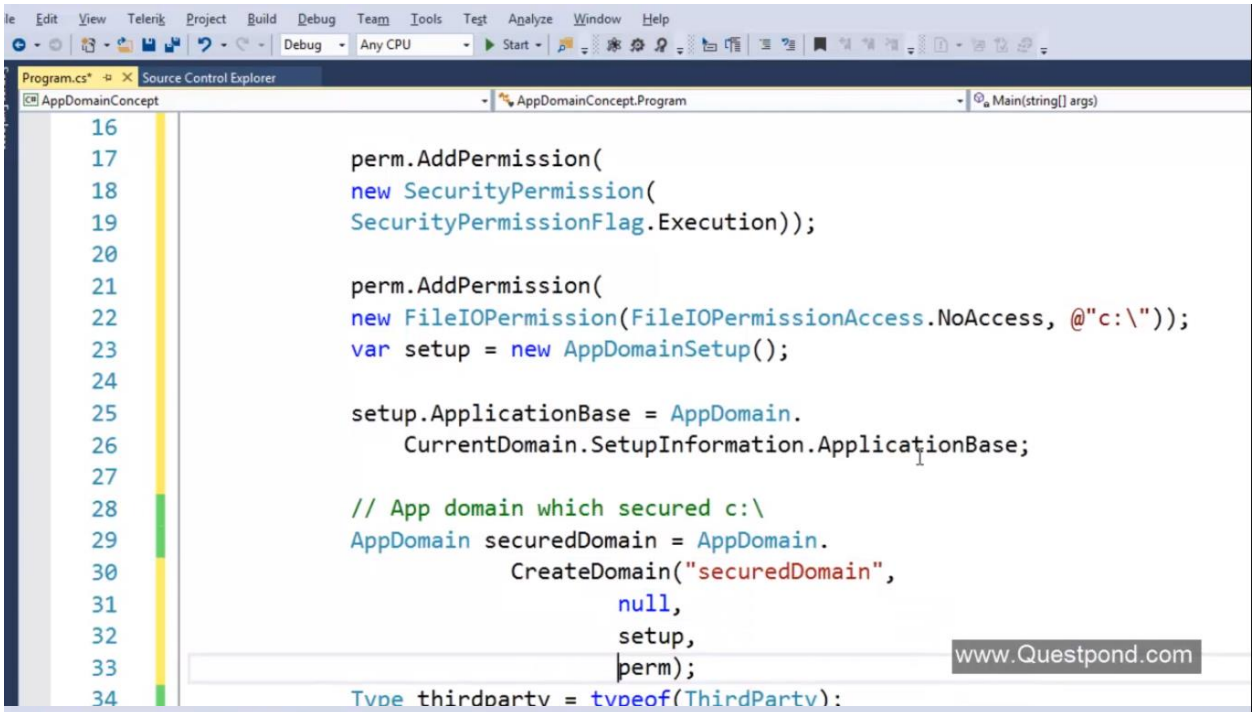
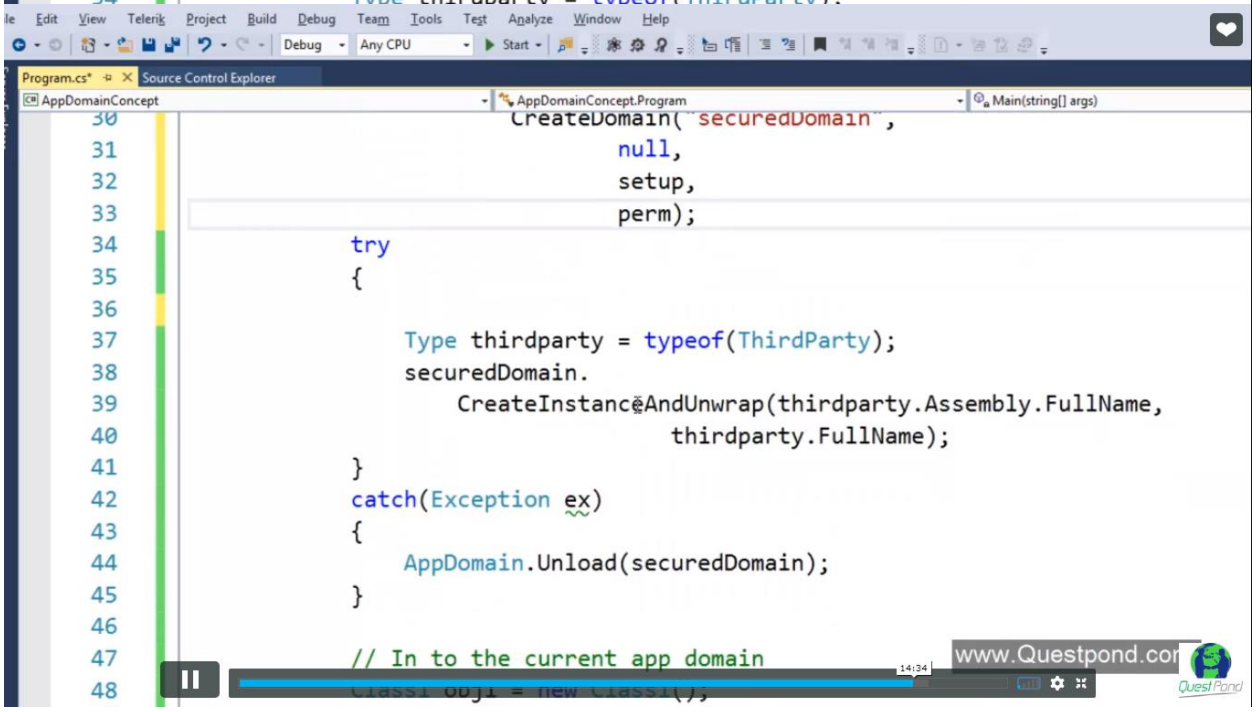

Process
Secured app domain
Third party
Default domain
Obj1
Obj2
Edit View Telerik Project Build Debug Team Tools Test Analyze Window Help
Any CPU
Start
AppDomainConcept.Program
Main(string[] args)
// App domain which secured c:\
AppDomain securedDomain = AppDomain.
CreateDomain("securedDomain");
Type thirdparty = typeof(ThirdParty);
securedDomain.
CreateInstanceAndUnwrap(thirdparty.Assembly.FullName,
thirdparty.FullName);
// In to the current app domain
Class1 obj1 = new Class1();
Class2 obj2 = new Class2();
Console.Read();
}
}
class ThirdParty
{
08:47
www.Questpond.com


Process
Secured app domain
Third party
Default domain
Obj1
Obj2
Edit View Telerik Project Build Debug Team Tools Test Analyze Window Help
Any CPU
Start
AppDomainConcept.ThirdParty
ThirdParty()
Type thirdparty = typeof(ThirdParty);
securedDomain.
CreateInstanceAndUnwrap(thirdparty.Assembly.FullName,
thirdparty.FullName);
// In to the current app domain
Class1 obj1 = new Class1();
Class2 obj2 = new Class2();
Console.Read();
}
}
[Serializable]
class ThirdParty
{
public ThirdParty()
{
09:03
www.Questpond.com

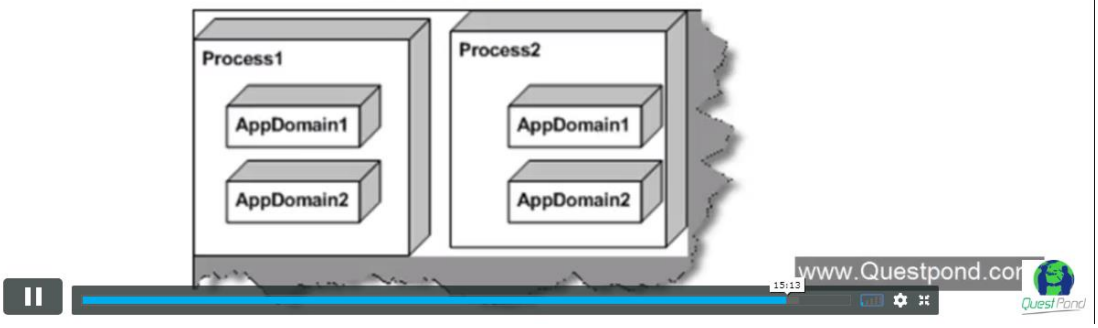

Process
Secured app domain
Third party
Default domain
Obj1
Obj2
Program.cs
Source Control Explorer
AppDomainConcept
AppDomainConcept.Program
Main(string[] args)
Type thirdparty = typeof(ThirdParty);
securedDomain.
CreateInstanceAndUnwrap(thirdparty.Assembly.FullName,
thirdparty.FullName);
AppDomain.Unload(securedDomain);
// In to the current app domain
C:\Windows\system32\cmd.exe
Third party loaded
Third party unloaded
www.Questpond.com
Program.cs*
class Program
static void Main(string[] args)
var perm = new PermissionSet(PermissionState.None);
perm.AddPermission(
new SecurityPermission(
SecurityPermissionFlag.Execution));
perm.AddPermission(
new FileIOPermission(FileIOPermissionAccess.NoAccess, @"c:\
var setup = new AppDomainSetup();
setup.ApplicationBase = AppDomain.


Edit View Telerik Project Build Debug Team Tools Test Analyze Window Help
Debug Any CPU Start
Program.cs* Source Control Explorer
AppDomainConcept AppDomainConcept.Program Main(string[] args)
perm.AddPermission(
new SecurityPermission(
SecurityPermissionFlag.Execution));
perm.AddPermission(
new FileIOPermission(FileIOPermissionAccess.NoAccess, @"c:\"));
var setup = new AppDomainSetup();
setup.ApplicationBase = AppDomain.
CurrentDomain.SetupInformation.ApplicationBase;
// App domain which secured c:\
AppDomain securedDomain = AppDomain.
CreateDomain("securedDomain",
null,
setup,
perm);
www.Questpond.com

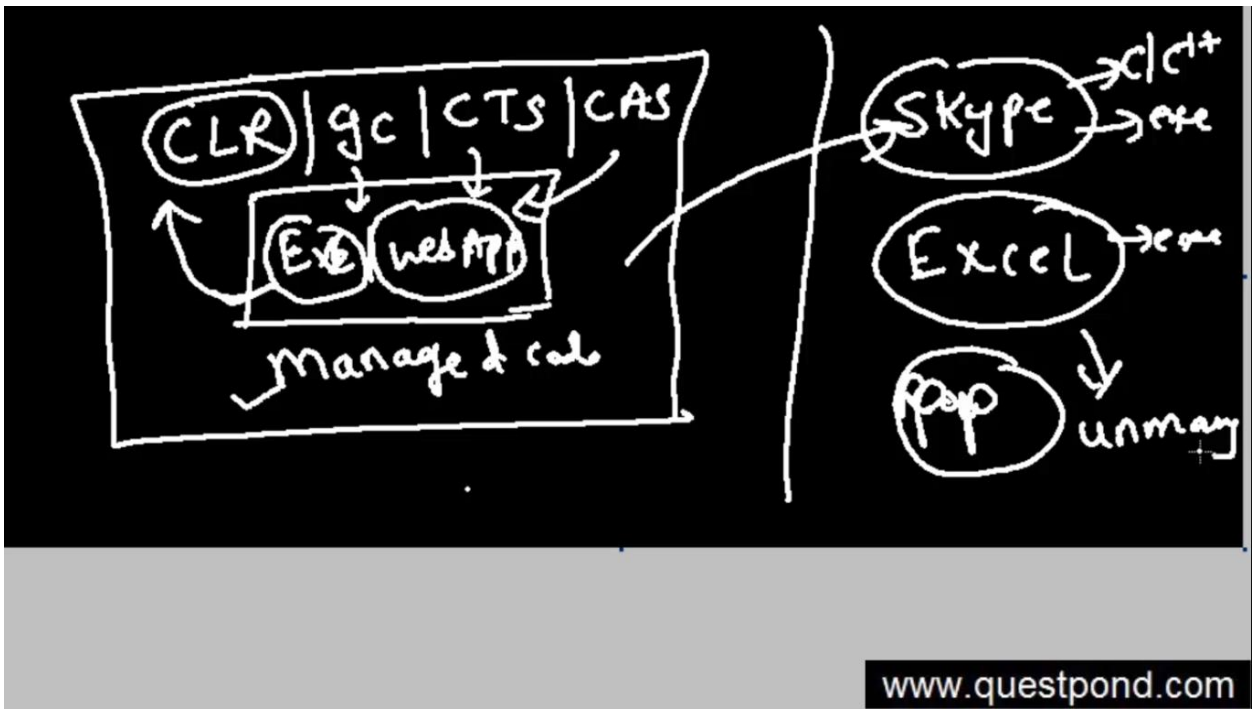

Edit View Telerik Project Build Debug Team Tools Test Analyze Window Help
Debug Any CPU Start
Program.cs* Source Control Explorer
AppDomainConcept AppDomainConcept.Program Main(string[] args)
CreateDomain("securedDomain",
null,
setup,
perm);
try
{
Type thirdparty = typeof(ThirdParty);
securedDomain.
CreateInstanceAndUnwrap(thirdparty.Assembly.FullName,
thirdparty.FullName);
}
catch(Exception ex)
{
AppDomain.Unload(securedDomain);
}
// In to the current app domain
www.Questpond.com
14:34

Application domain is a logical isolated container inside a process. In this logical isolation you can load and run .NET code in an isolated manner. Below are the benefits of application domain:-

- You can load and unload DLL inside these logical containers with out one container affecting the other. So if there are issues in one application domain you can unload that application domain and the other application domain work with out issues.
- If you have a third party DLL and from some reason you do not trust that third party code. You can run that DLL in an isolated app domain with less privelges. For example you can say that the DLL cannot access your "c:\" drive. And other DLLs which you trust you can run with full privilege in a different app domain.
- You can run different versions of DLL in every application domain.



- [What is the difference between managed & unmanaged code? (5 Minutes)]

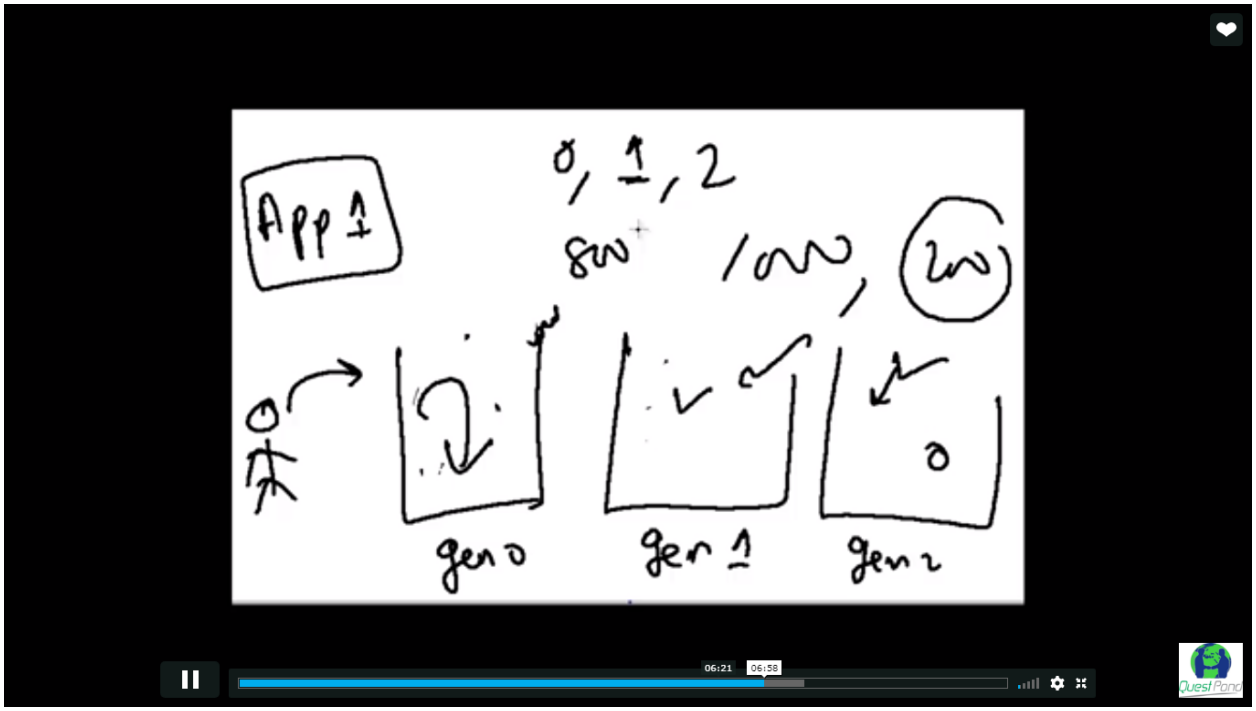


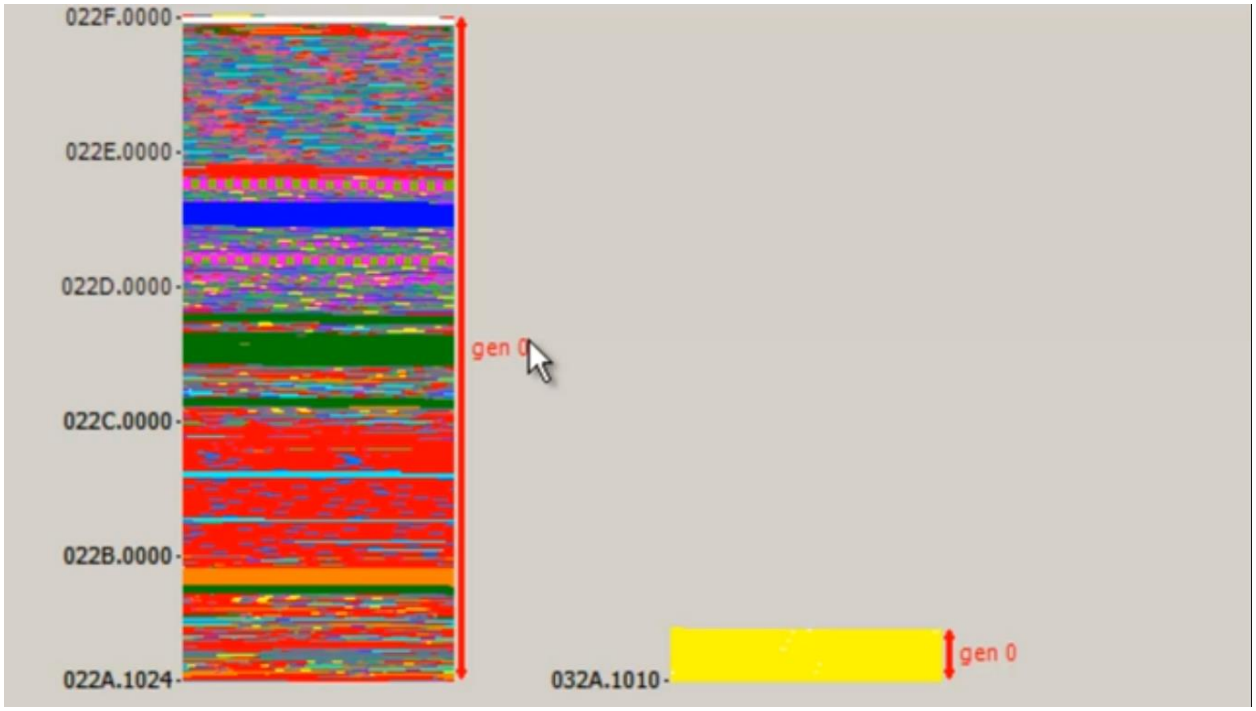
Code run under **CLR** is nothing but managed code

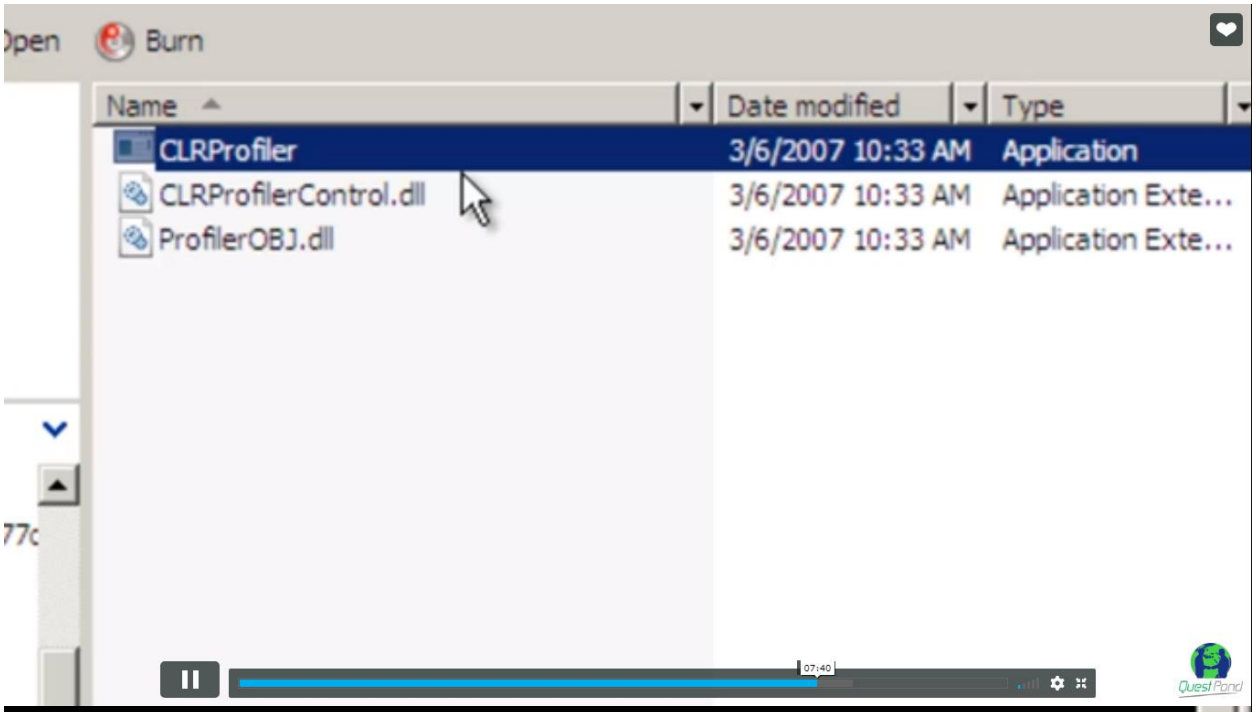
Do not code under CLR called is unmanaged code

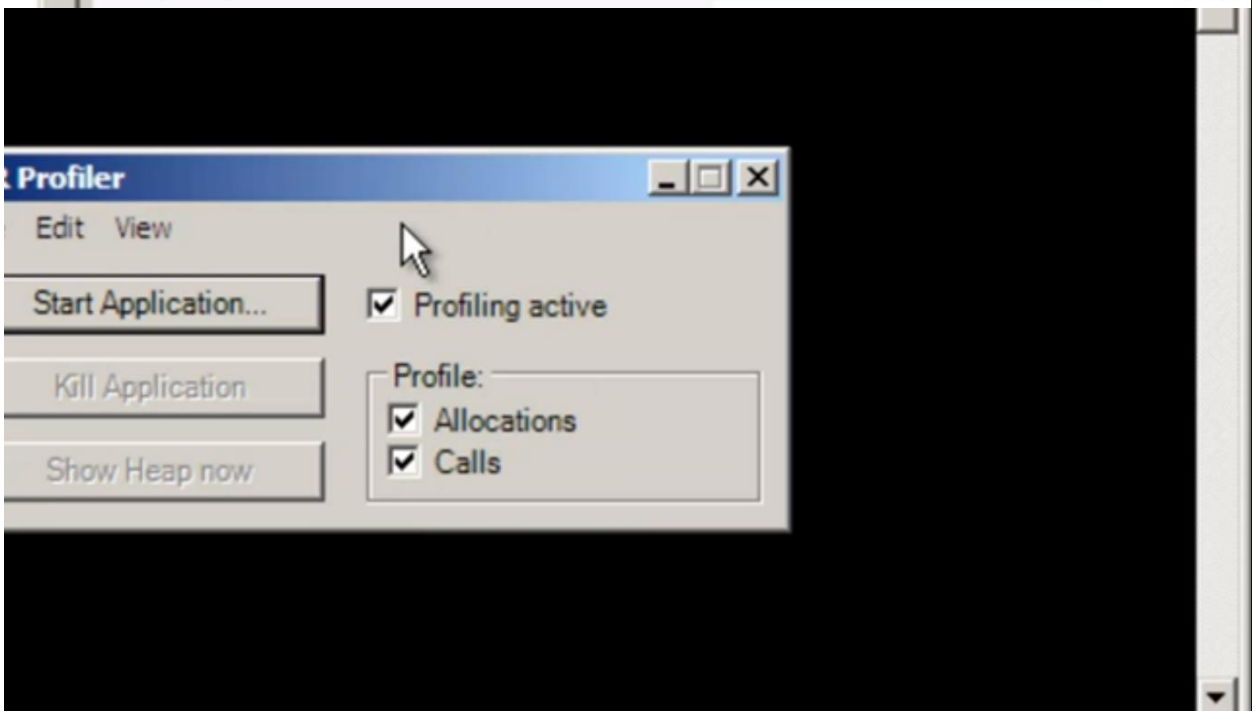
- What is Garbage Collector Gen 0, 1 & 2? (10 Minutes)

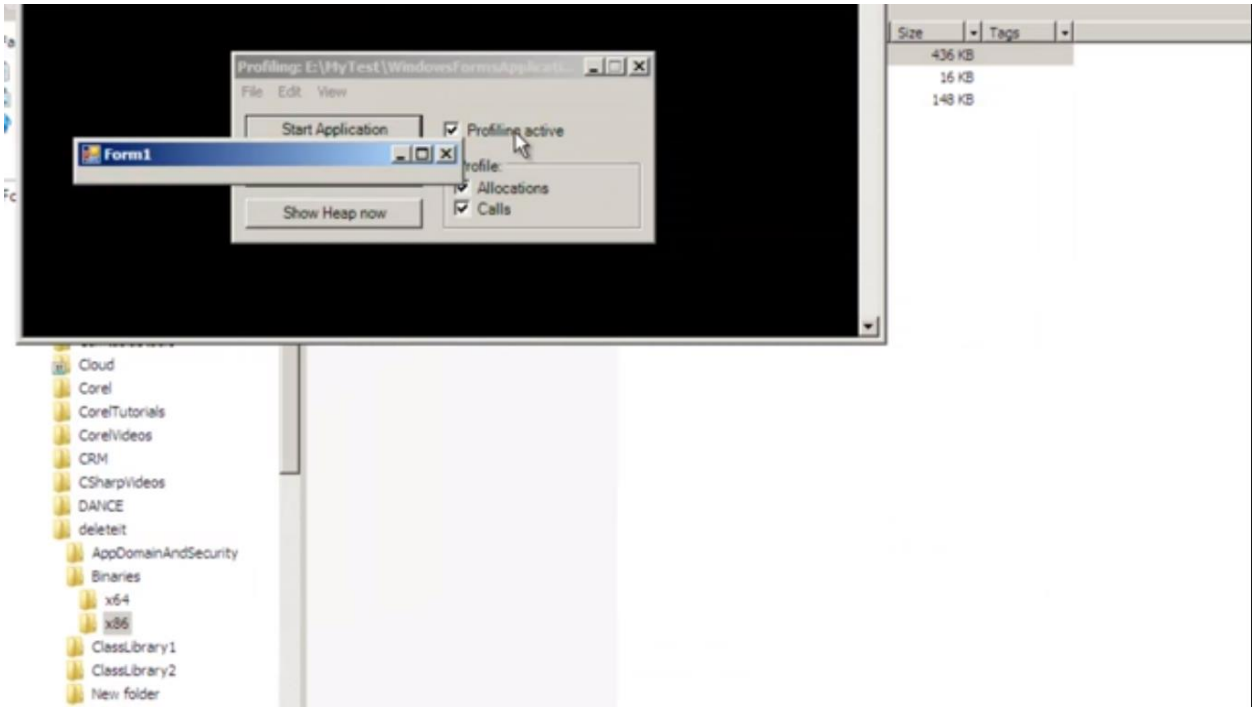
  Garbage collector run as background thread under CLR which clear unused managed objects from memory and reclaim memory and doesn't clean unmanaged objects





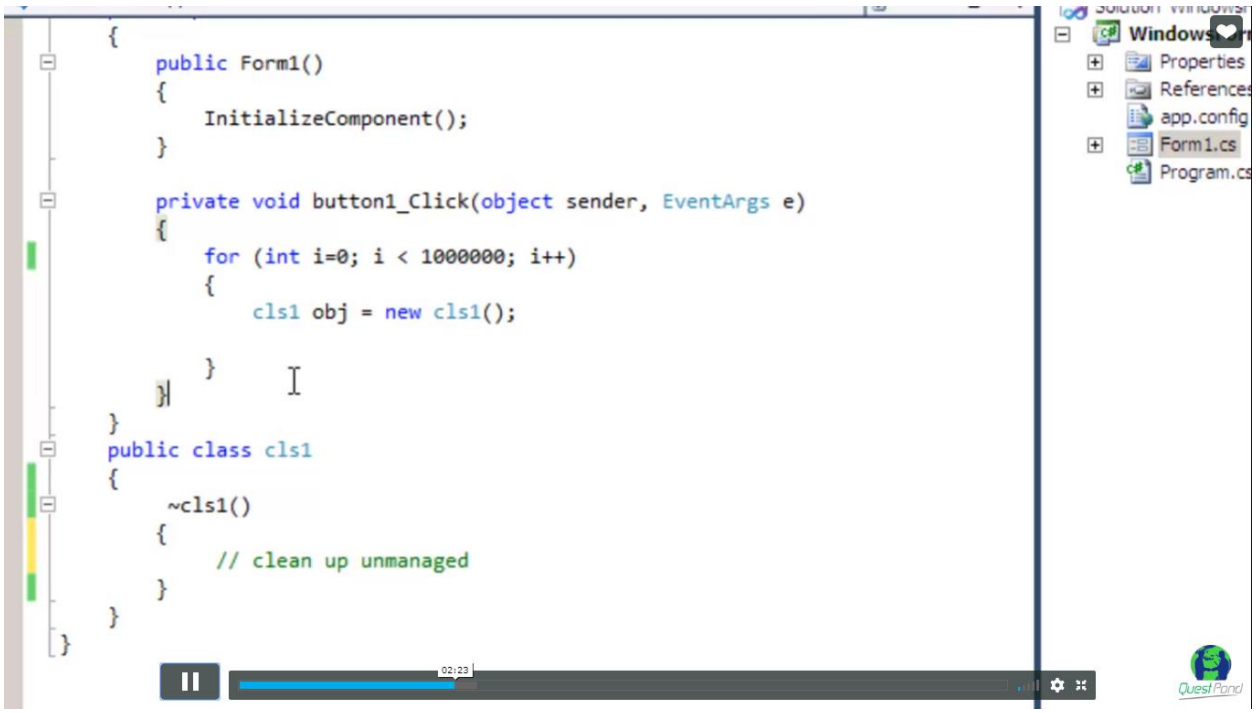

Open
Burn
Name
Date modified
Type
CLRProfiler
3/6/2007 10:33 AM
Application
CLRProfilerControl.dll
3/6/2007 10:33 AM
Application Exte...
ProfilerOBJ.dll
3/6/2007 10:33 AM
Application Exte...
07:40
QuestPond

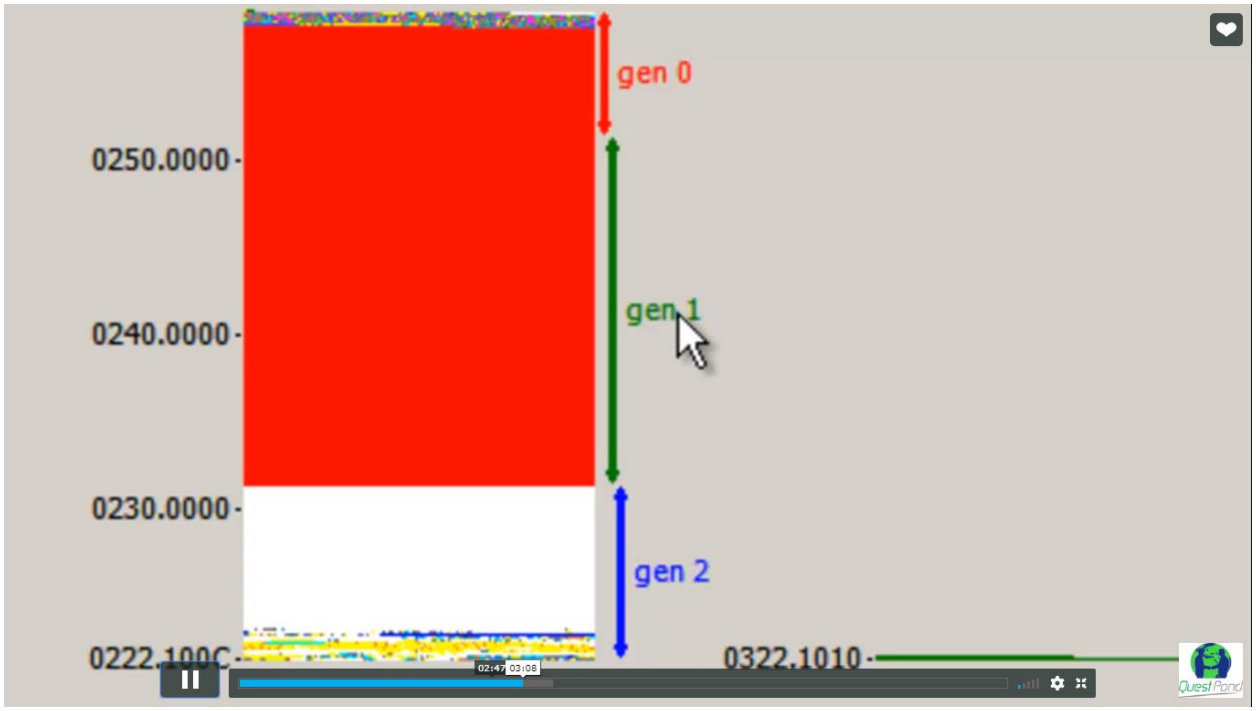

Profiler
Edit
View
Start Application...
Profiling active
Kill Application
Profile:
Allocations
Calls
Show Heap now

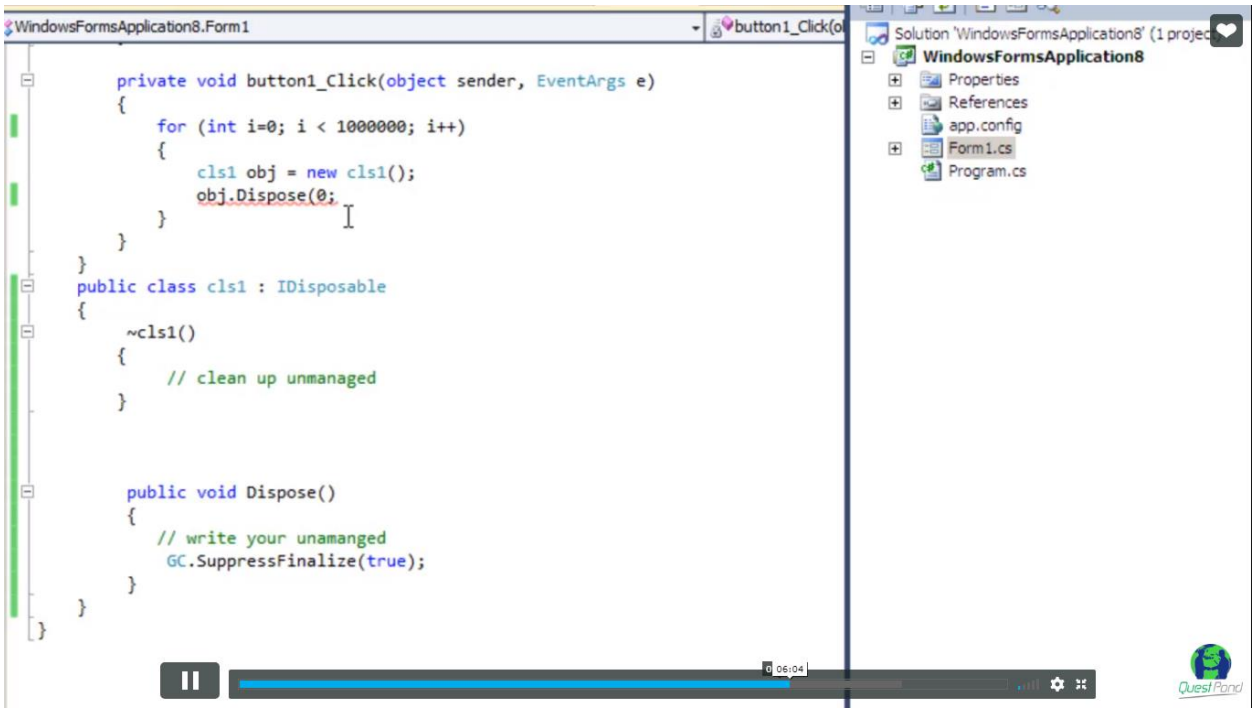


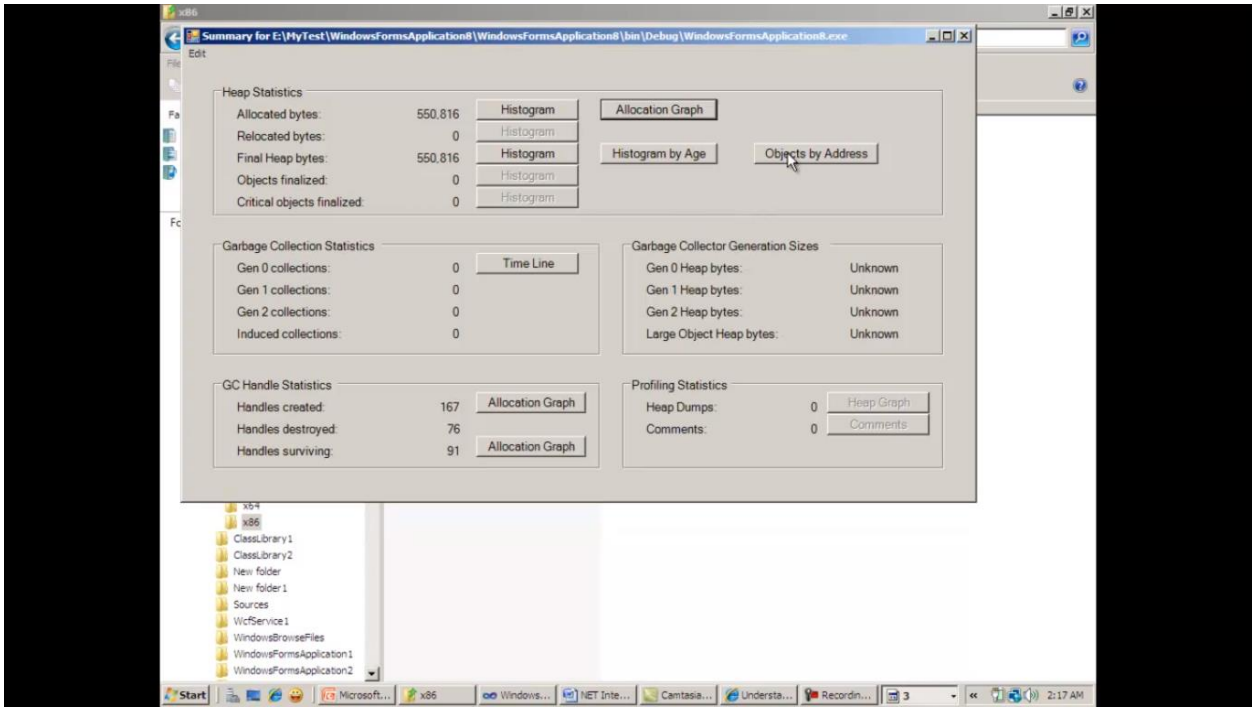
CLR Profiler monitor the garbage collector

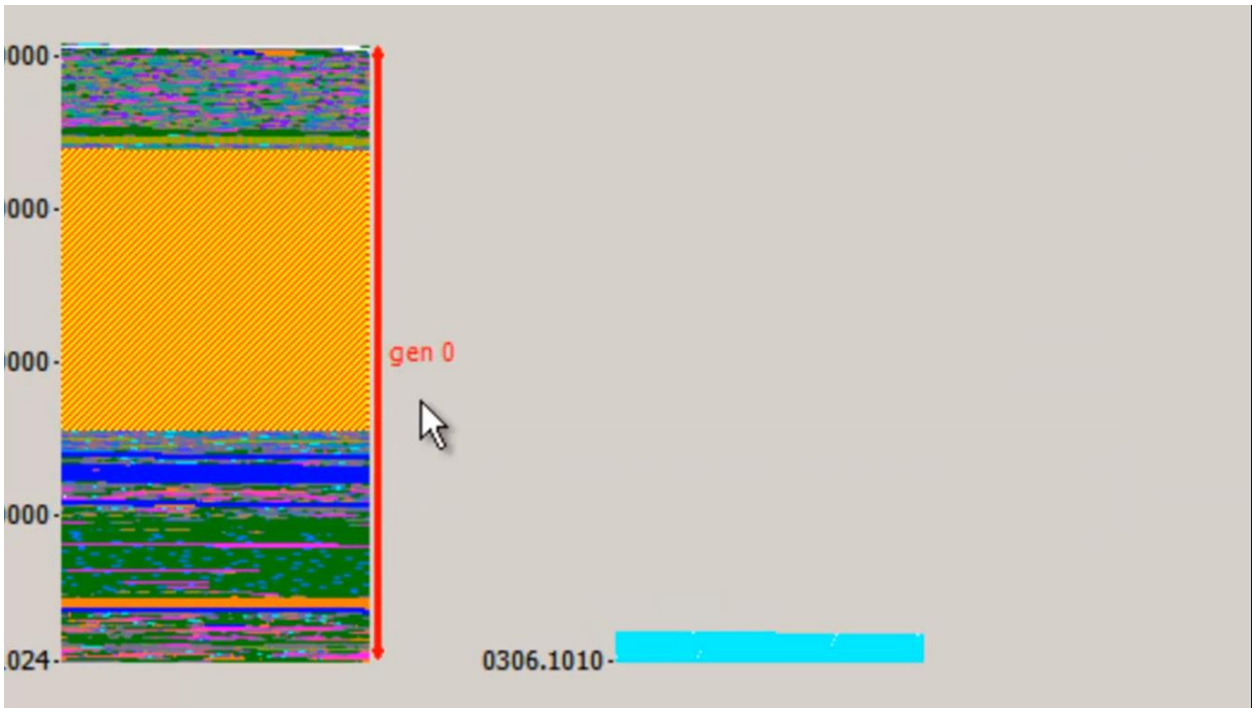
- [What is IDisposable interface & finalize dispose pattern in GC? (9 Minutes)]




gen 0
gen 1
gen 2
0250.0000
0240.0000
0230.0000
0222.100C
0322.1010
02:47 03:08
Quest Pond


WindowsFormsApplication8.Form1
button1_Click(o
private void button1_Click(object sender, EventArgs e)
{
for (int i=0; i < 1000000; i++)
{
cls1 obj = new cls1();
obj.Dispose(0;
}
}
}
public class cls1 : IDisposable
{
~cls1()
{
// clean up unmanaged
}
public void Dispose()
{
// write your unamanged
GC.SuppressFinalize(true);
}
}
}
Solution 'WindowsFormsApplication8' (1 projec
WindowsFormsApplication8
Properties
References
app.config
Form1.cs
Program.cs
0 06:04
Quest Pond

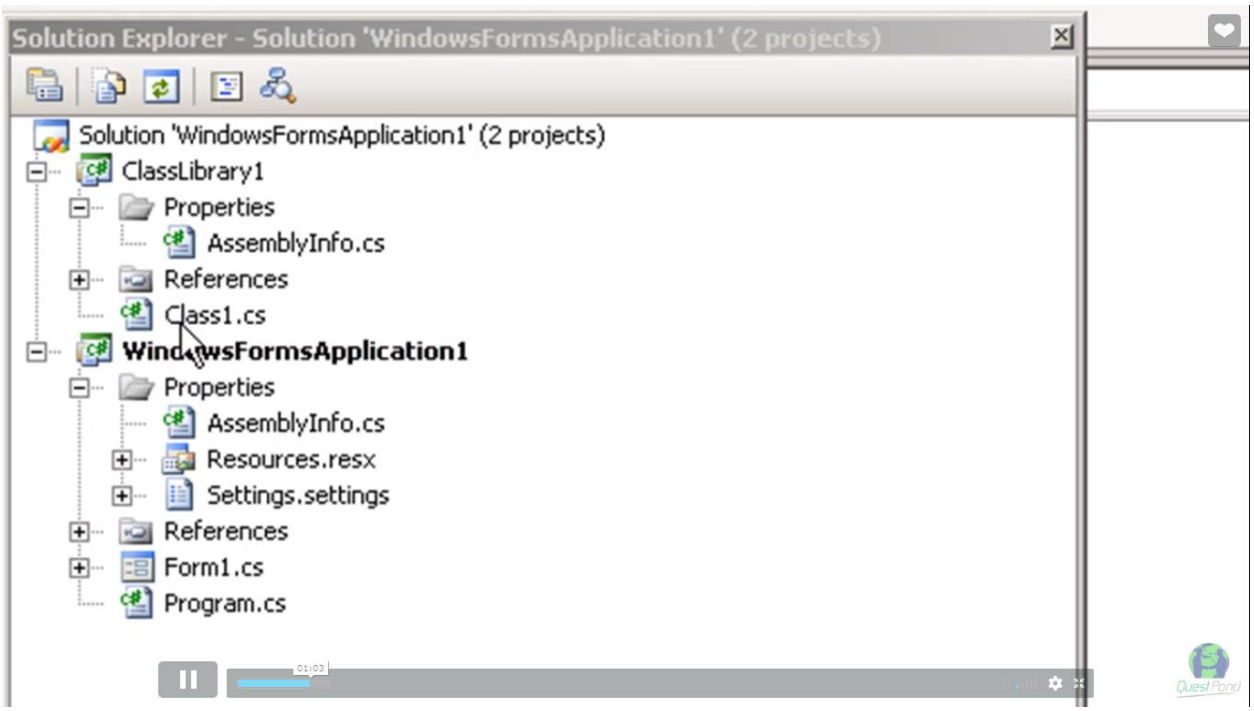




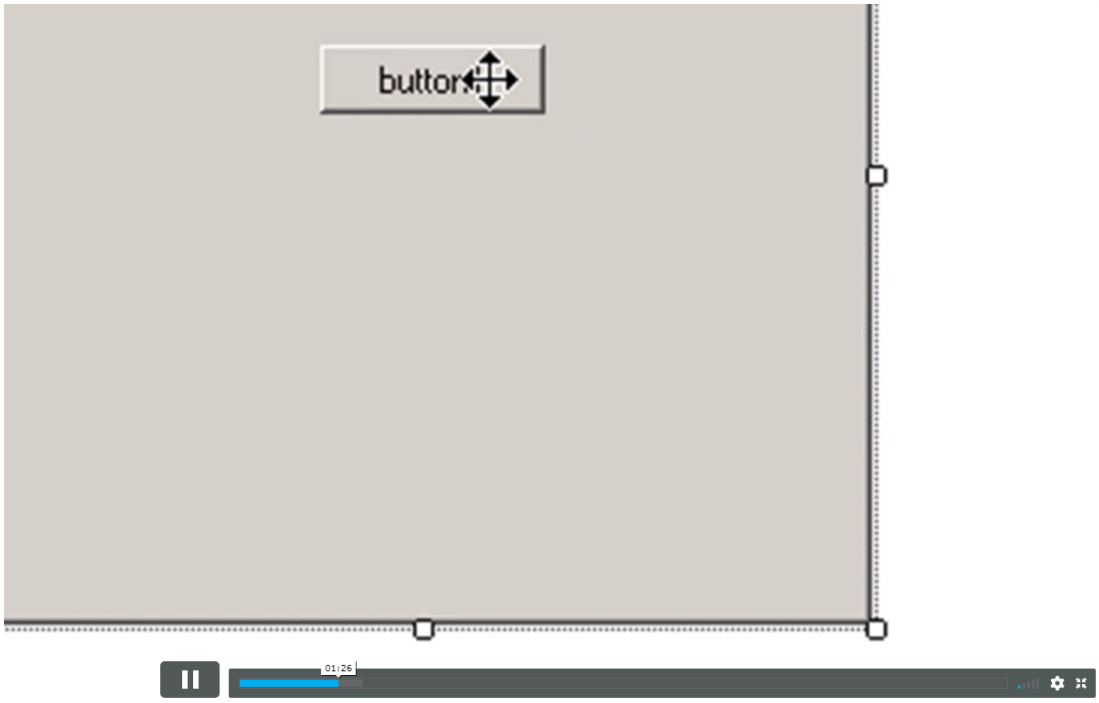
difference between dispose and finalize in c#

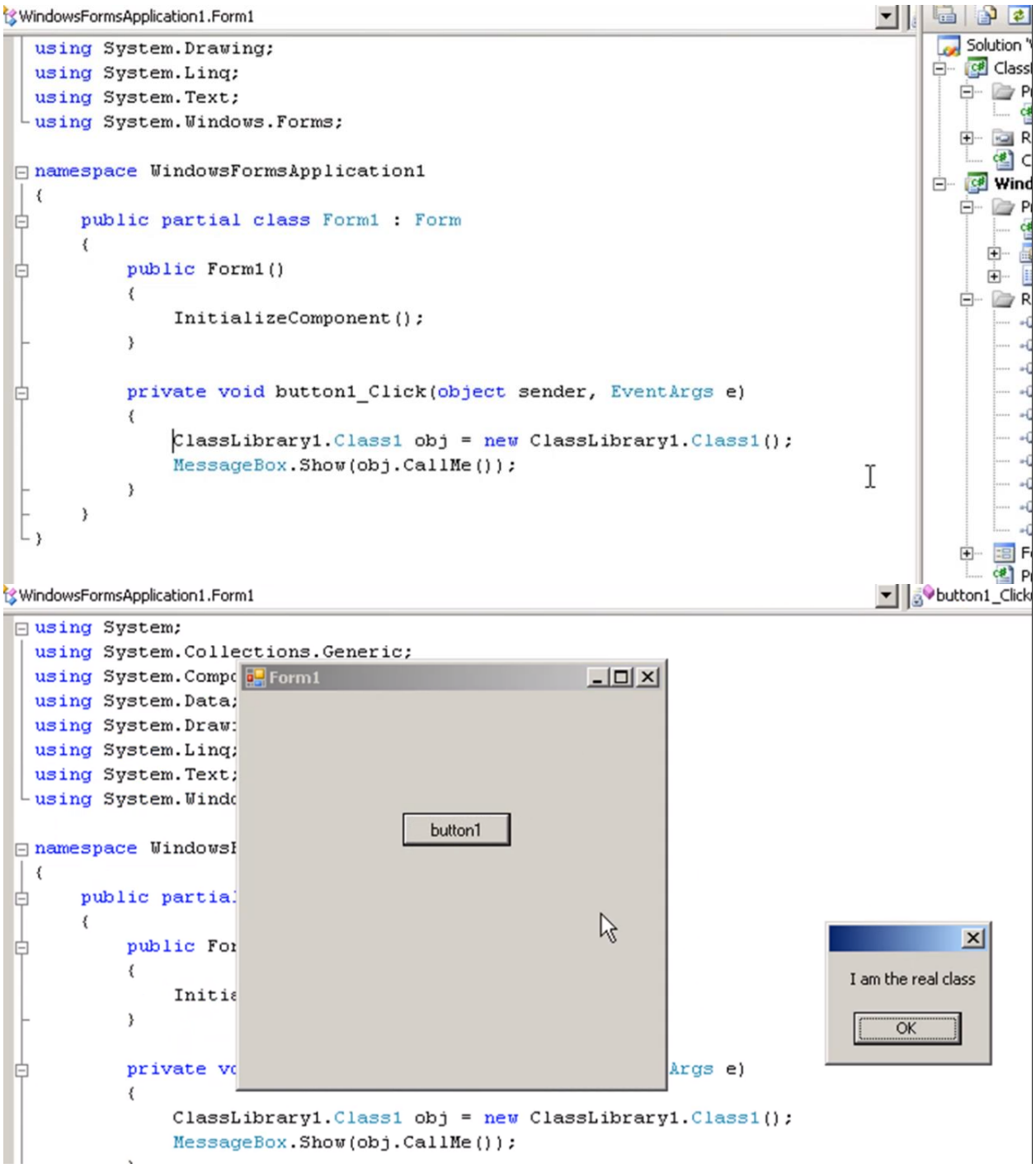
Dispose	Finalize
It is used to free unmanaged resources like files, database connections etc. at any time.	It can be used to free unmanaged resources (when you implement it) like files, database connections etc. held by an object before that object is destroyed.
Explicitly, it is called by user code and the class which is implementing dispose method, must has to implement IDisposable interface.	Internally, it is called by Garbage Collector and cannot be called by user code.
It belongs to IDisposable interface.	It belongs to Object class.
It's implemented by implementing IDisposable interface Dispose() method.	It's implemented with the help of destructor in C++ & C#.
There is no performance costs associated with Dispose method.	There is performance costs associated with Finalize method since it doesn't clean the memory immediately and called by GC automatically.

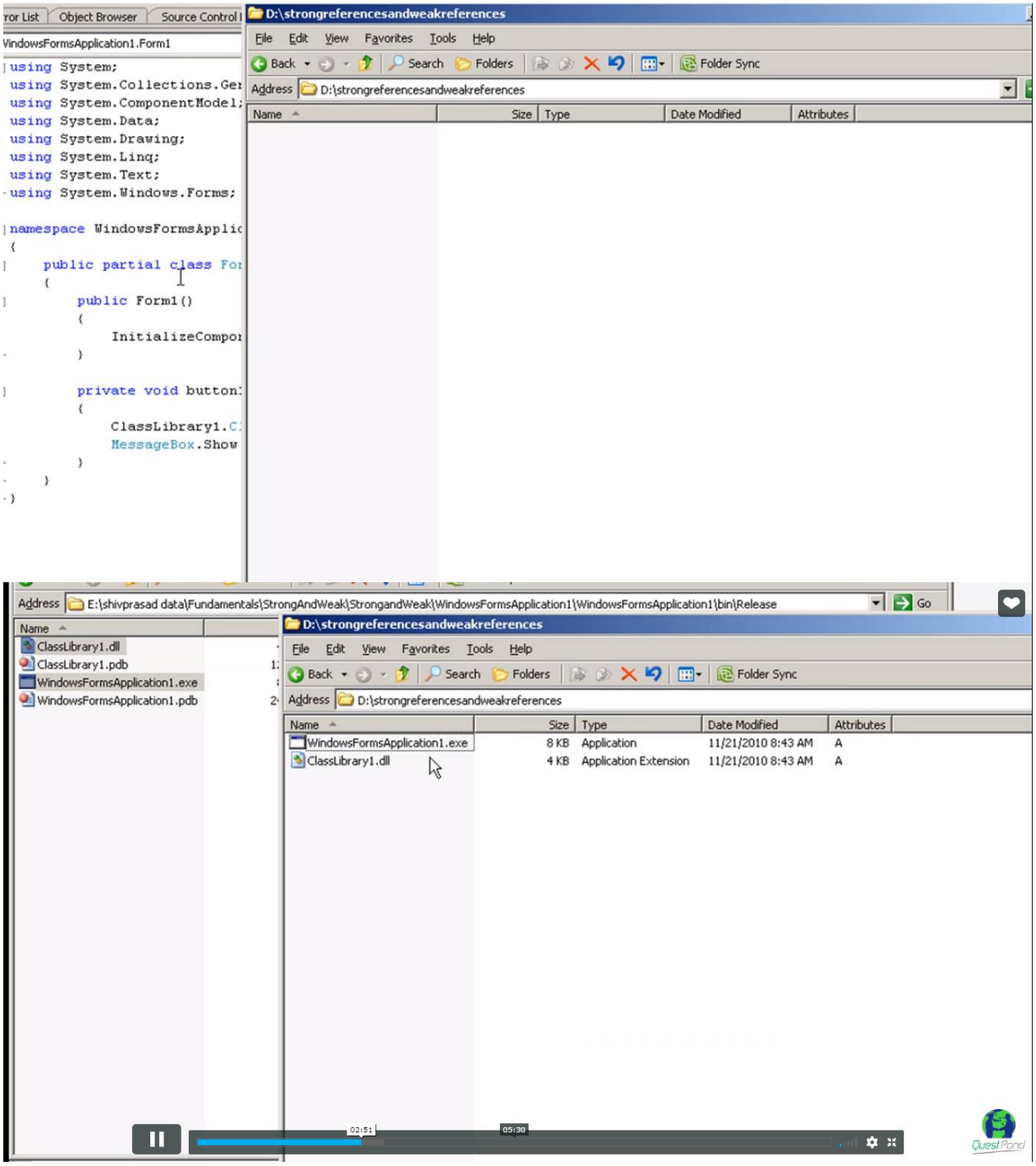
What is the difference between strong and weak references?



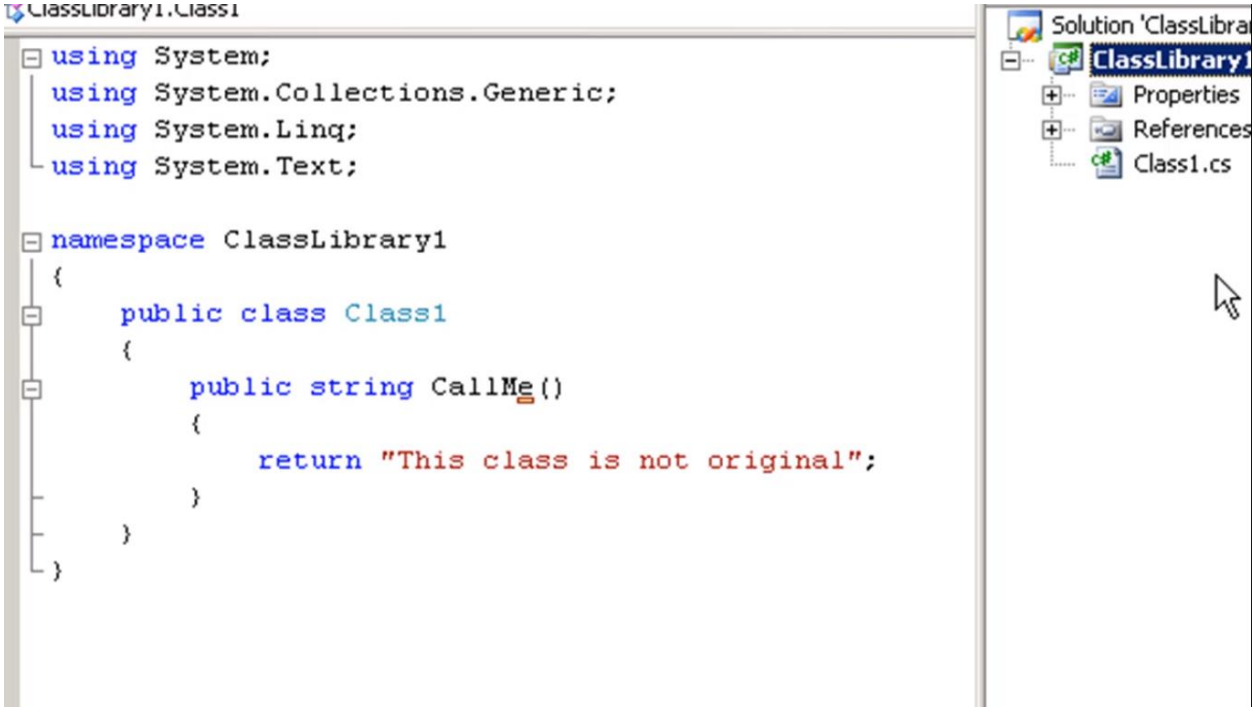
```
namespace ClassLibrary1
{
    public class Class1
    {
        public string CallMe()
        {
            return "I am the real class";
        }
    }
}
```

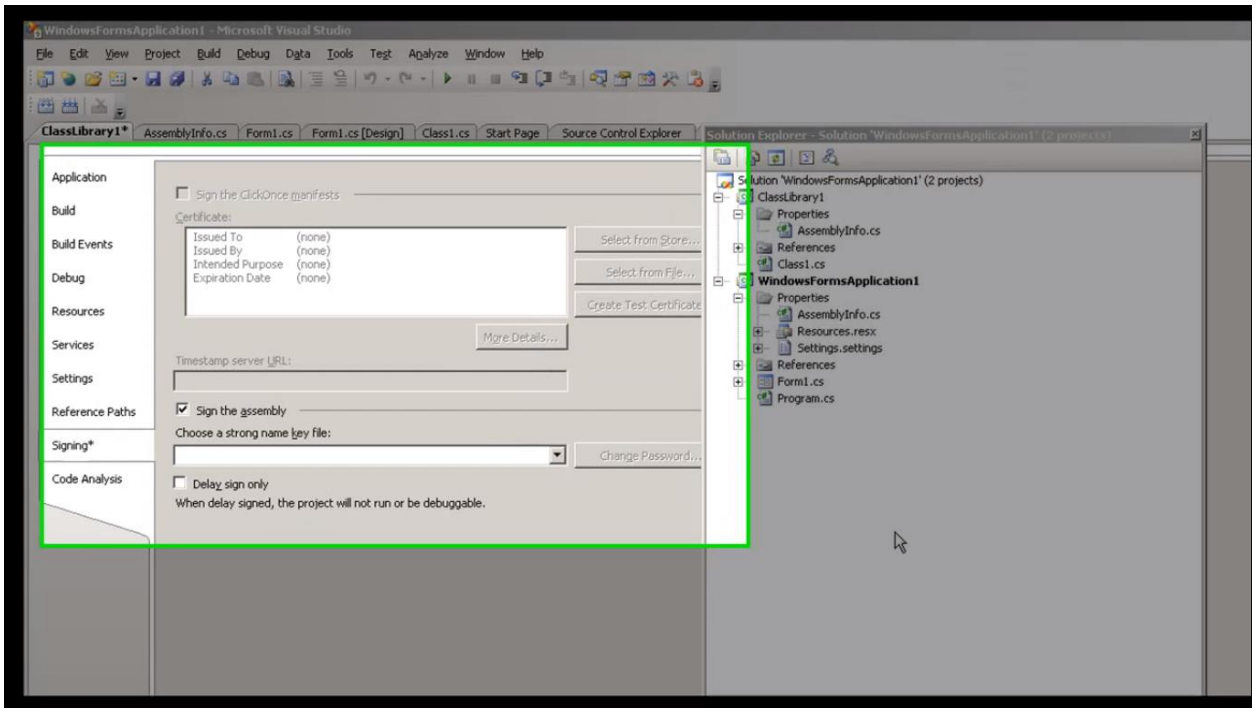


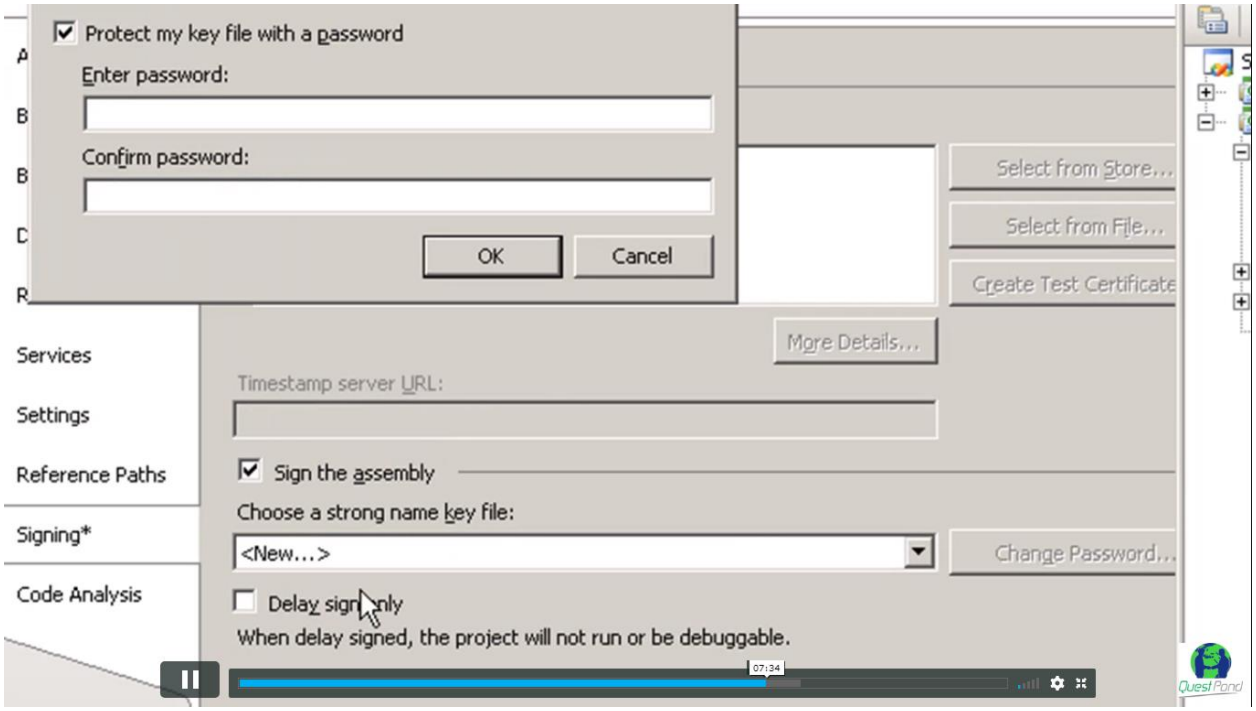

WindowsFormsApplication1.Form1
using System.Drawing;
using System.Linq;
using System.Text;
using System.Windows.Forms;
namespace WindowsFormsApplication1
{
public partial class Form1 : Form
{
public Form1()
{
InitializeComponent();
}
private void button1_Click(object sender, EventArgs e)
{
ClassLibrary1.Class1 obj = new ClassLibrary1.Class1();
MessageBox.Show(obj.CallMe());
}
}
}
Solution
WindowsFormsApplication1.Form1
button1_Click
using System;
using System.Collections.Generic;
using System.Data;
using System.Linq;
using System.Text;
namespace WindowsF
{
public partia
{
public For
{
Initia
}
private vo
Args e)
{
ClassLibrary1.Class1 obj = new ClassLibrary1.Class1();
MessageBox.Show(obj.CallMe());
Form1
button1
I am the real class
OK

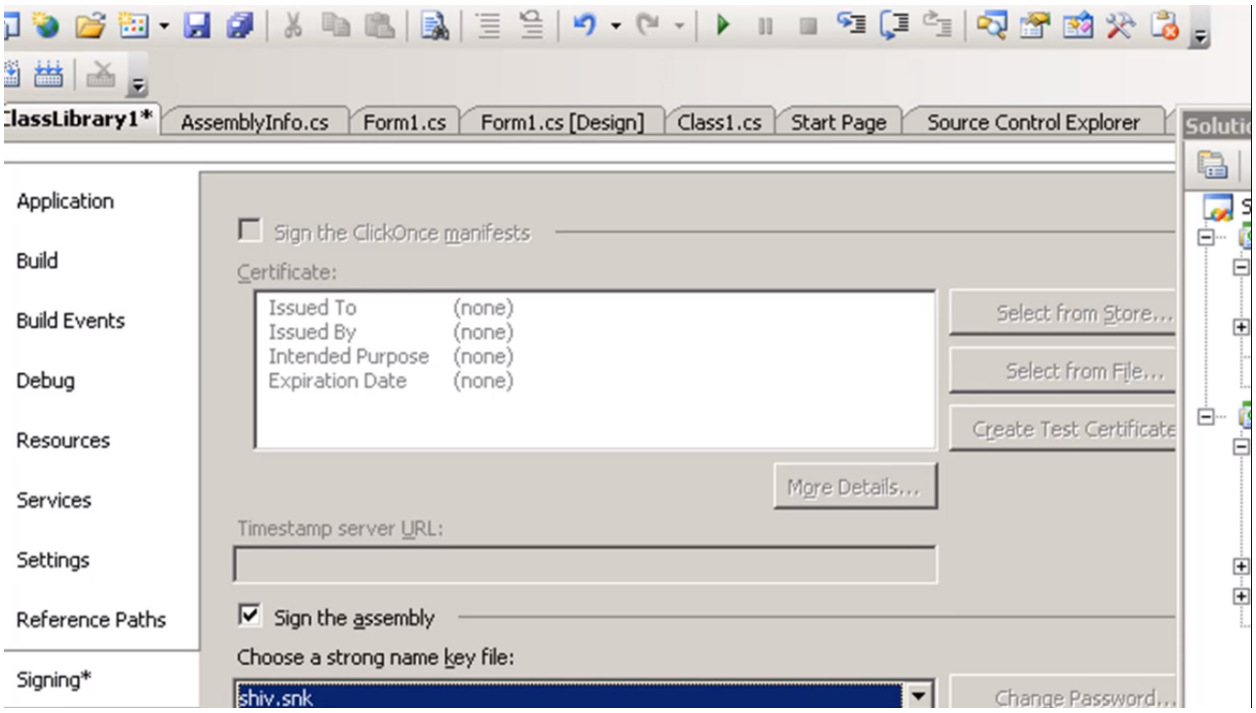


Create fake dll with same class and same function and replace with original dll manipulate production environment , using ILdASM tool get original dll class name and methods


ClassLibrary1.Class1
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
namespace ClassLibrary1
{
public class Class1
{
public string CallMe()
{
return "This class is not original";
}
}
}
Solution 'ClassLibra
ClassLibrary1
Properties
References
Class1.cs


WindowsFormsApplication1 - Microsoft Visual Studio
File Edit View Project Build Debug Data Tools Test Analyze Window Help
ClassLibrary1* AssemblyInfo.cs Form1.cs Form1.cs [Design] Class1.cs Start Page Source Control Explorer
Application
Build
Build Events
Debug
Resources
Services
Settings
Reference Paths
Signing*
Code Analysis
Sign the ClickOnce manifests
Certificate:
Issued To (none)
Issued By (none)
Intended Purpose (none)
Expiration Date (none)
Select from Store...
Select from File...
Create Test Certificate...
More Details...
Timestamp server URL:
Sign the assembly
Choose a strong name key file:
Change Password...
Delay sign only
When delay signed, the project will not run or be debuggable.
Solution Explorer - Solution 'WindowsFormsApplication1' (2 projects)
Solution 'WindowsFormsApplication1' (2 projects)
ClassLibrary1
Properties
AssemblyInfo.cs
References
Class1.cs
WindowsFormsApplication1
Properties
AssemblyInfo.cs
Resources.resx
Settings.settings
References
Form1.cs
Program.cs

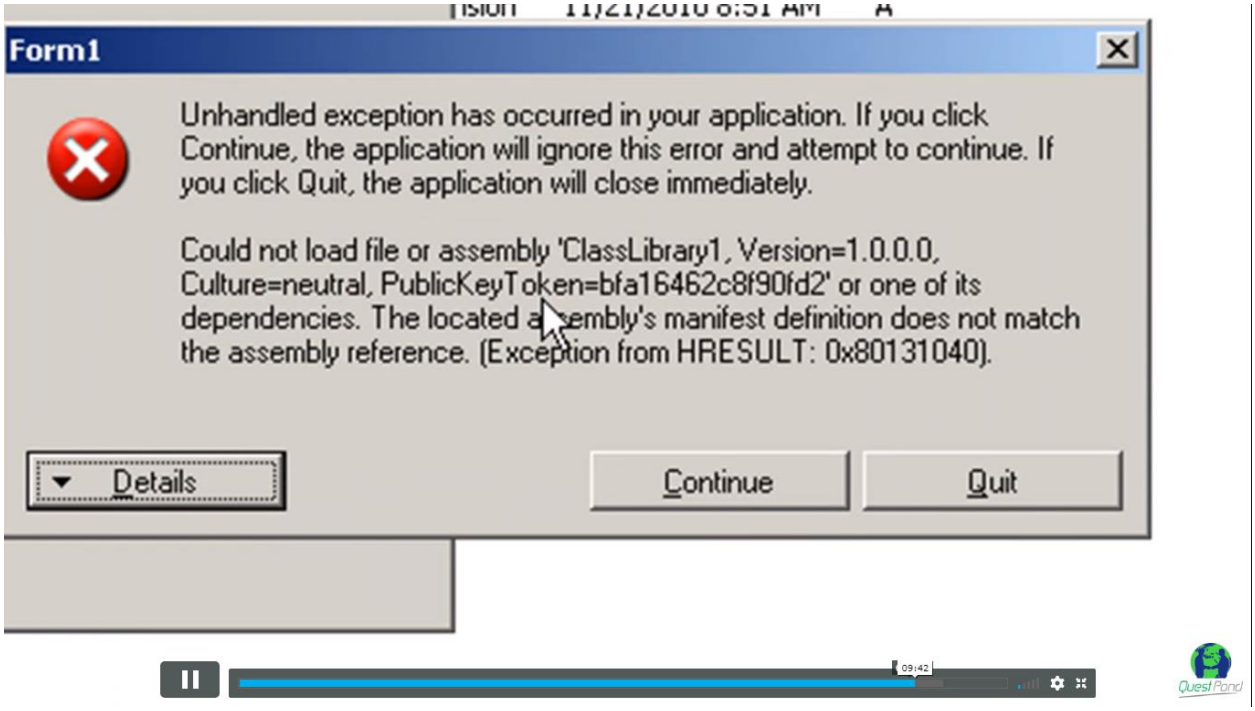




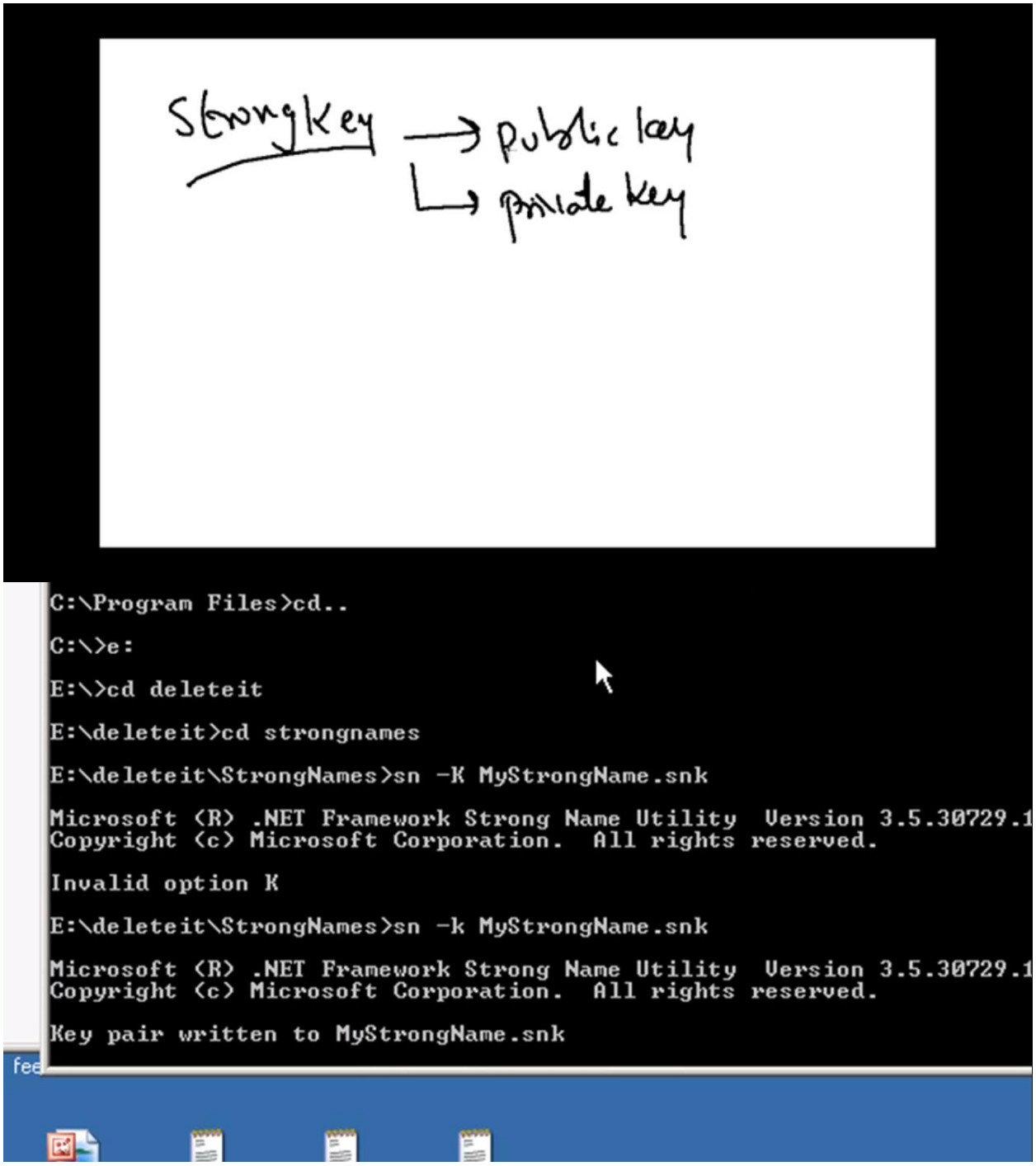
Solution -> properties -> signing* -> add New -> Add StrongName -> click ok->it create snk file

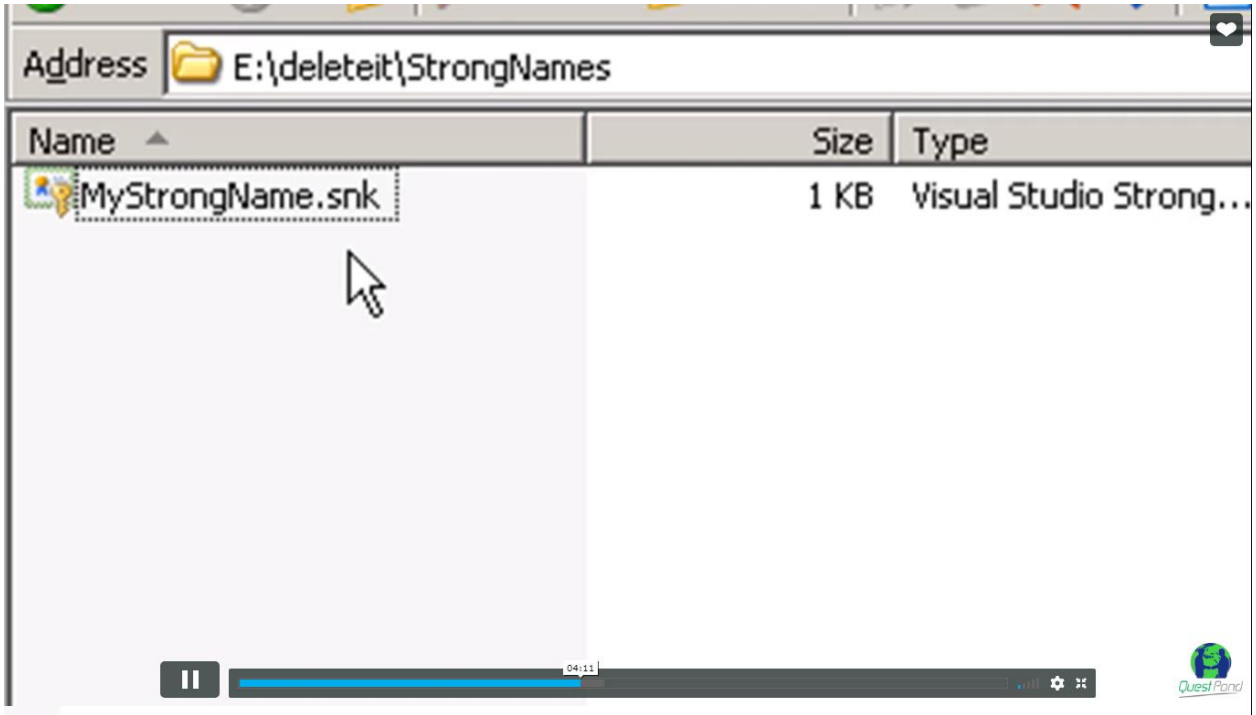
Strong references nothing but client identifies the dll using strong key or unique identifier

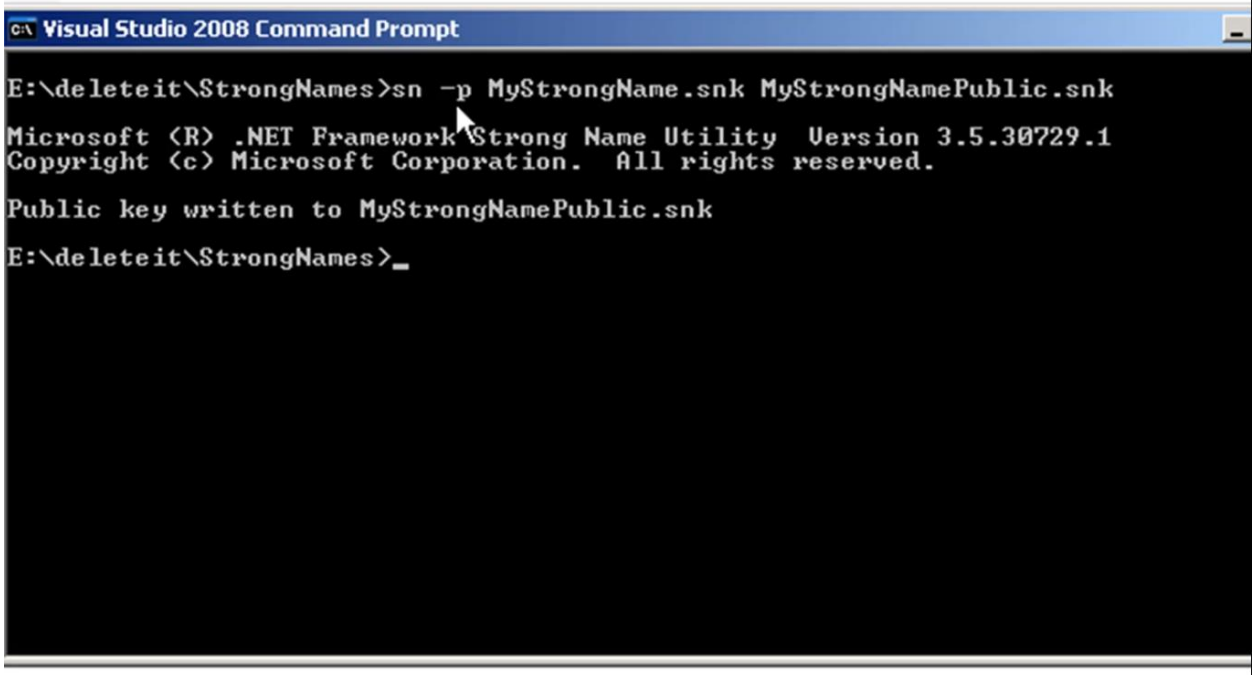
Weak references nothing but client identifies the dll using class and method names

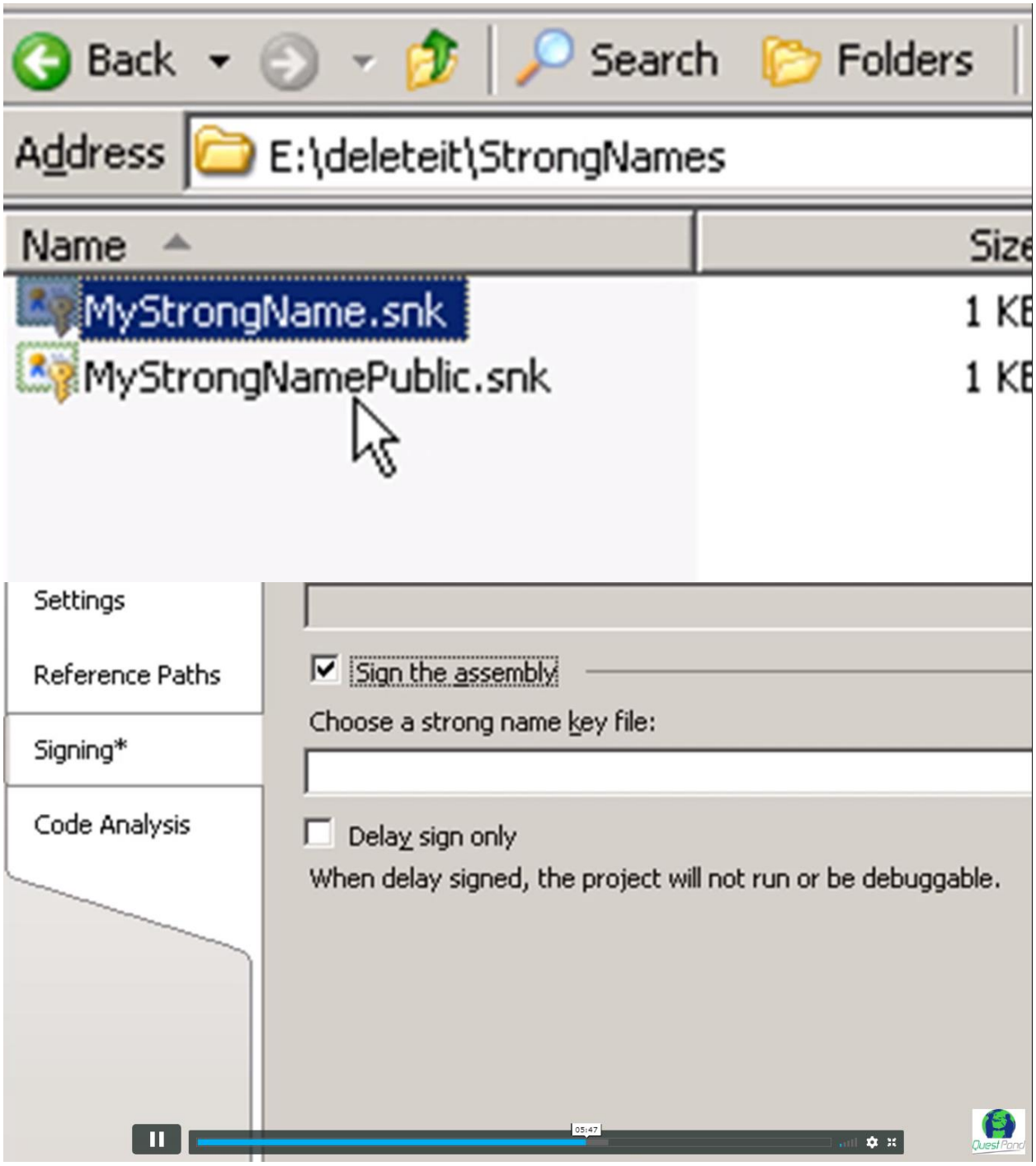


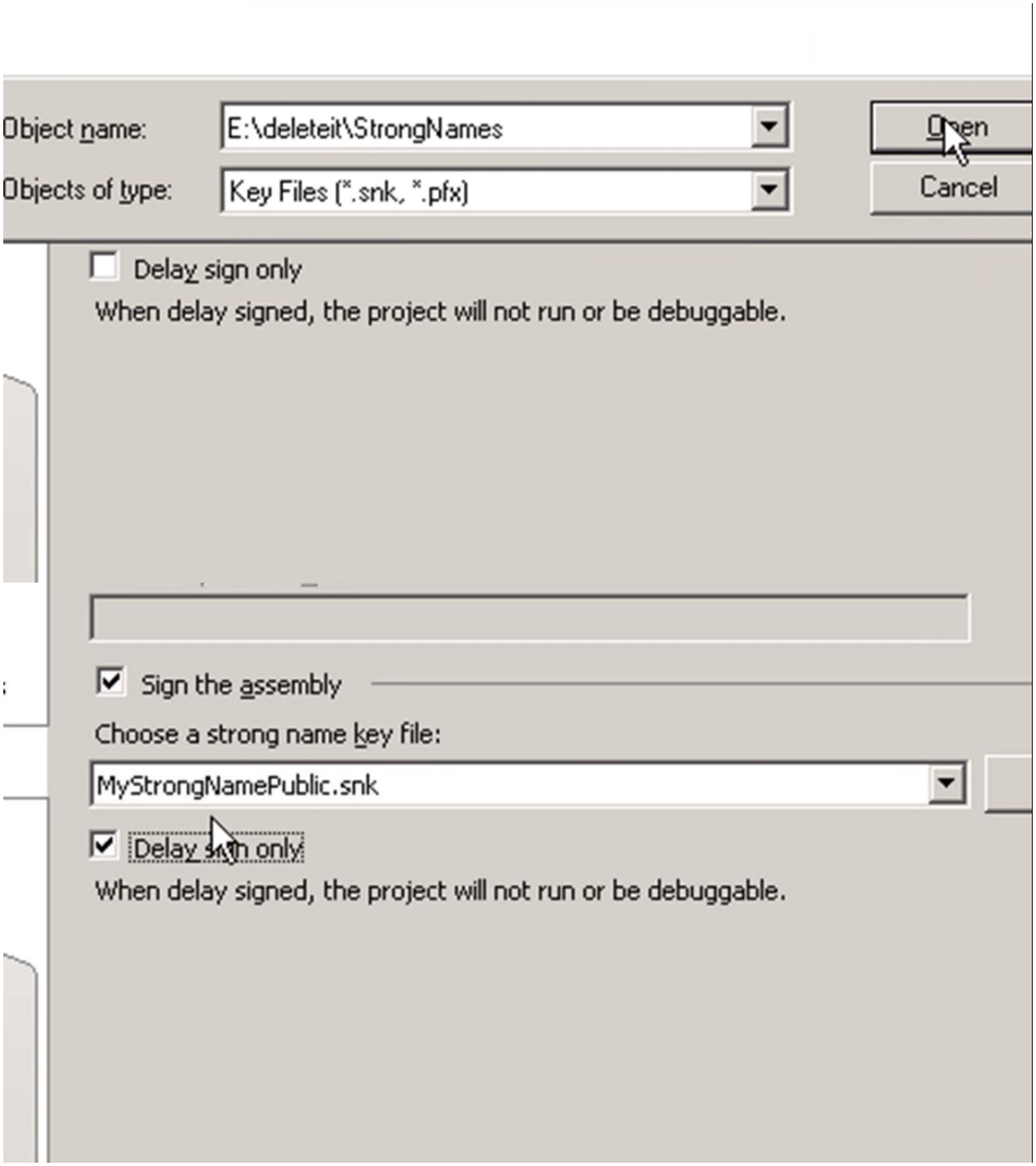
What is delay signing?

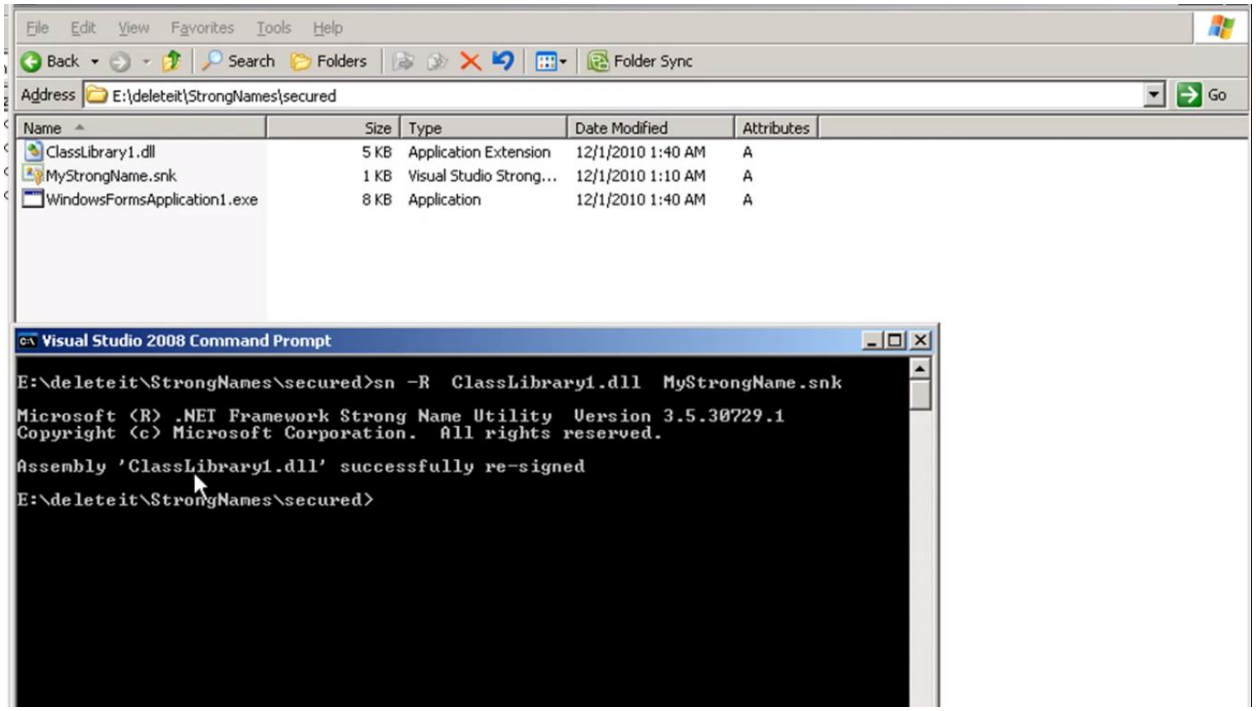

StrongKey
public key
private key
C:\Program Files>cd..
C:\>e:
E:\>cd deleteit
E:\deleteit>cd strongnames
E:\deleteit\StrongNames>sn -K MyStrongName.snk
Microsoft (R) .NET Framework Strong Name Utility Version 3.5.30729.1
Copyright (c) Microsoft Corporation. All rights reserved.
Invalid option K
E:\deleteit\StrongNames>sn -k MyStrongName.snk
Microsoft (R) .NET Framework Strong Name Utility Version 3.5.30729.1
Copyright (c) Microsoft Corporation. All rights reserved.
Key pair written to MyStrongName.snk


Address
E:\deleteit\StrongNames
Name
Size
Type
MyStrongName.snk
1 KB
Visual Studio Strong...
04:11
QuestPond


Visual Studio 2008 Command Prompt
E:\deleteit\StrongNames>sn -p MyStrongName.snk MyStrongNamePublic.snk
Microsoft (R) .NET Framework Strong Name Utility Version 3.5.30729.1
Copyright (c) Microsoft Corporation. All rights reserved.
Public key written to MyStrongNamePublic.snk
E:\deleteit\StrongNames>

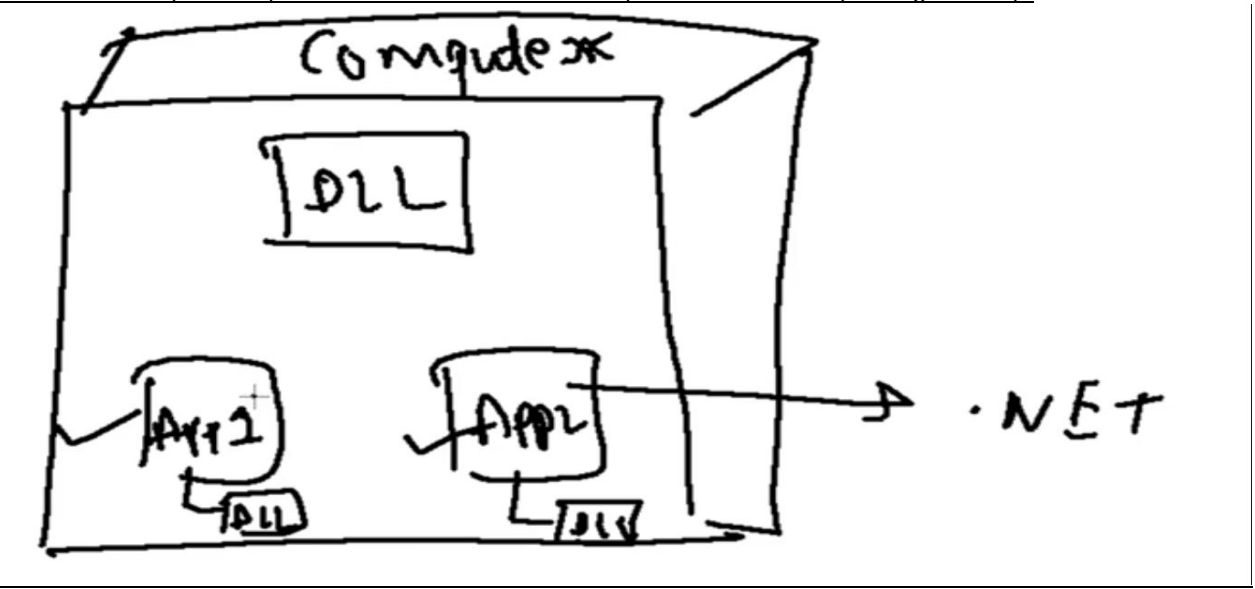

Back
Search
Folders
Address
E:\deleteit\StrongNames
Name
Size
MyStrongName.snk
1 KB
MyStrongNamePublic.snk
1 KB
Settings
Reference Paths
Signing*
Code Analysis
Sign the assembly
Choose a strong name key file:
Delay sign only
When delay signed, the project will not run or be debuggable.
05:47

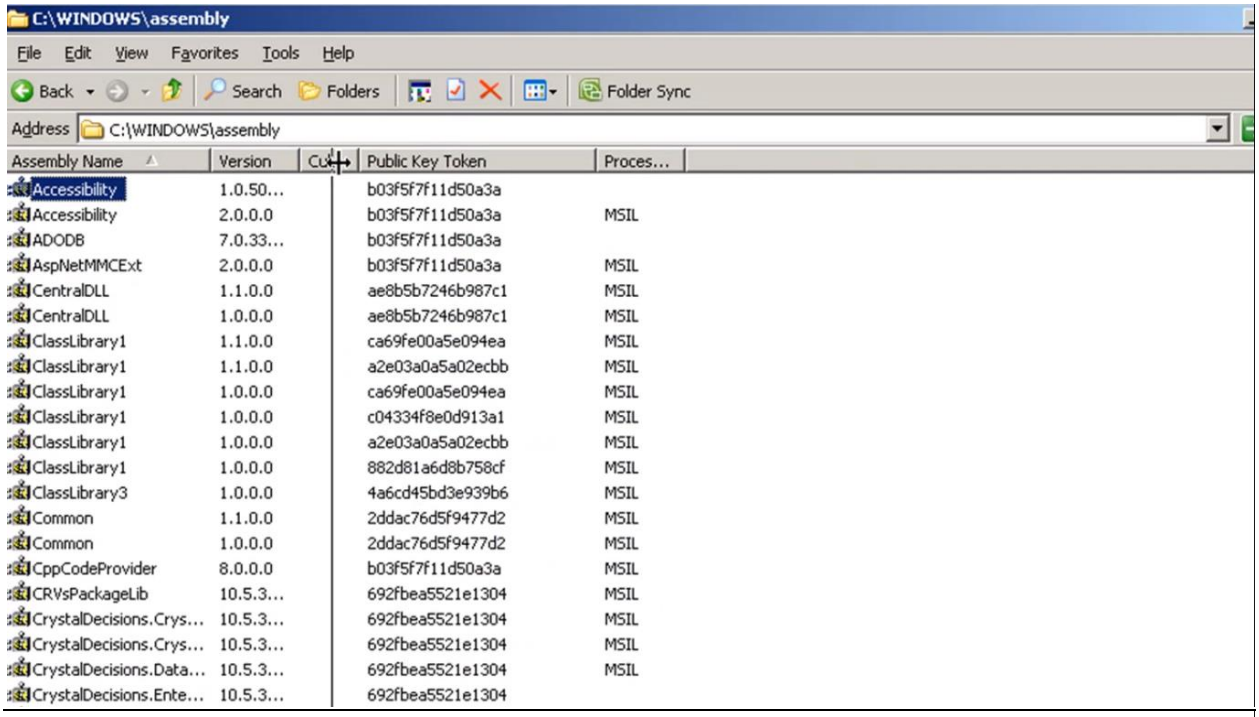

Object name:
E:\deleteit\StrongNames
Open
Objects of type:
Key Files (*.snk, *.pfx)
Cancel
Delay sign only
When delay signed, the project will not run or be debuggable.
Sign the assembly
Choose a strong name key file:
MyStrongNamePublic.snk
Delay sign only
When delay signed, the project will not run or be debuggable.



Create snk(strong key) file extract public key token from the snk file this file using for development process actual file put into secure folder while deploying application this file can use this delay signing

Can we see simple example of GAC & How to handle multiple versions in GAC(Binding redirect)?

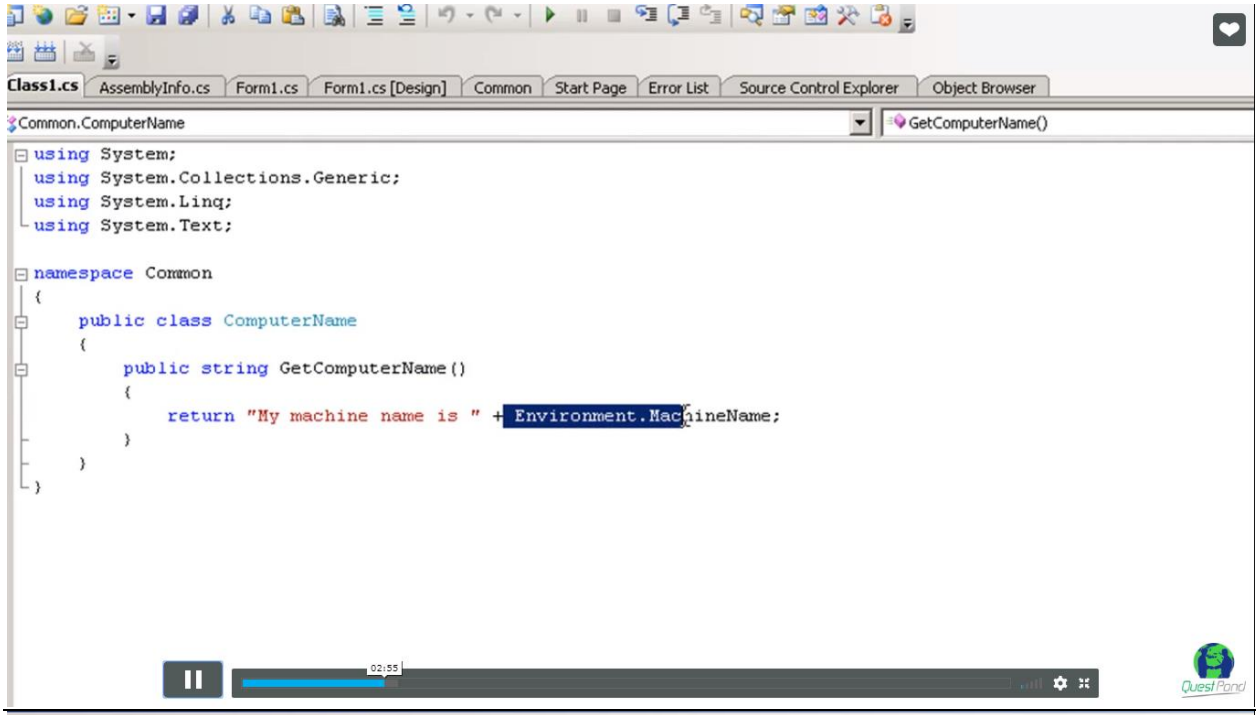


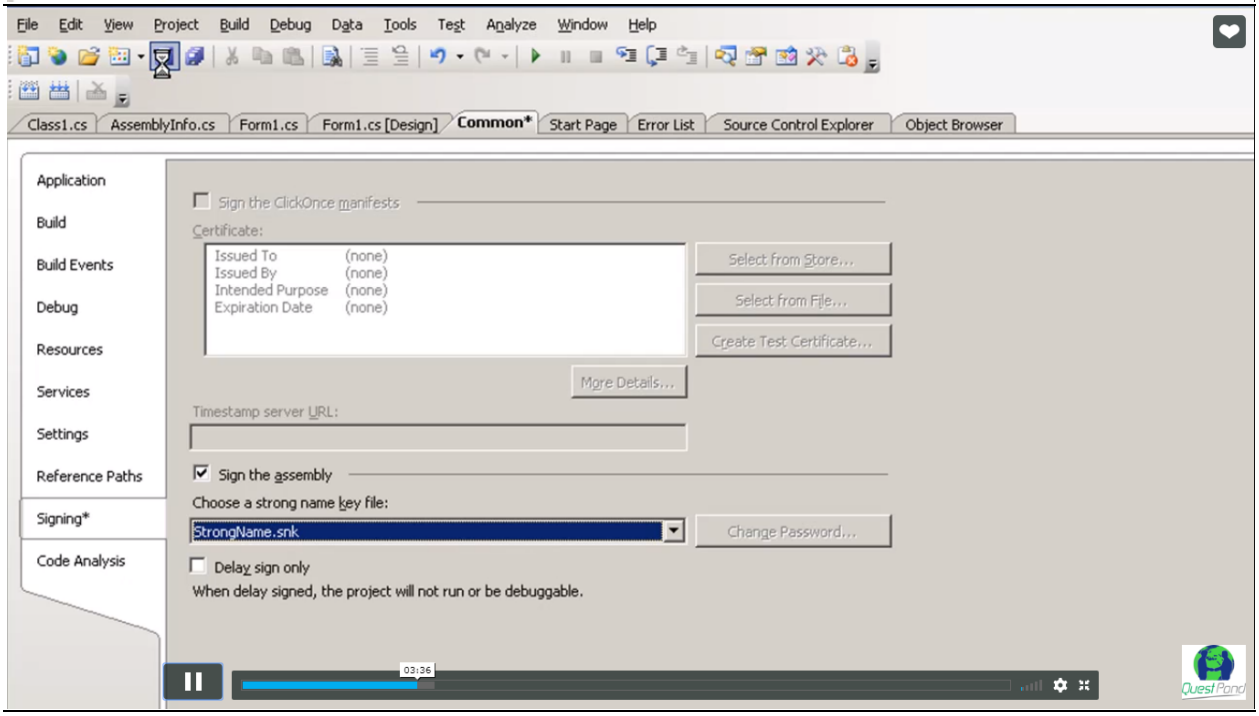


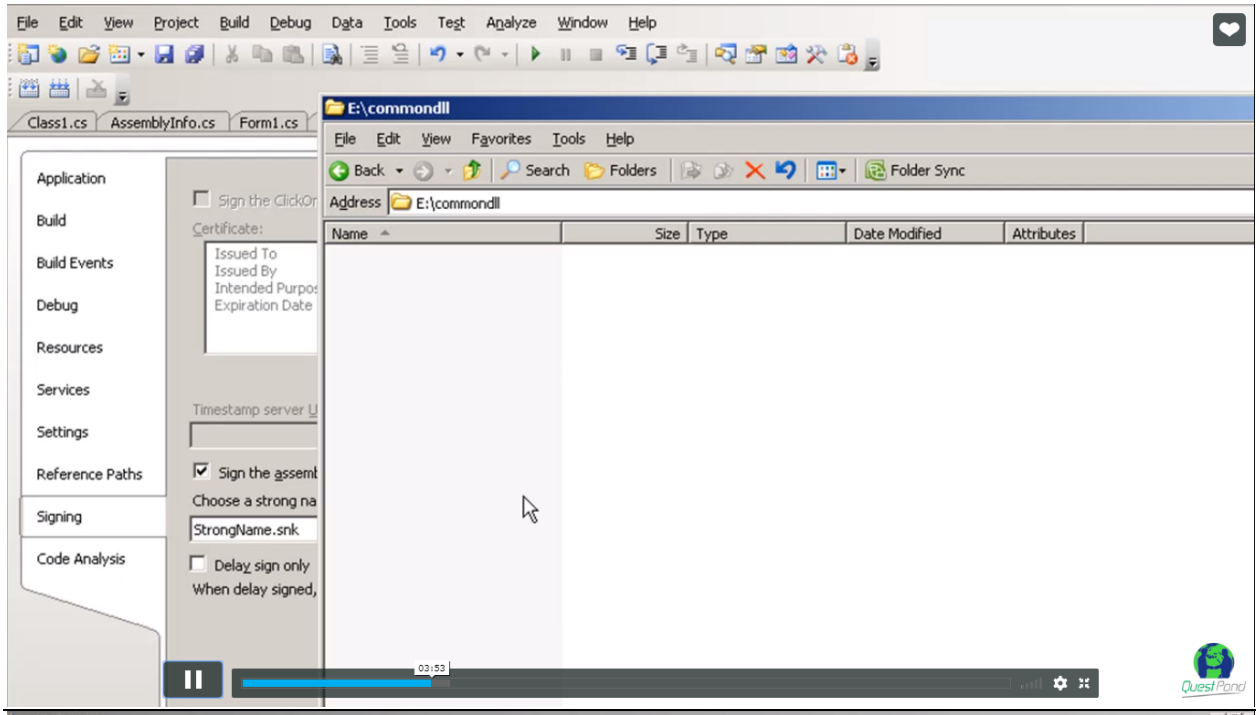
Assembly Name	Version	Cu	Public Key Token	Proces...
Accessibility	1.0.50...		b03f5f7f11d50a3a	
Accessibility	2.0.0.0		b03f5f7f11d50a3a	MSIL
ADODB	7.0.33...		b03f5f7f11d50a3a	
AspNetMMCExt	2.0.0.0		b03f5f7f11d50a3a	MSIL
CentralDLL	1.1.0.0		ae8b5b7246b987c1	MSIL
CentralDLL	1.0.0.0		ae8b5b7246b987c1	MSIL
ClassLibrary1	1.1.0.0		ca69fe00a5e094ea	MSIL
ClassLibrary1	1.1.0.0		a2e03a0a5a02ecbb	MSIL
ClassLibrary1	1.0.0.0		ca69fe00a5e094ea	MSIL
ClassLibrary1	1.0.0.0		c04334f8e0d913a1	MSIL
ClassLibrary1	1.0.0.0		a2e03a0a5a02ecbb	MSIL
ClassLibrary1	1.0.0.0		882d81a6d8b758cf	MSIL
ClassLibrary3	1.0.0.0		4a6cd45bd3e939b6	MSIL
Common	1.1.0.0		2ddac76d5f9477d2	MSIL
Common	1.0.0.0		2ddac76d5f9477d2	MSIL
CppCodeProvider	8.0.0.0		b03f5f7f11d50a3a	MSIL
CRVsPackageLib	10.5.3...		692fbea5521e1304	MSIL
CrystalDecisions.Crys...	10.5.3...		692fbea5521e1304	MSIL
CrystalDecisions.Crys...	10.5.3...		692fbea5521e1304	MSIL
CrystalDecisions.Data...	10.5.3...		692fbea5521e1304	MSIL
CrystalDecisions.Ente...	10.5.3...		692fbea5521e1304	

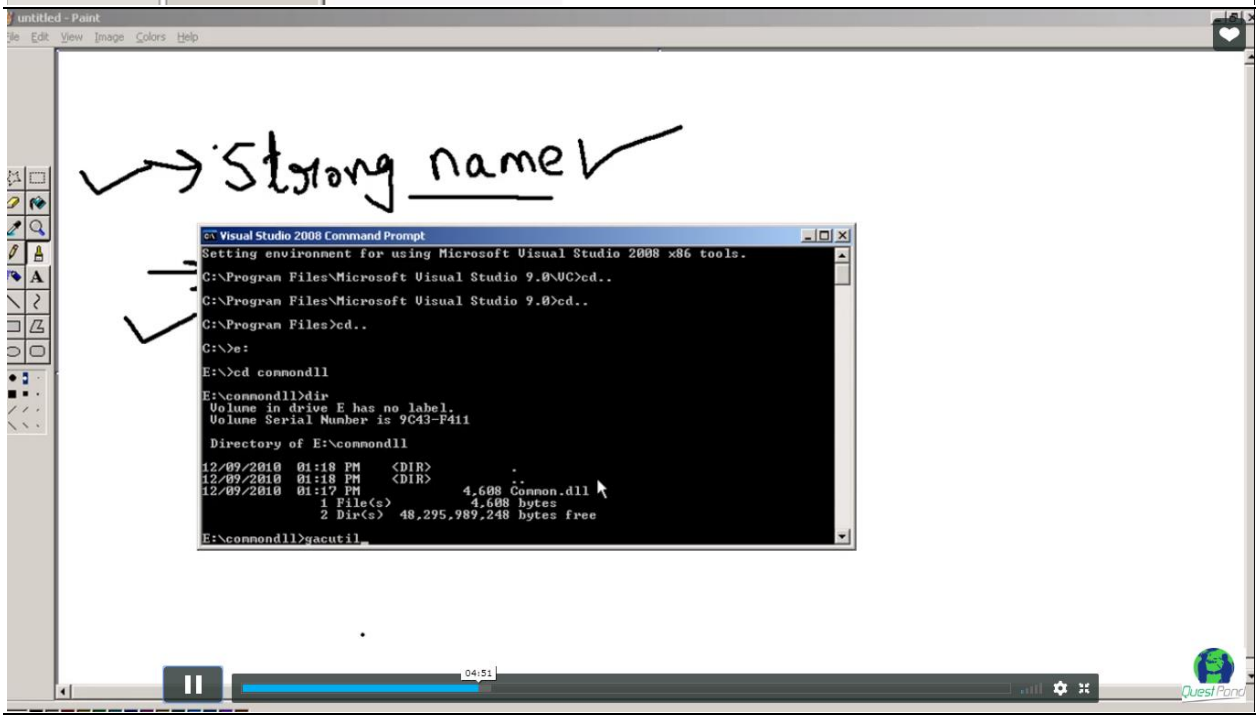
→ Strong name

→ gacutil tool ⇒ registration


Class1.cs
AssemblyInfo.cs
Form1.cs
Form1.cs [Design]
Common
Start Page
Error List
Source Control Explorer
Object Browser
Common.ComputerName
GetComputerName()
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
namespace Common
{
public class ComputerName
{
public string GetComputerName()
{
return "My machine name is " + Environment.MachineName;
}
}
}
02:55


File Edit View Project Build Debug Data Tools Test Analyze Window Help
Class1.cs
AssemblyInfo.cs
Form1.cs
Form1.cs [Design]
Common*
Start Page
Error List
Source Control Explorer
Object Browser
Application
Build
Build Events
Debug
Resources
Services
Settings
Reference Paths
Signing*
Code Analysis
Sign the ClickOnce manifests
Certificate:
Issued To (none)
Issued By (none)
Intended Purpose (none)
Expiration Date (none)
Select from Store...
Select from File...
Create Test Certificate...
More Details...
Timestamp server URL:
Sign the assembly
Choose a strong name key file:
StrongName.snk
Change Password...
Delay sign only
When delay signed, the project will not run or be debuggable.
03:36


File Edit View Project Build Debug Data Tools Test Analyze Window Help
Class1.cs AssemblyInfo.cs Form1.cs
Application
Build
Build Events
Debug
Resources
Services
Settings
Reference Paths
Signing
Code Analysis
Sign the ClickOr
Certificate:
Issued To
Issued By
Intended Purpos
Expiration Date
Timestamp server U
Sign the assemb
Choose a strong na
StrongName.snk
Delay sign only
When delay signed,
E:\commondll
File Edit View Favorites Tools Help
Back Search Folders Folder Sync
Address E:\commondll
Name Size Type Date Modified Attributes
03:53
Quest Pond

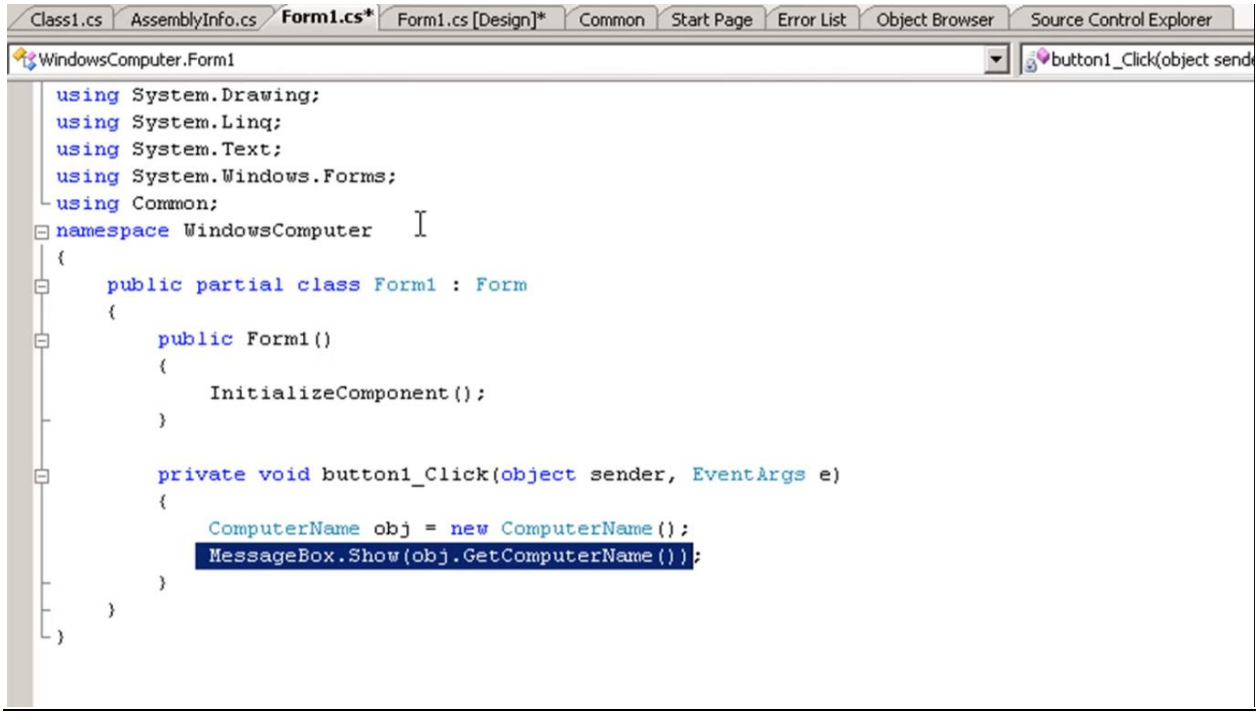

untitled - Paint
File Edit View Image Colors Help
Strong name
Visual Studio 2008 Command Prompt
Setting environment for using Microsoft Visual Studio 2008 x86 tools.
C:\Program Files\Microsoft Visual Studio 9.0\VC>cd..
C:\Program Files\Microsoft Visual Studio 9.0>cd..
C:\Program Files>cd..
C:\>e:
E:\>cd commondll
E:\commondll>dir
Volume in drive E has no label.
Volume Serial Number is 9C43-F411
Directory of E:\commondll
12/09/2010 01:18 PM <DIR> .
12/09/2010 01:18 PM <DIR> ..
12/09/2010 01:17 PM 4,608 Common.dll
1 File(s) 4,608 bytes
2 Dir(s) 48,295,989,248 bytes free
E:\commondll>gacutil
04:51
Quest Pond

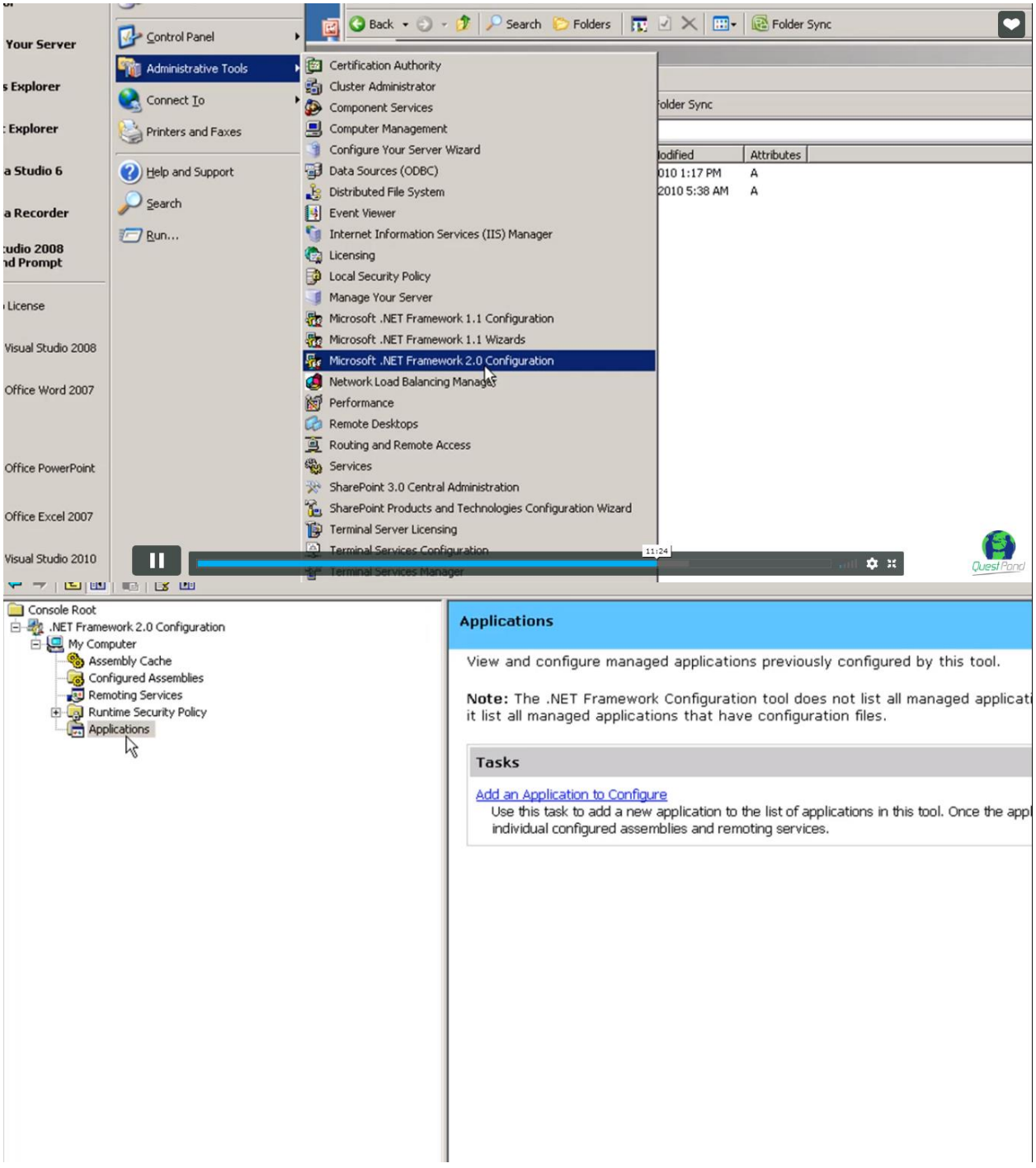
```
  /?
    Displays a detailed help screen

 Options:
  /r <reference_scheme> <reference_id> <description>
    Specifies a traced reference to install (/i, /il) or uninsta

  /f
    Forces reinstall of an assembly.

  /nologo
    Suppresses display of the logo banner

  /silent
    Suppresses display of all output


E:\commondll>gacutil -i common.dll
Microsoft (R) .NET Global Assembly Cache Utility.  Version 3.5.3
Copyright (c) Microsoft Corporation.  All rights reserved.

Assembly successfully added to the cache

E:\commondll>
```

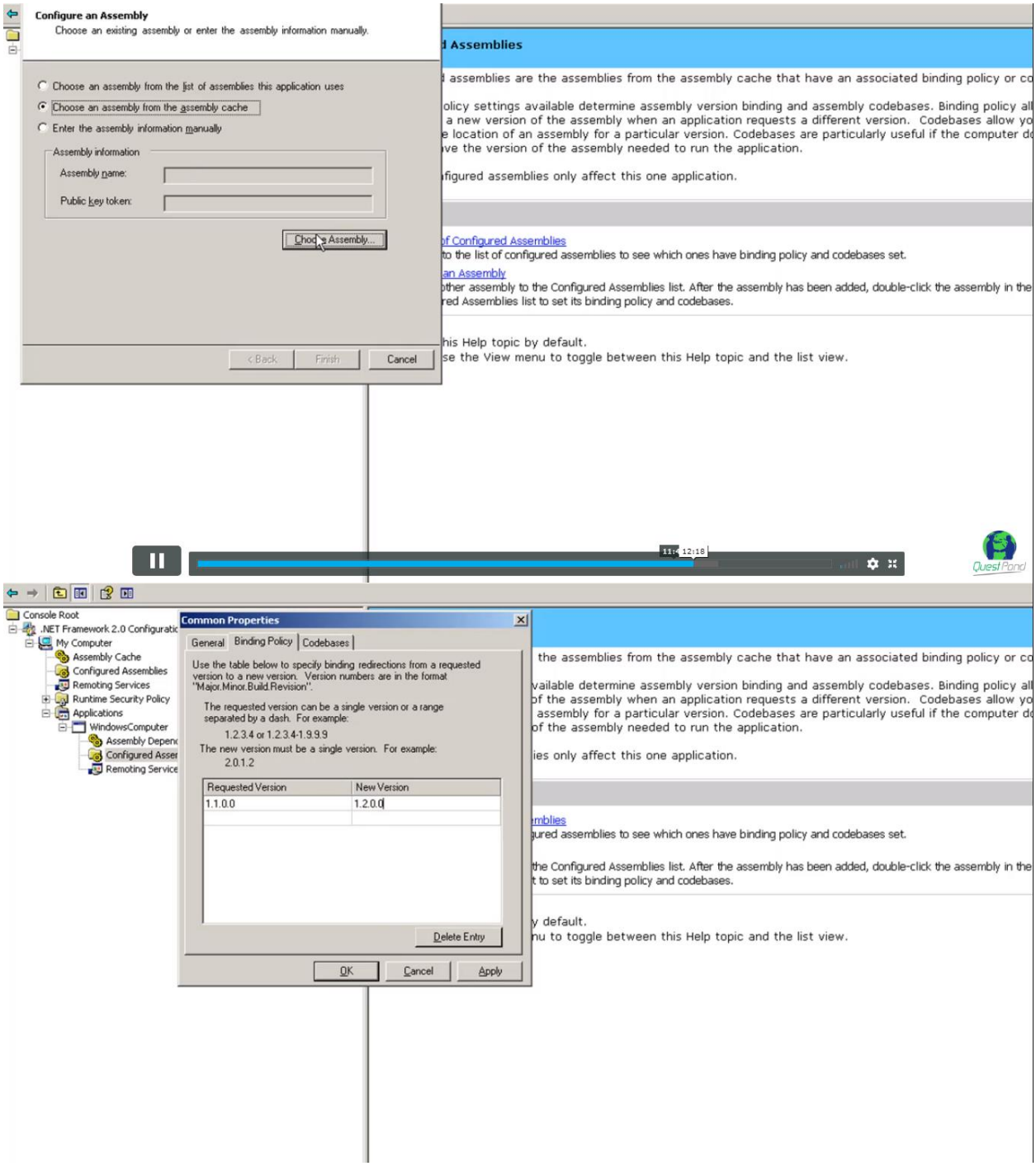
Back | Search | Folders | Folder Sync

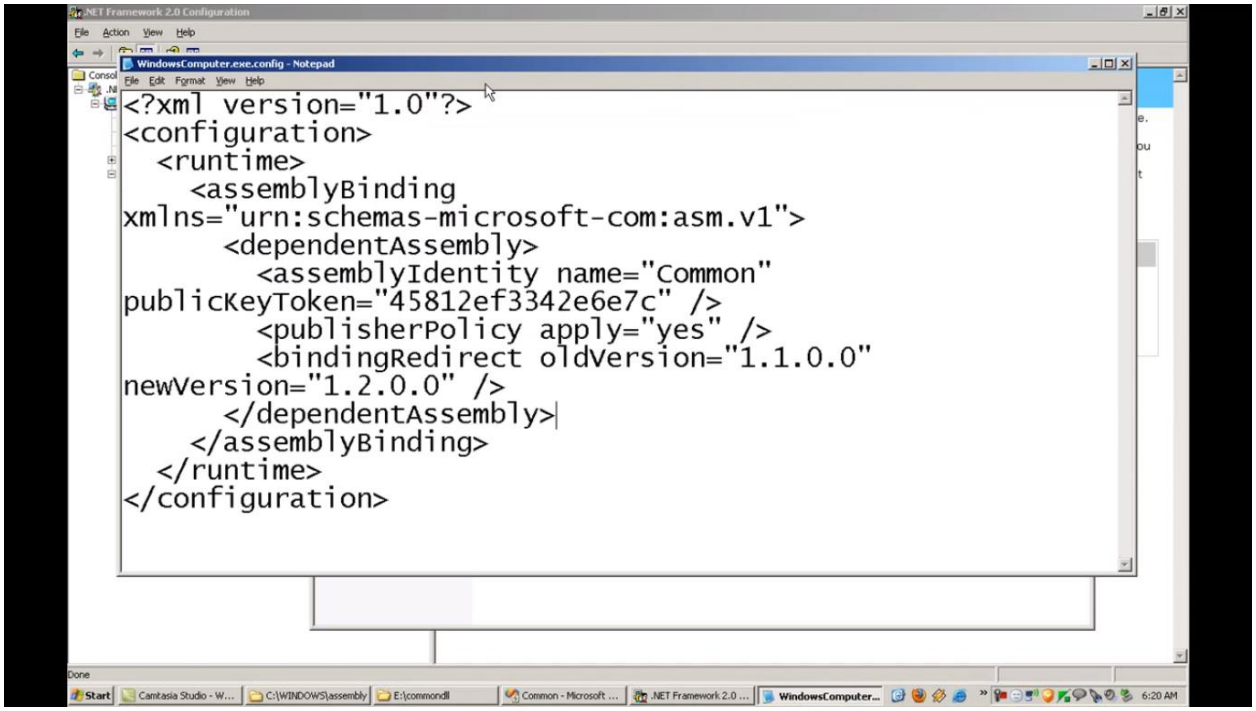
Address C:\WINDOWS\assembly

Assembly Name	Version	Cul...	Public Key Token	Proces...
Accessibility	1.0.50...		b03f5f7f11d50a3a	
Accessibility	2.0.0.0		b03f5f7f11d50a3a	MSIL
ADODB	7.0.33...		b03f5f7f11d50a3a	
AspNetMMCExt	2.0.0.0		b03f5f7f11d50a3a	MSIL
CentralDLL	1.1.0.0		ae8b5b7246b987c1	MSIL
CentralDLL	1.0.0.0		ae8b5b7246b987c1	MSIL
ClassLibrary1	1.1.0.0		ca69fe00a5e094ea	MSIL
ClassLibrary1	1.1.0.0		a2e03a0a5a02ecbb	MSIL
ClassLibrary1	1.0.0.0		ca69fe00a5e094ea	MSIL
ClassLibrary1	1.0.0.0		c04334f8e0d913a1	MSIL
ClassLibrary1	1.0.0.0		a2e03a0a5a02ecbb	MSIL
ClassLibrary1	1.0.0.0		882d81a6d8b758cf	MSIL
ClassLibrary3	1.0.0.0		4a6cd45bd3e939b6	MSIL
Common	1.1.0.0		45812ef3342e6e7c	MSIL
CppCodeProvider	8.0.0.0		b03f5f7f11d50a3a	MSIL
CRVsPackageLib	10.5.3...		692fbea5521e1304	MSIL
CrystalDecisions.Crys...	10.5.3...		692fbea5521e1304	MSIL
CrystalDecisions.Crys...	10.5.3...		692fbea5521e1304	MSIL
CrystalDecisions.Data...	10.5.3...		692fbea5521e1304	MSIL
CrystalDecisions.Ente...	10.5.3...		692fbea5521e1304	

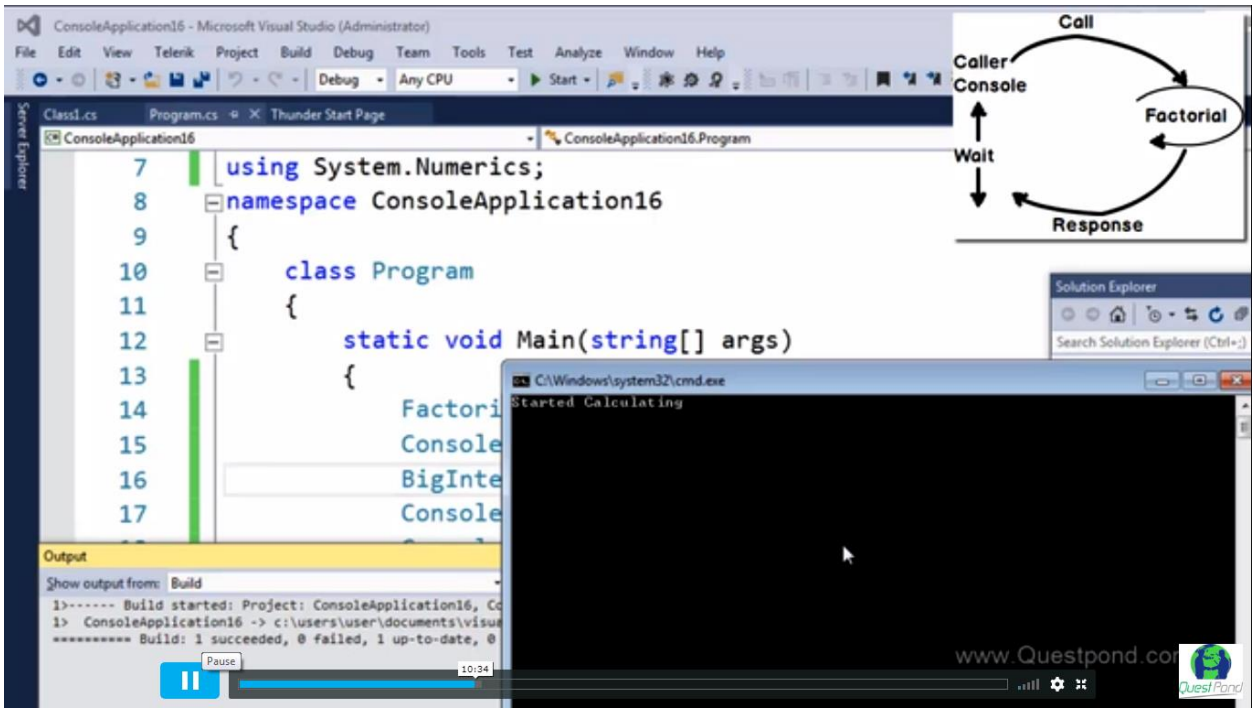

Class1.cs
AssemblyInfo.cs
Form1.cs*
Form1.cs [Design]*
Common
Start Page
Error List
Object Browser
Source Control Explorer
WindowsComputer.Form1
button1_Click(object sende
using System.Drawing;
using System.Linq;
using System.Text;
using System.Windows.Forms;
using Common;
namespace WindowsComputer
{
public partial class Form1 : Form
{
public Form1()
{
InitializeComponent();
}
private void button1_Click(object sender, EventArgs e)
{
ComputerName obj = new ComputerName();
MessageBox.Show(obj.GetComputerName());
}
}
}


Control Panel
Administrative Tools
Connect To
Printers and Faxes
Help and Support
Search
Run...
Certification Authority
Cluster Administrator
Component Services
Computer Management
Configure Your Server Wizard
Data Sources (ODBC)
Distributed File System
Event Viewer
Internet Information Services (IIS) Manager
Licensing
Local Security Policy
Manage Your Server
Microsoft .NET Framework 1.1 Configuration
Microsoft .NET Framework 1.1 Wizards
Microsoft .NET Framework 2.0 Configuration
Network Load Balancing Manager
Performance
Remote Desktops
Routing and Remote Access
Services
SharePoint 3.0 Central Administration
SharePoint Products and Technologies Configuration Wizard
Terminal Server Licensing
Terminal Services Configuration
Terminal Services Manager
Back
Search
Folders
Folder Sync
Attributes
Console Root
.NET Framework 2.0 Configuration
My Computer
Assembly Cache
Configured Assemblies
Remoting Services
Runtime Security Policy
Applications
Applications
View and configure managed applications previously configured by this tool.
Note: The .NET Framework Configuration tool does not list all managed applicati
it list all managed applications that have configuration files.
Tasks
Add an Application to Configure
Use this task to add a new application to the list of applications in this tool. Once the appl
individual configured assemblies and remoting services.


Configure an Assembly
Choose an existing assembly or enter the assembly information manually.
Choose an assembly from the list of assemblies this application uses
Choose an assembly from the assembly cache
Enter the assembly information manually
Assembly information
Assembly name:
Public key token:
Choose Assembly...
< Back
Finish
Cancel
Assemblies
assemblies are the assemblies from the assembly cache that have an associated binding policy or co
olicy settings available determine assembly version binding and assembly codebases. Binding policy all
a new version of the assembly when an application requests a different version. Codebases allow yo
e location of an assembly for a particular version. Codebases are particularly useful if the computer do
ve the version of the assembly needed to run the application.
figured assemblies only affect this one application.
of Configured Assemblies
to the list of configured assemblies to see which ones have binding policy and codebases set.
an Assembly
ther assembly to the Configured Assemblies list. After the assembly has been added, double-click the assembly in the
red Assemblies list to set its binding policy and codebases.
his Help topic by default.
se the View menu to toggle between this Help topic and the list view.
Console Root
.NET Framework 2.0 Configuratic
My Computer
Assembly Cache
Configured Assemblies
Remoting Services
Runtime Security Policy
Applications
WindowsComputer
Assembly Depenc
Configured Asser
Remoting Service
Common Properties
General
Binding Policy
Codebases
Use the table below to specify binding redirections from a requested version to a new version. Version numbers are in the format "Major.Minor.Build.Revision".
The requested version can be a single version or a range separated by a dash. For example:
1.2.3.4 or 1.2.3.4-1.9.9.9
The new version must be a single version. For example:
2.0.1.2
Requested Version
New Version
1.1.0.0
1.2.0.0
Delete Entry
OK
Cancel
Apply
the assemblies from the assembly cache that have an associated binding policy or co
vailable determine assembly version binding and assembly codebases. Binding policy all
of the assembly when an application requests a different version. Codebases allow yo
assembly for a particular version. Codebases are particularly useful if the computer do
of the assembly needed to run the application.
ies only affect this one application.
mblies
gured assemblies to see which ones have binding policy and codebases set.
the Configured Assemblies list. After the assembly has been added, double-click the assembly in the
t to set its binding policy and codebases.
y default.
nu to toggle between this Help topic and the list view.

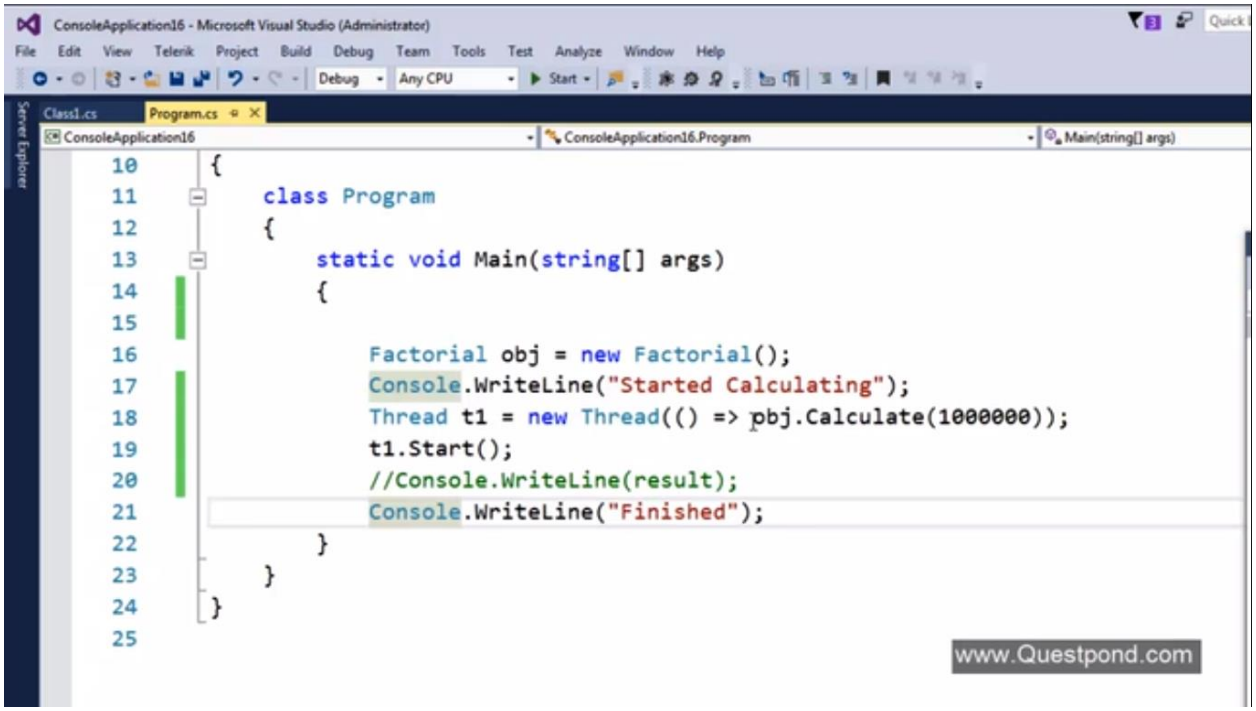


Explain Synch, Asynch, Delegates, Multicast Delegates and Events.

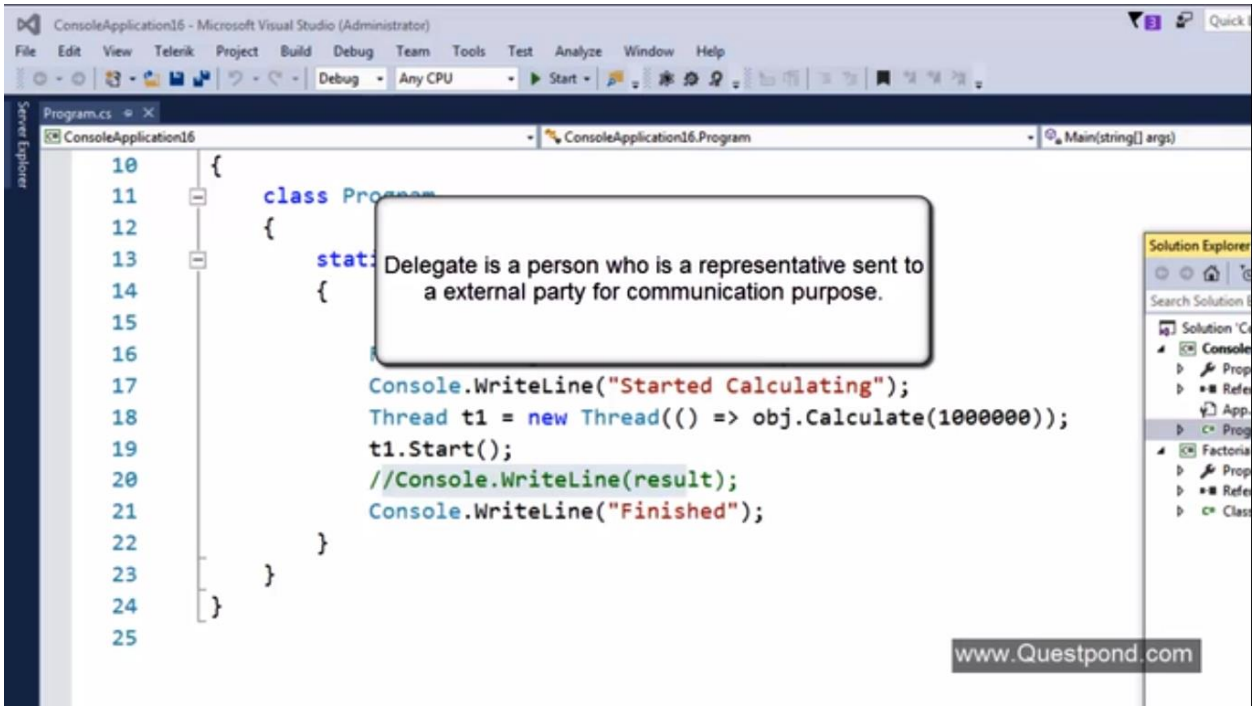


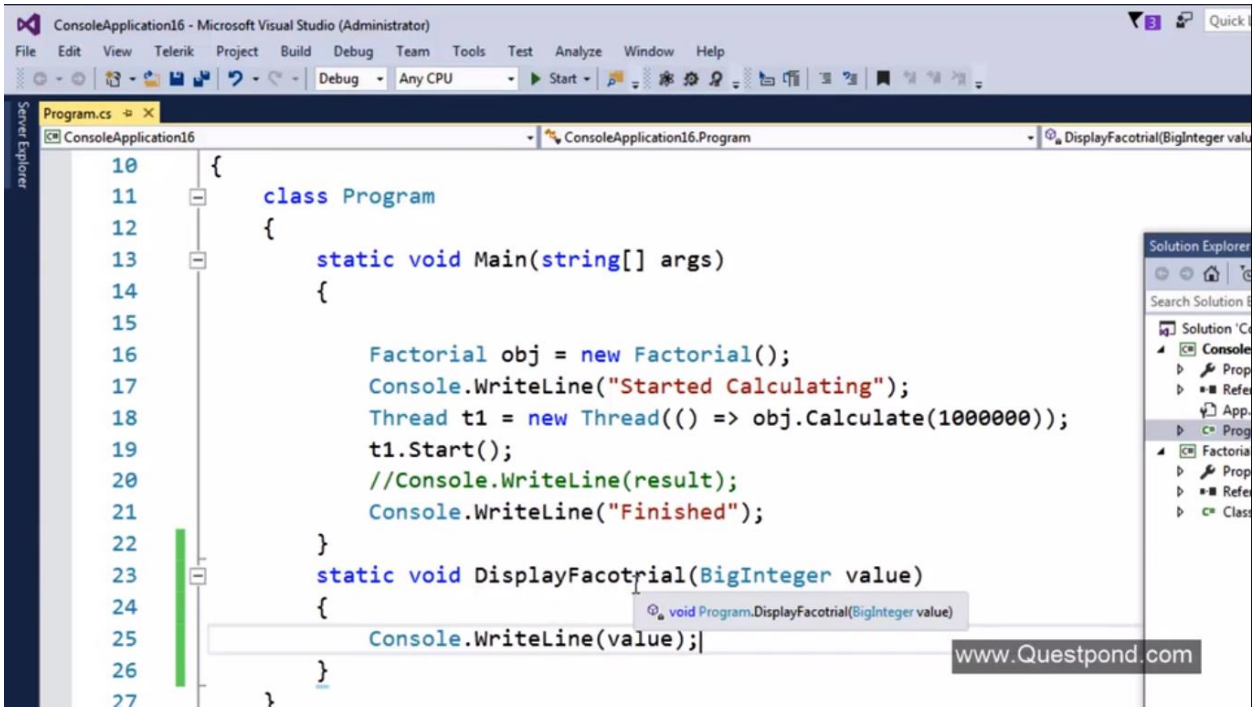
Synchronous is nothing but when request is happened it will wait for response until response come next lines of code not executing

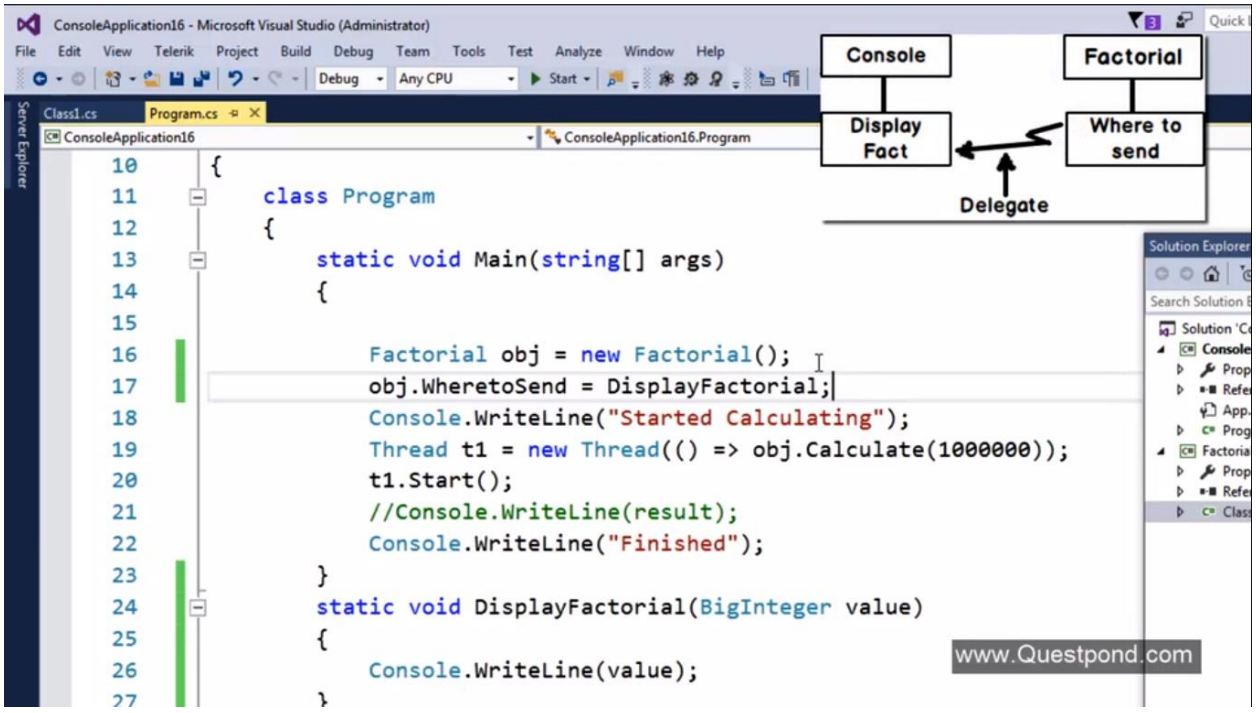
Caller doesn't wait for callee response it will execute that is called asynchronous coding



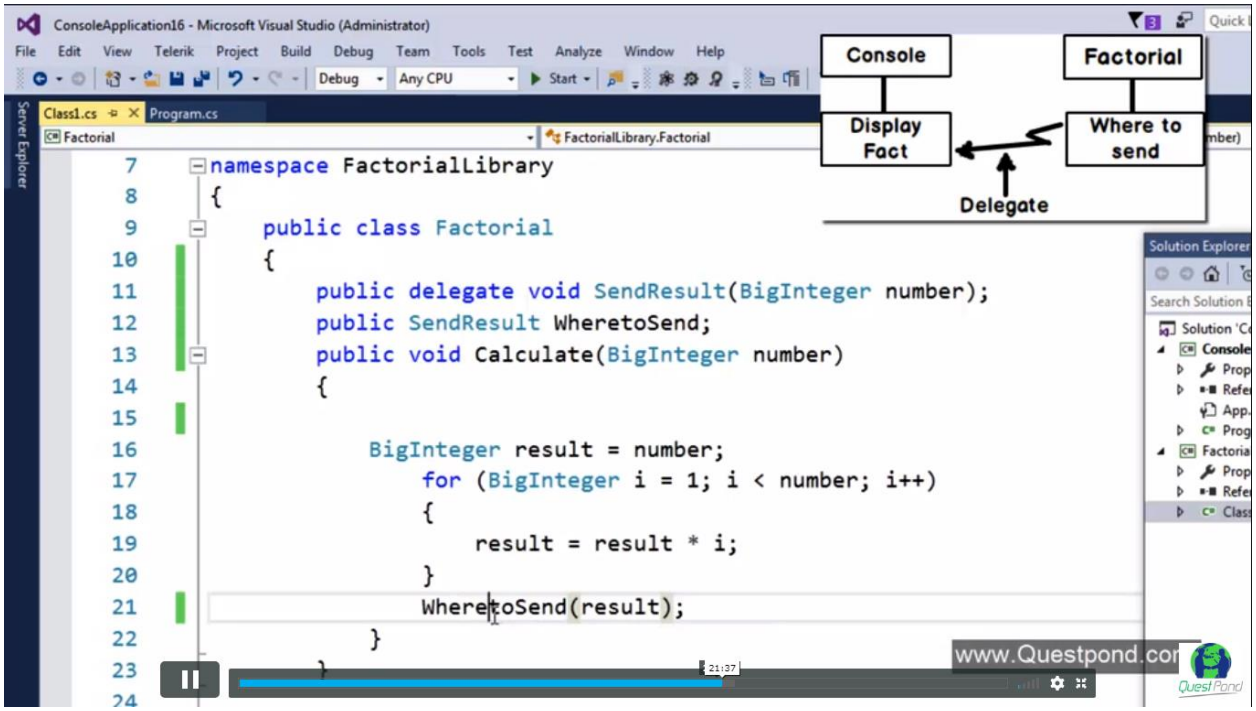
Threads are used to help asynchronous programming or parallel execution

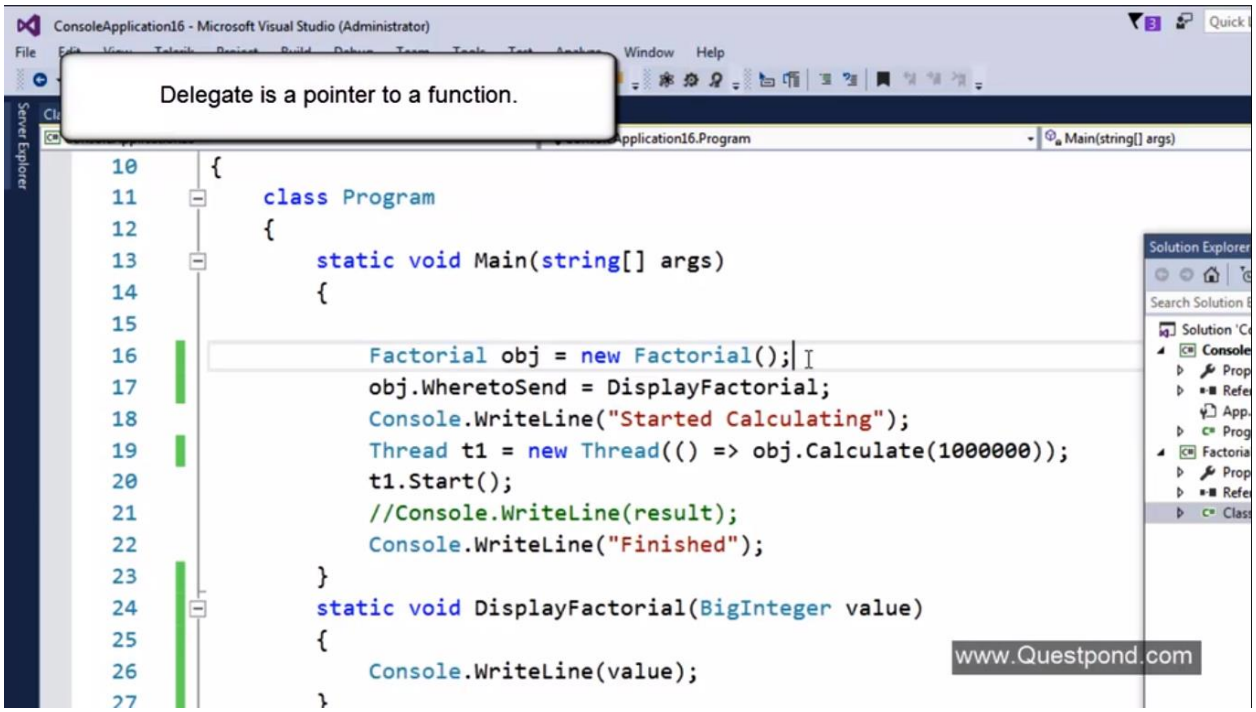


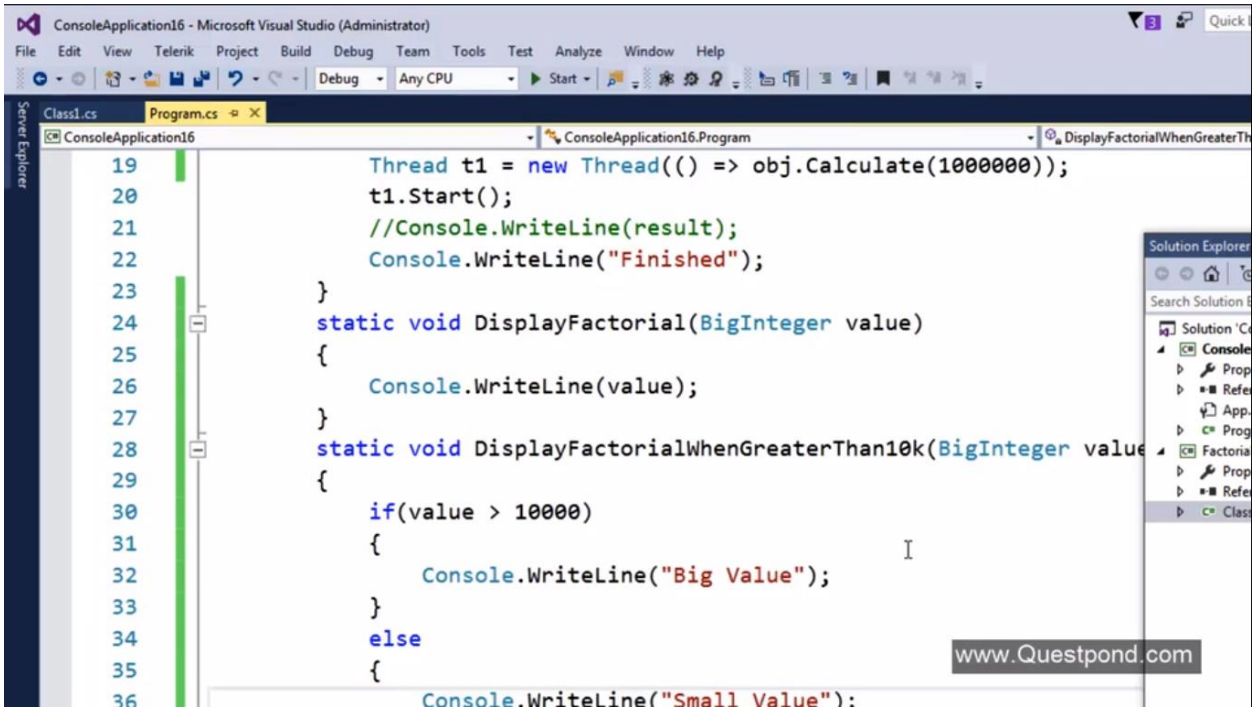


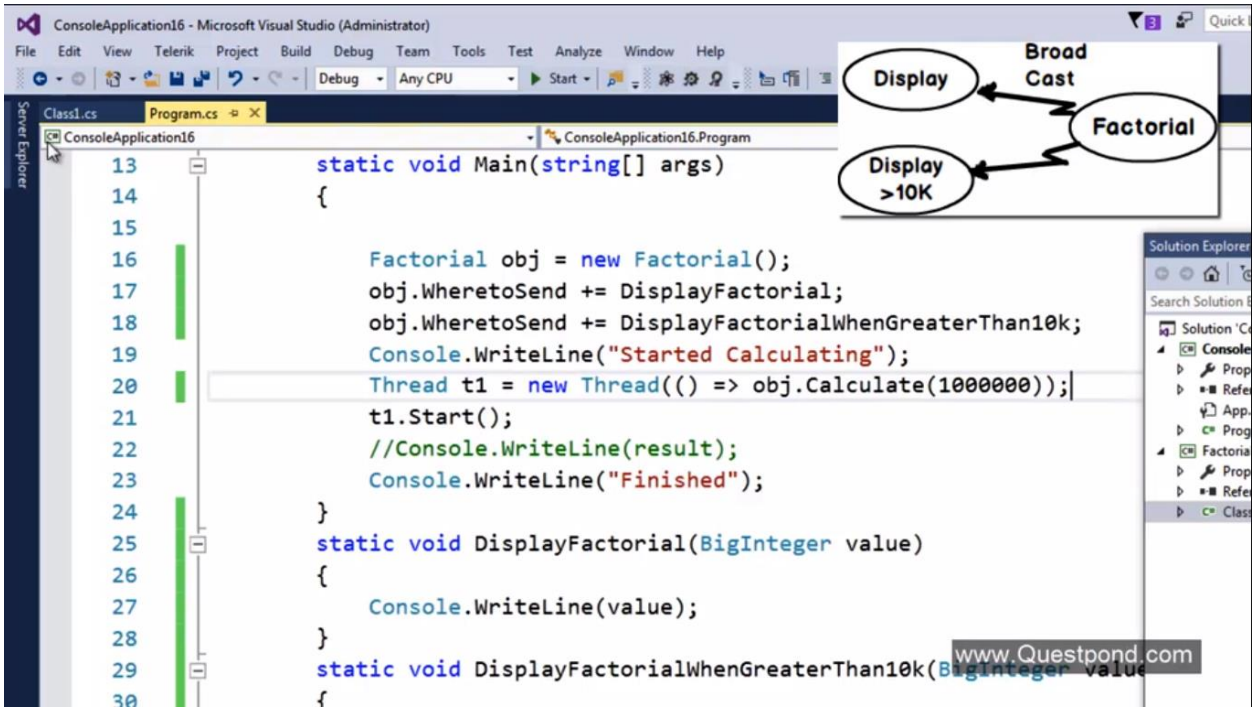


Whole purpose of delegate is call back function and communication

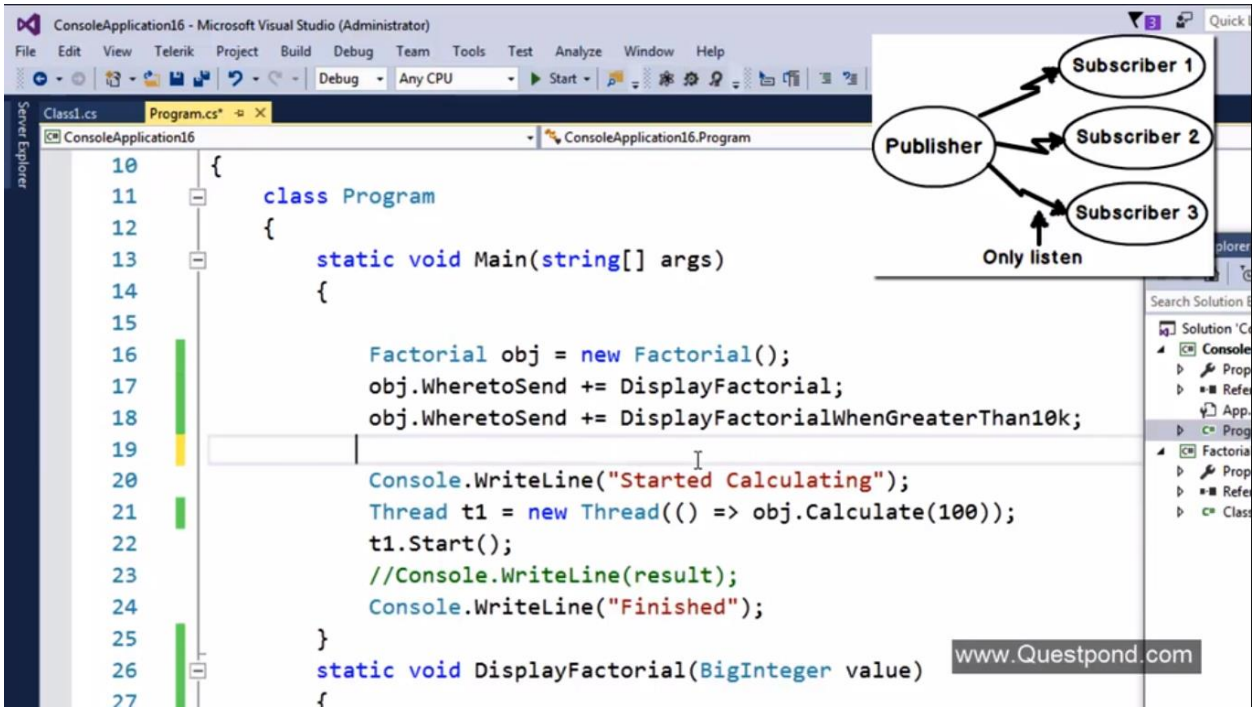

ConsoleApplication16 - Microsoft Visual Studio (Administrator)
Console
Factorial
Display Fact
Where to send
Delegate
namespace FactorialLibrary
{
public class Factorial
{
public delegate void SendResult(BigInteger number);
public SendResult WheretoSend;
public void Calculate(BigInteger number)
{
BigInteger result = number;
for (BigInteger i = 1; i < number; i++)
{
result = result * i;
}
WheretoSend(result);
}
www.Questpond.com

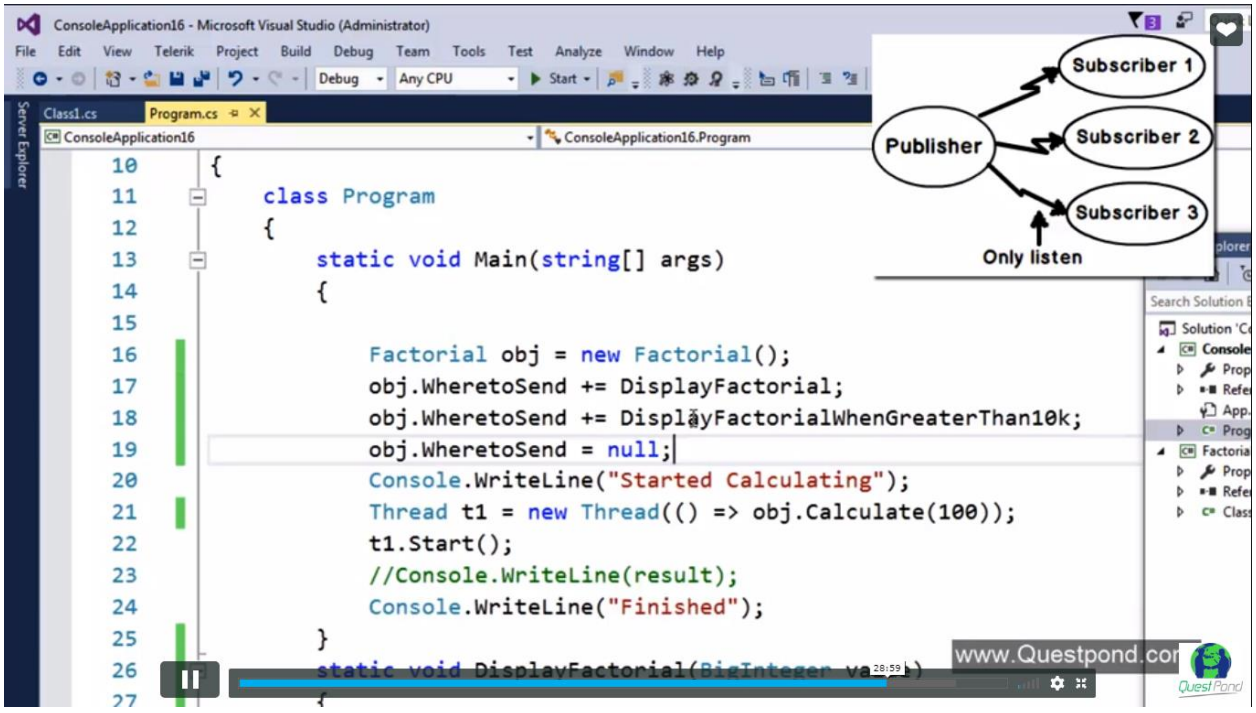

ConsoleApplication16 - Microsoft Visual Studio (Administrator)
Delegate is a pointer to a function.
{
class Program
{
static void Main(string[] args)
{
Factorial obj = new Factorial();
obj.WheretoSend = DisplayFactorial;
Console.WriteLine("Started Calculating");
Thread t1 = new Thread(() => obj.Calculate(1000000));
t1.Start();
//Console.WriteLine(result);
Console.WriteLine("Finished");
}
static void DisplayFactorial(BigInteger value)
{
Console.WriteLine(value);
www.Questpond.com





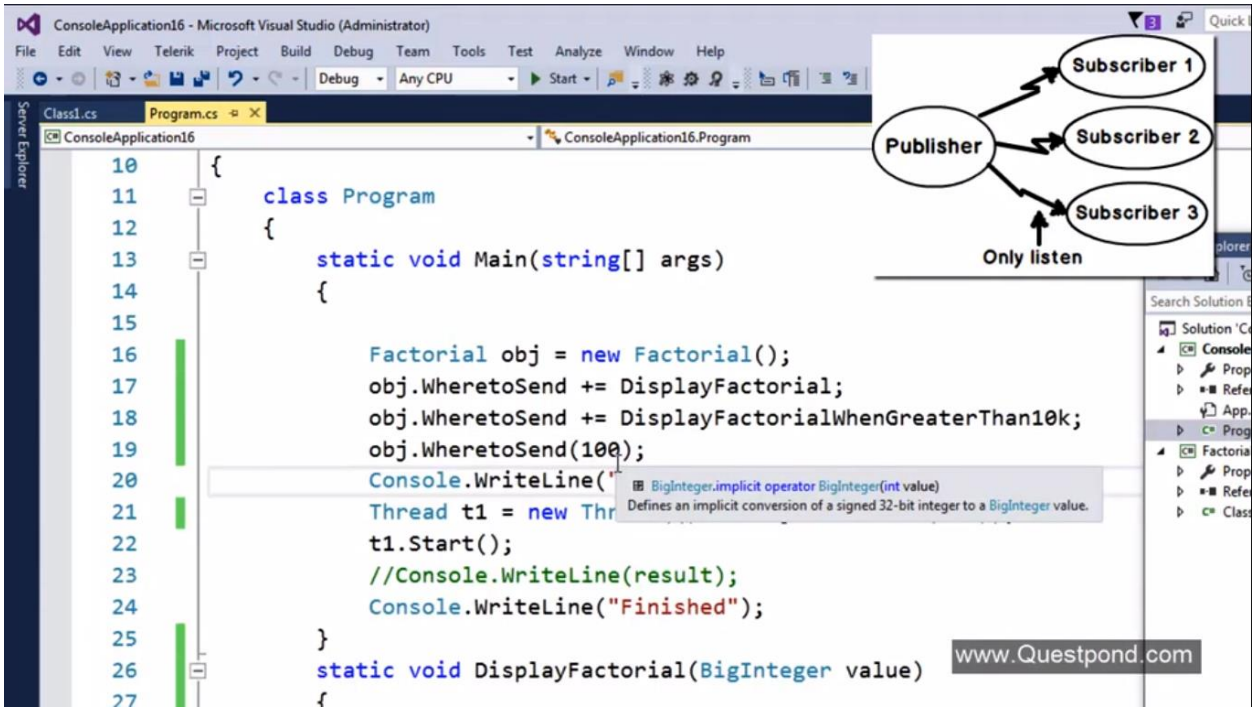
Multicast delegate send the call back function to multiple clients.

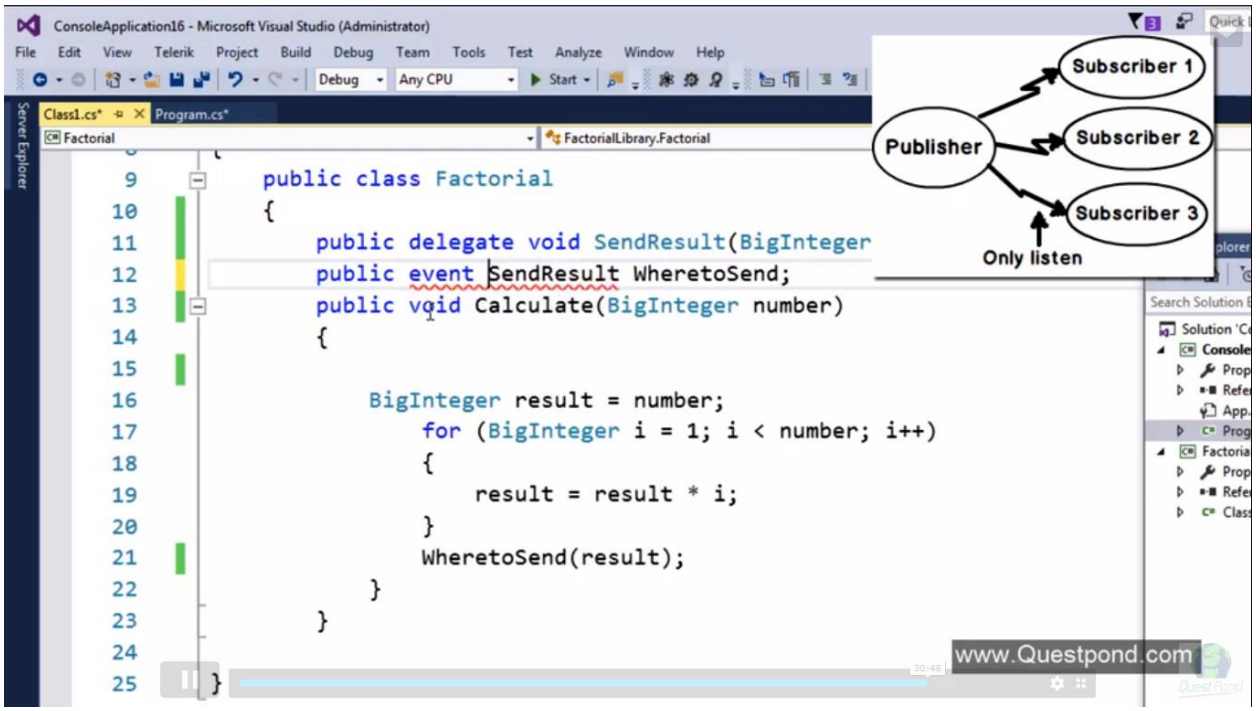


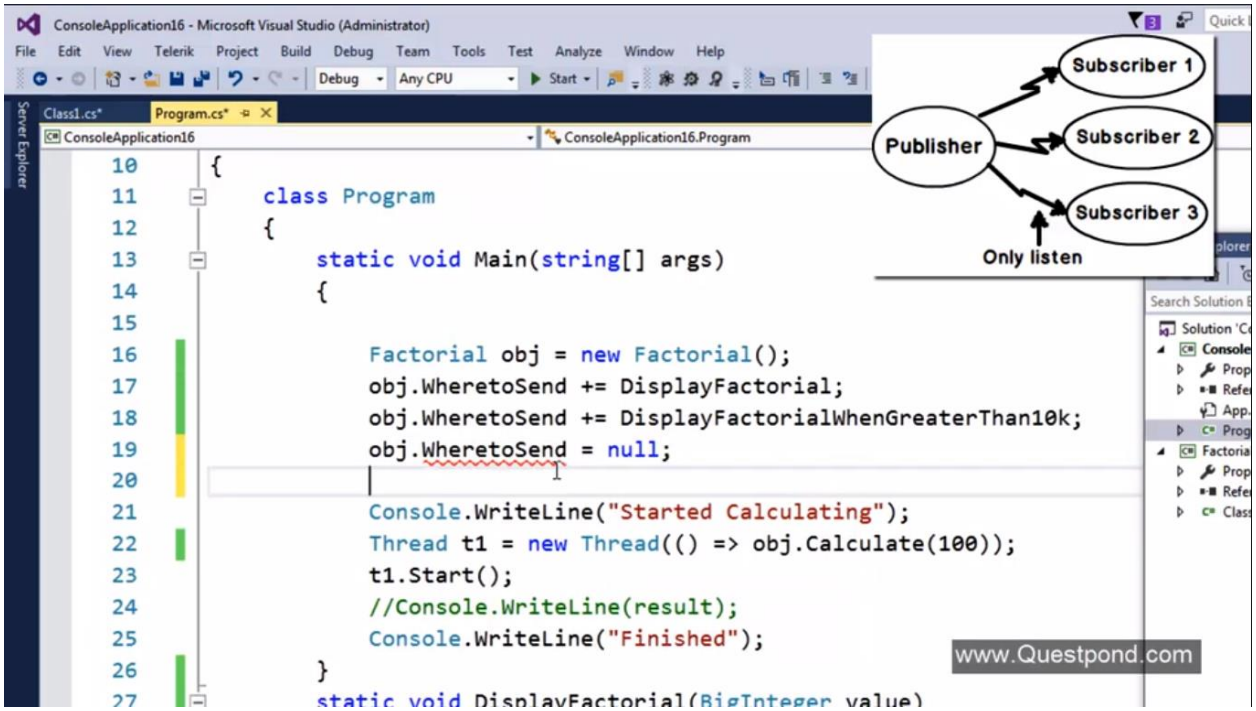


Multicast delegate is used two way communction between publisher and subscriber

But Client can use consume not change the publisher

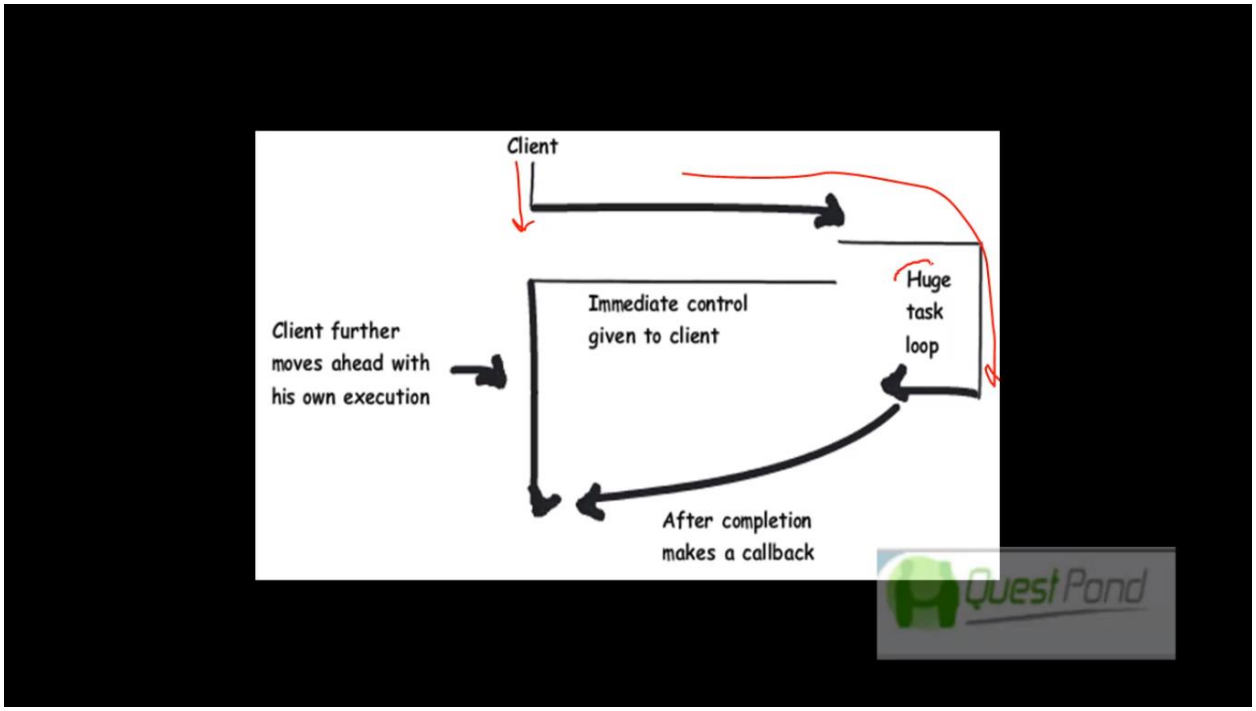

ConsoleApplication16 - Microsoft Visual Studio (Administrator)
Subscriber 1
Publisher
Subscriber 2
Subscriber 3
Only listen
{
class Program
{
static void Main(string[] args)
{
Factorial obj = new Factorial();
obj.WheretoSend += DisplayFactorial;
obj.WheretoSend += DisplayFactorialWhenGreaterThan10k;
obj.WheretoSend(100);
Console.WriteLine("
Thread t1 = new Thr
t1.Start();
//Console.WriteLine(result);
Console.WriteLine("Finished");
}
static void DisplayFactorial(BigInteger value)
{
BigInteger.implicit operator BigInteger(int value)
Defines an implicit conversion of a signed 32-bit integer to a BigInteger value.
www.Questpond.com


ConsoleApplication16 - Microsoft Visual Studio (Administrator)
Subscriber 1
Publisher
Subscriber 2
Subscriber 3
Only listen
public class Factorial
{
public delegate void SendResult(BigInteger
public event SendResult WheretoSend;
public void Calculate(BigInteger number)
{
BigInteger result = number;
for (BigInteger i = 1; i < number; i++)
{
result = result * i;
}
WheretoSend(result);
}
}
}
www.Questpond.com



Events use delegate internally but event encapsulate the delegate rather than giving two communication it will give one way communication , client can subscribe or unsubscribe the functions

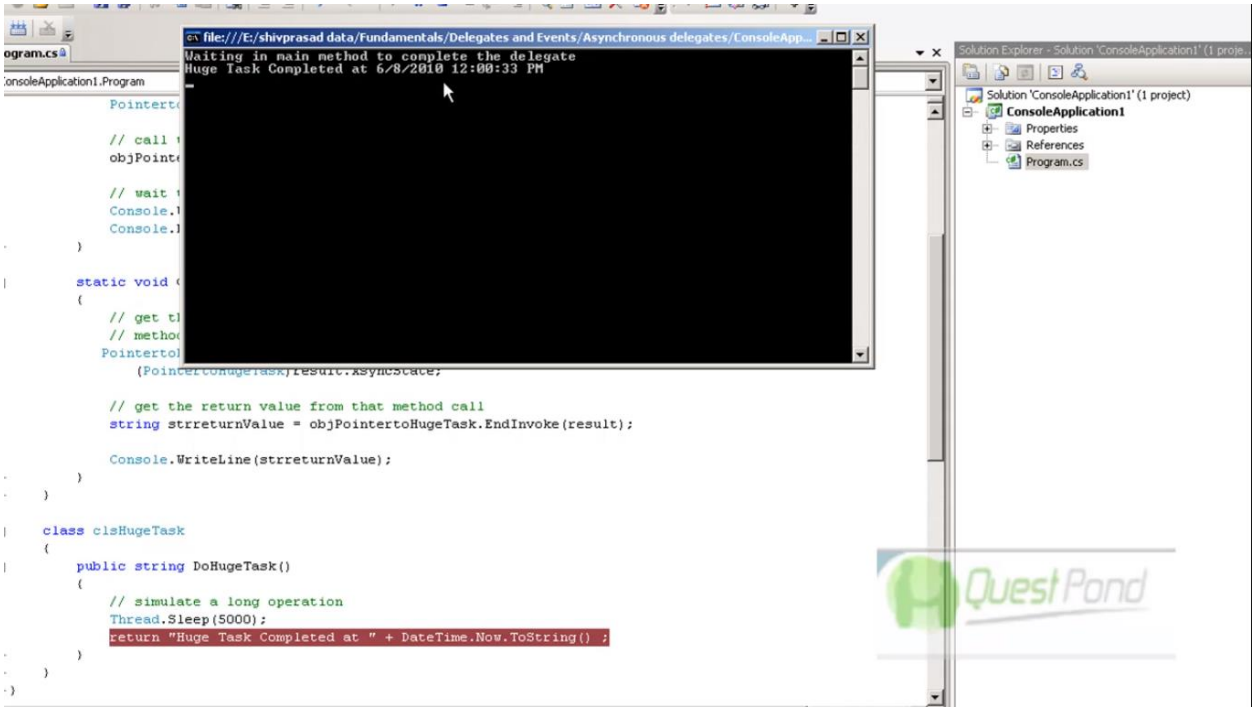
How can we make Asynchronous method calls using delegates?



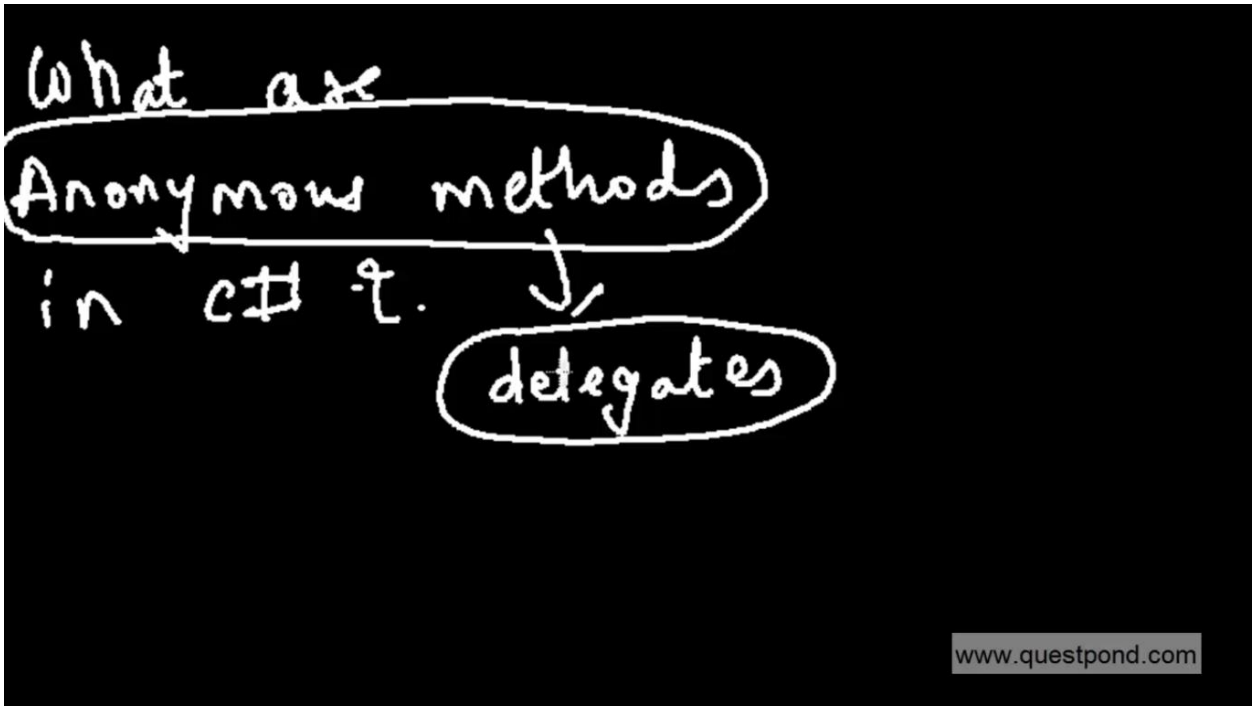

```
;

class clsHugeTask
{
    public string DoHugeTask()
    {
        // simulate a long operation
        Thread.Sleep(5000);
        return "Huge Task Completed at " + DateTime.Now.ToString()
    }
}
```

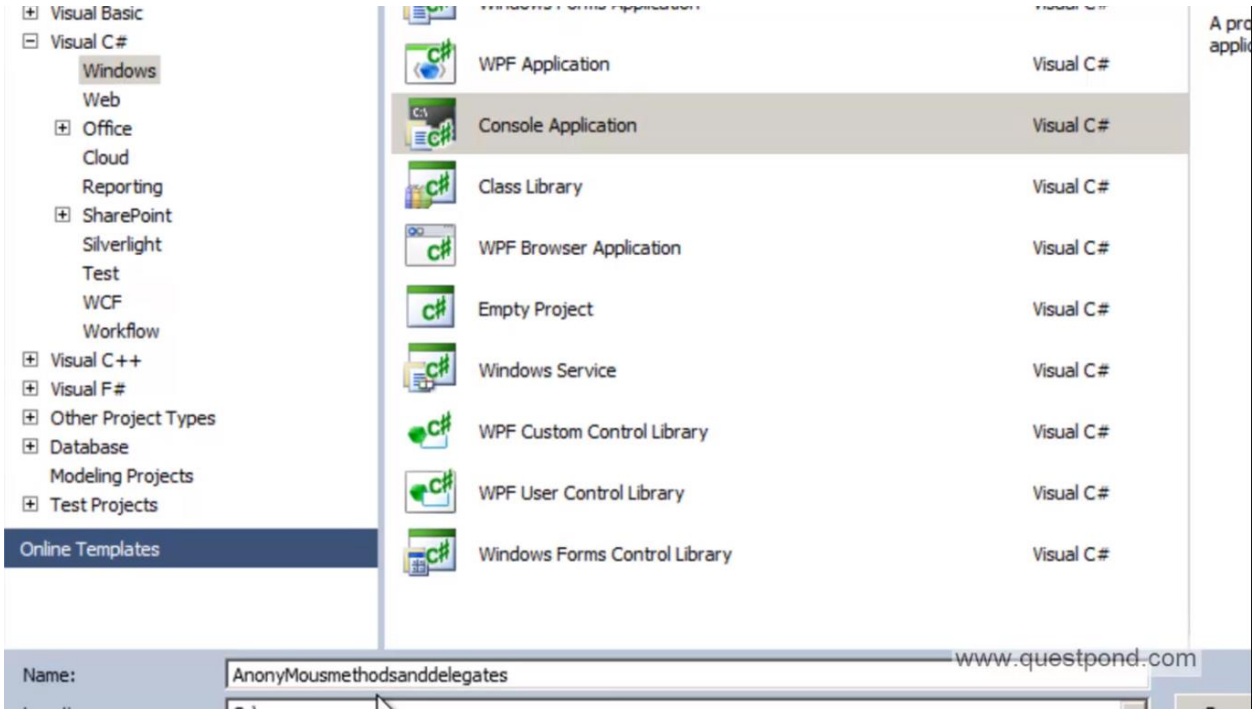
```
    delegate string PointertoHugeTask();
    static void Main(string[] args)
    {
        // create the object
        clsHugeTask objHugeTask = new clsHugeTask();

        // create the delegate
        PointertoHugeTask objPointertoHugeTask = new PointertoHugeTask(objHugeTask.DoHugeTask);

        // call the delegate asynchronously
        objPointertoHugeTask.BeginInvoke(new AsyncCallback(CallbackMethod), objPointertoHugeTask);

        // wait to exit
        Console.WriteLine("Waiting in main method to complete the delegate");
        Console.ReadLine();
    }

    static void CallbackMethod(IAsyncResult result)
    {
        // get the delegate that was used to call that
        // method
       PointertoHugeTask objPointertoHugeTask =
           (PointertoHugeTask)result.AsyncState;

        // get the return value from that method call
        string strreturnValue = objPointertoHugeTask.EndInvoke(result);
```


```
        // call the delegate asynchronously
        objPointertoHugeTask.BeginInvoke(new AsyncCallback(CallbackMethod), objPointertoHugeTask);

        // wait to exit
        Console.WriteLine("Waiting in main method to complete the delegate");
        Console.ReadLine();
    }

    static void CallbackMethod(IAsyncResult result)
    {
        // get the delegate that was used to call that
        // method
       PointertoHugeTask objPointertoHugeTask =
           (PointertoHugeTask)result.AsyncState;

        // get the return value from that method call
        string strreturnValue = objPointertoHugeTask.EndInvoke(result);

        Console.WriteLine(strreturnValue);
    }
}

class clsHugeTask
{
    public string DoHugeTask()
    {
        // simulate a long operation
```



What are anonymous methods in C#?

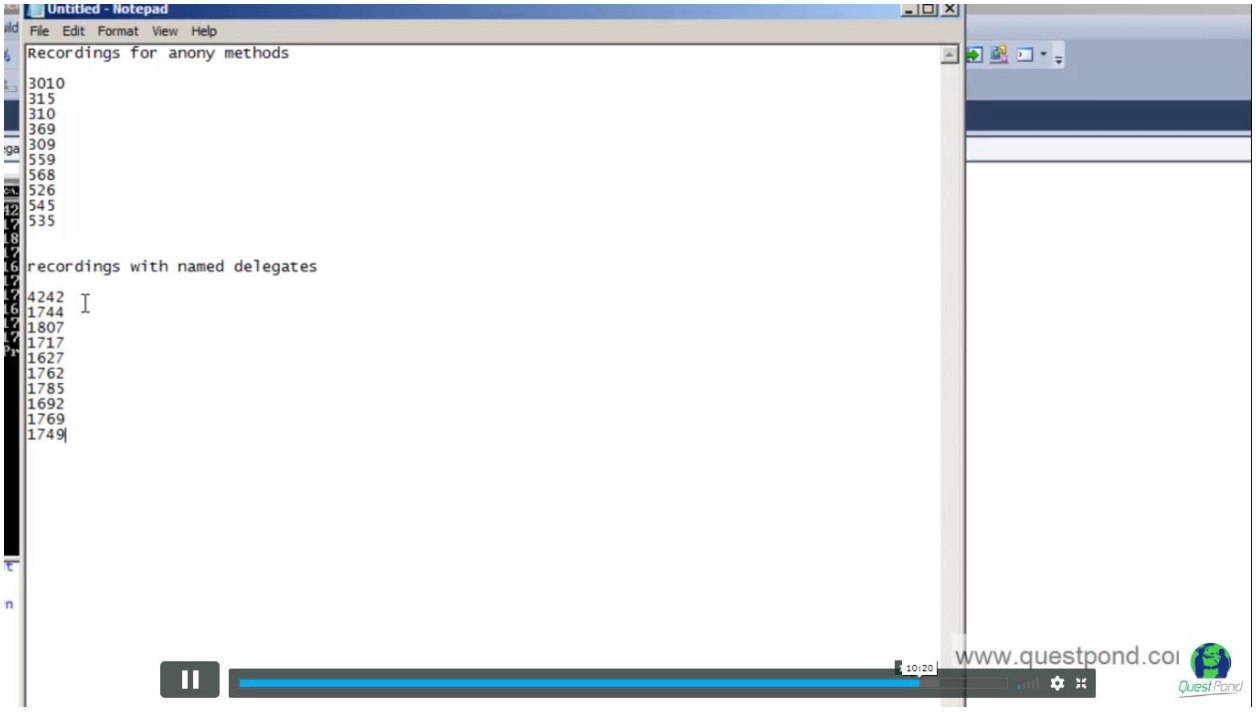


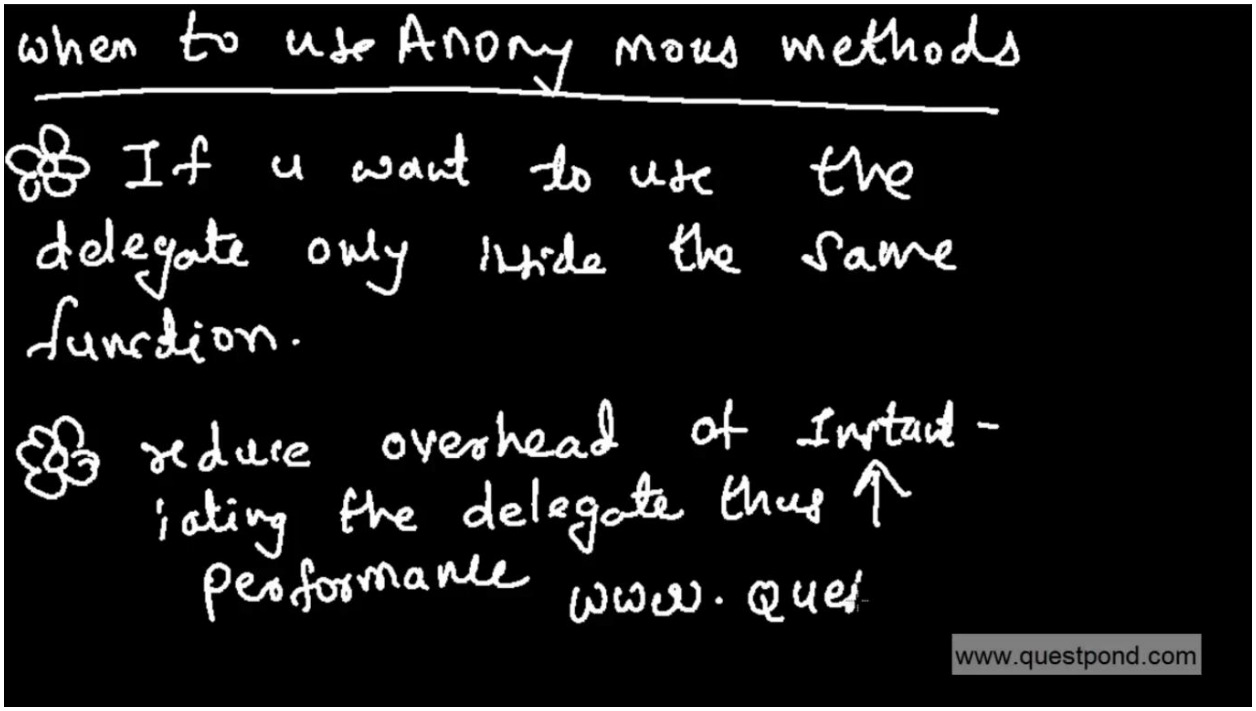



```
namespace AnonyMousmethodsanddelegates
{
    class Program
    {
        delegate int PointtoAddFunction(int num1, int num2);
        static void Main(string[] args)
        {
            PointtoAddFunction pobjAdd = Add;
            Console.WriteLine(pobjAdd.Invoke(2, 2).ToString());
            Console.ReadLine();
        }

        static int Add(int num1, int num2)
        {
            return num1 + num2;
        }
    }
}
```

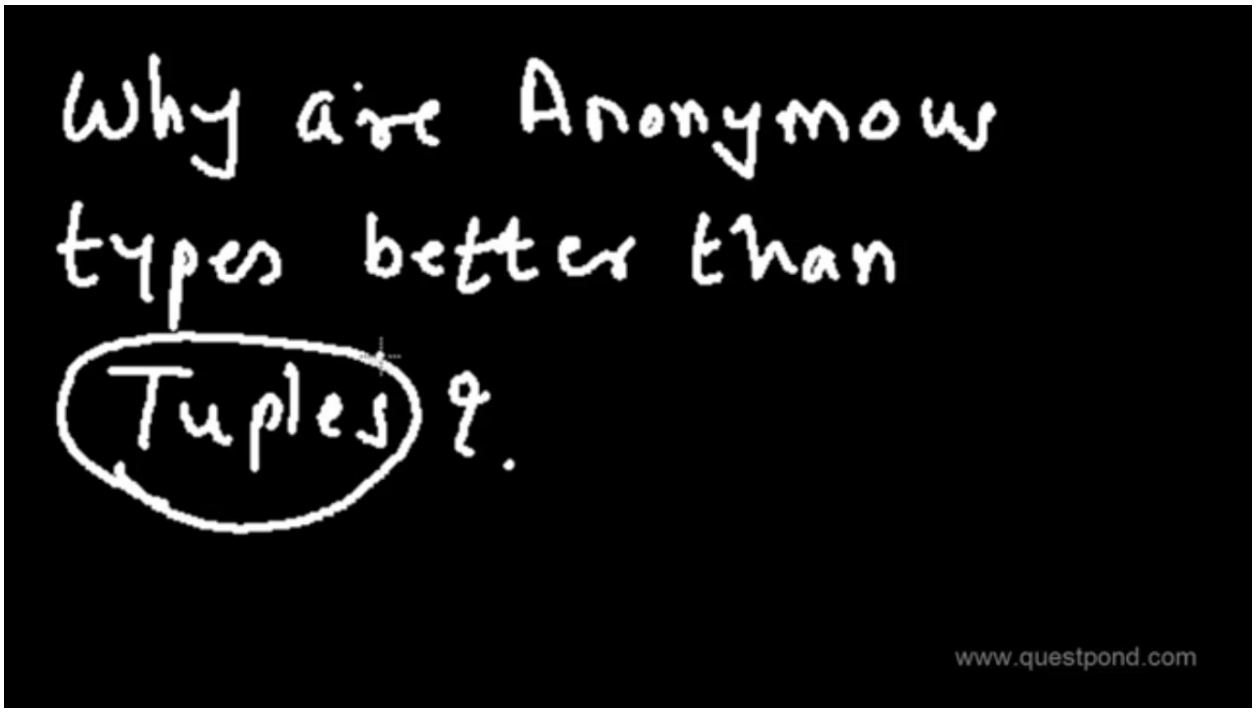
```
namespace AnonyMousmethodsanddelegates
{
    class Program
    {
        delegate int PointtoAddFunction(int num1, int num2);
        static void Main(string[] args)
        {
            PointtoAddFunction pobjAdd = delegate(int num1, int num2)
            {
                return num1 + num2;
            };
            Console.WriteLine(pobjAdd.Invoke(2, 2).ToString());
            Console.ReadLine();
        }


    }
}
```

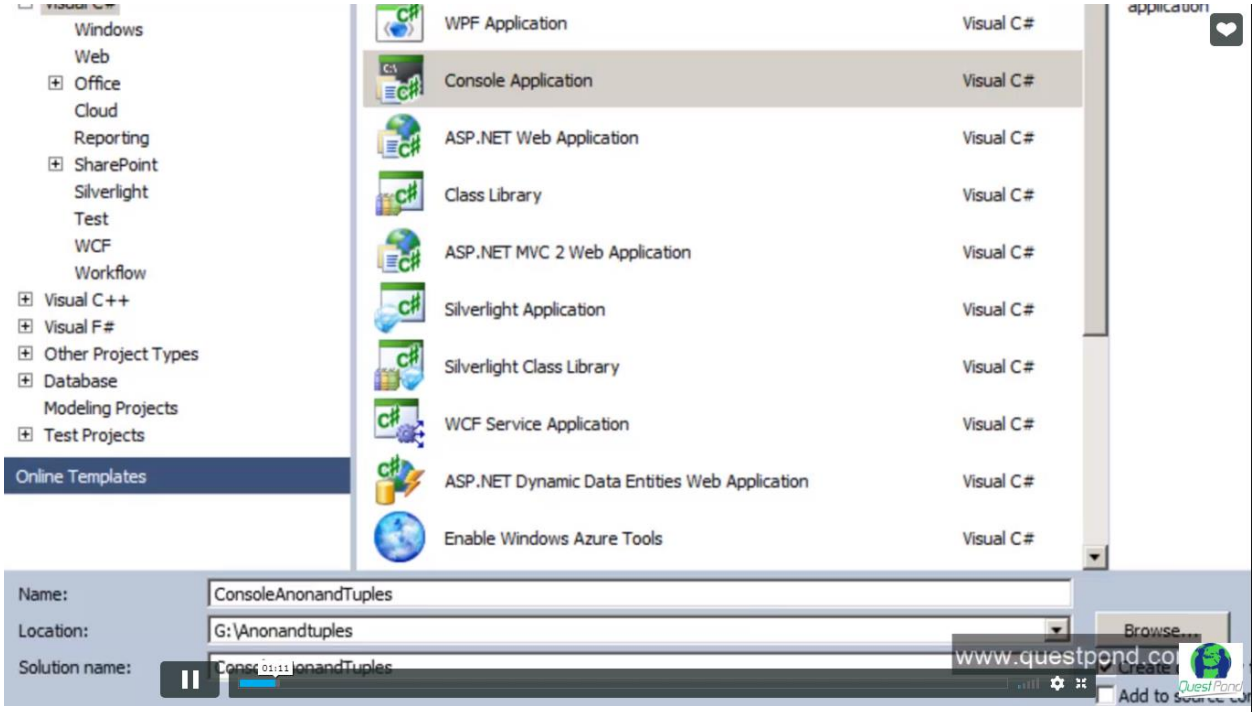

Anonymous methods help us to avoid over head of creating methods for simple lines code where you pointed to delegate. Anonymous methods in order to increase performance





Why anonymous types are preferred over Tuples?






```
class Program
{
    static void Main(string[] args)
    {
        string str = "Shivprasad H Koirala 92839283";
        string strFirstName = "";
        string strMiddleName = "";
        string strSurname = "";
        double Phonenumber = 0;
        ParseData(str,out strFirstName,out strMiddleName,out strSurname,out Phonenumb

    }

    static void ParseData(string strData, out string strFirstName, out string strMidd
    {
        string[] ArrayData = new string[3];
        ArrayData = strData.Split(' ');
        strFirstName = ArrayData[0];
        strMiddleName = ArrayData[1];
```


class Program
{
static void Main(string[] args)
{
string str = "Shivprasad H Koirala 92839283";
string strFirstName = "";
string strMiddleName = "";
string strSurname = "";
double Phonenumber = 0;
ParseData(str,out strFirstName,out strMiddleName,out strSurname,out Phonenumb
Console.WriteLine("First name : " + strFirstName);
Console.WriteLine("Middle name : " + strMiddleName);
Console.WriteLine("surName : " + strSurname);
Console.WriteLine("Phonenumber : " + Phonenumber.ToString());
Console.ReadLine();
}
08:12
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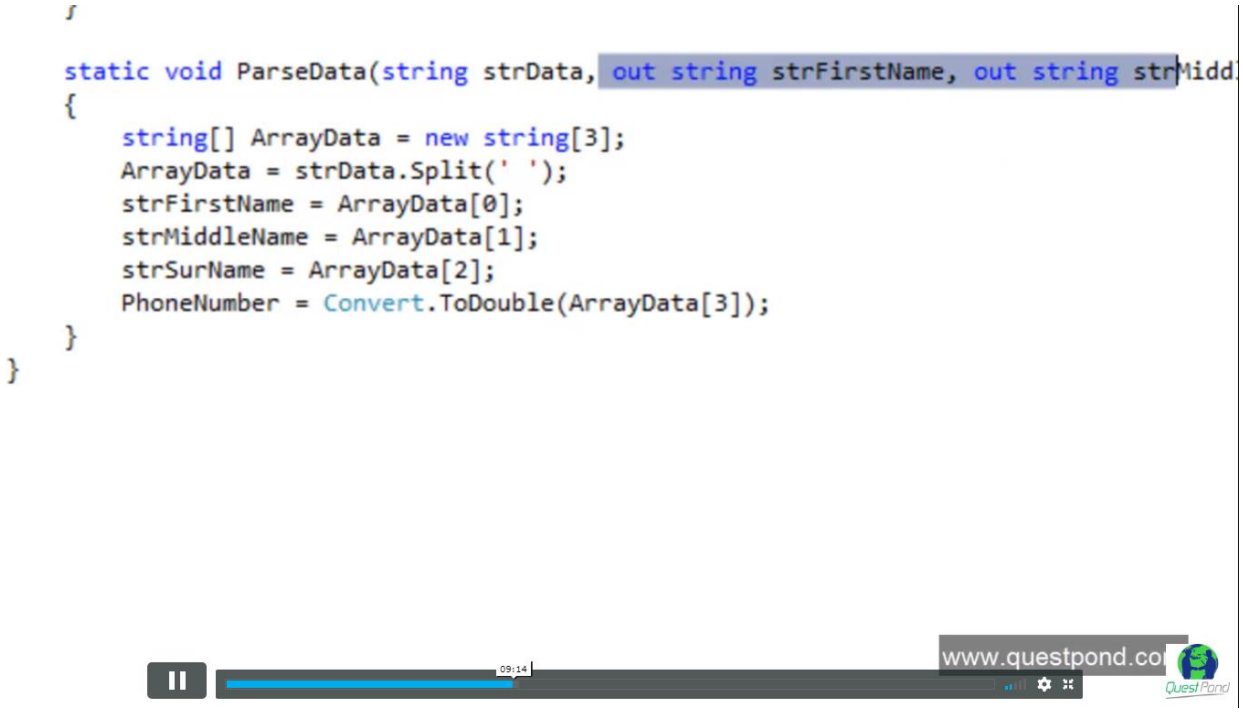
static void ParseData(string strData, out string strFirstName, out string strMidd
{
string[] ArrayData = new string[3];
ArrayData = strData.Split(' ');
strFirstName = ArrayData[0];
strMiddleName = ArrayData[1];
strSurName = ArrayData[2];
PhoneNumber = Convert.ToDouble(ArrayData[3]);
}
}
09:14
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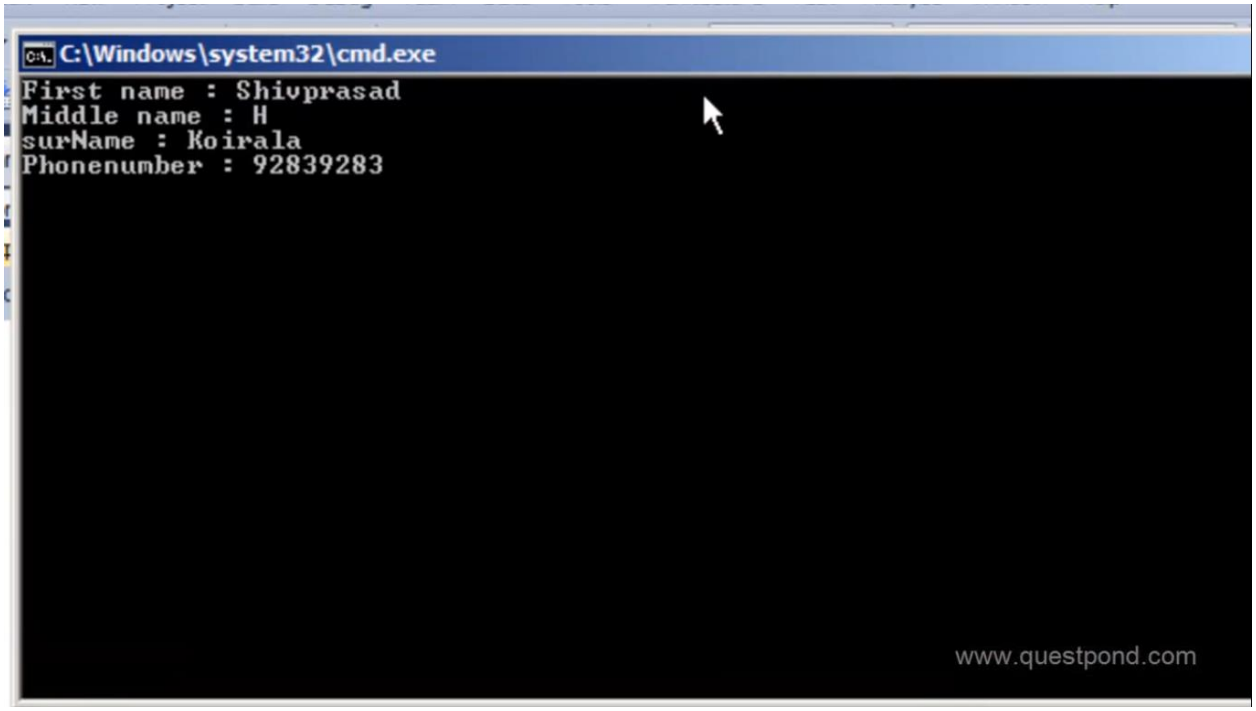
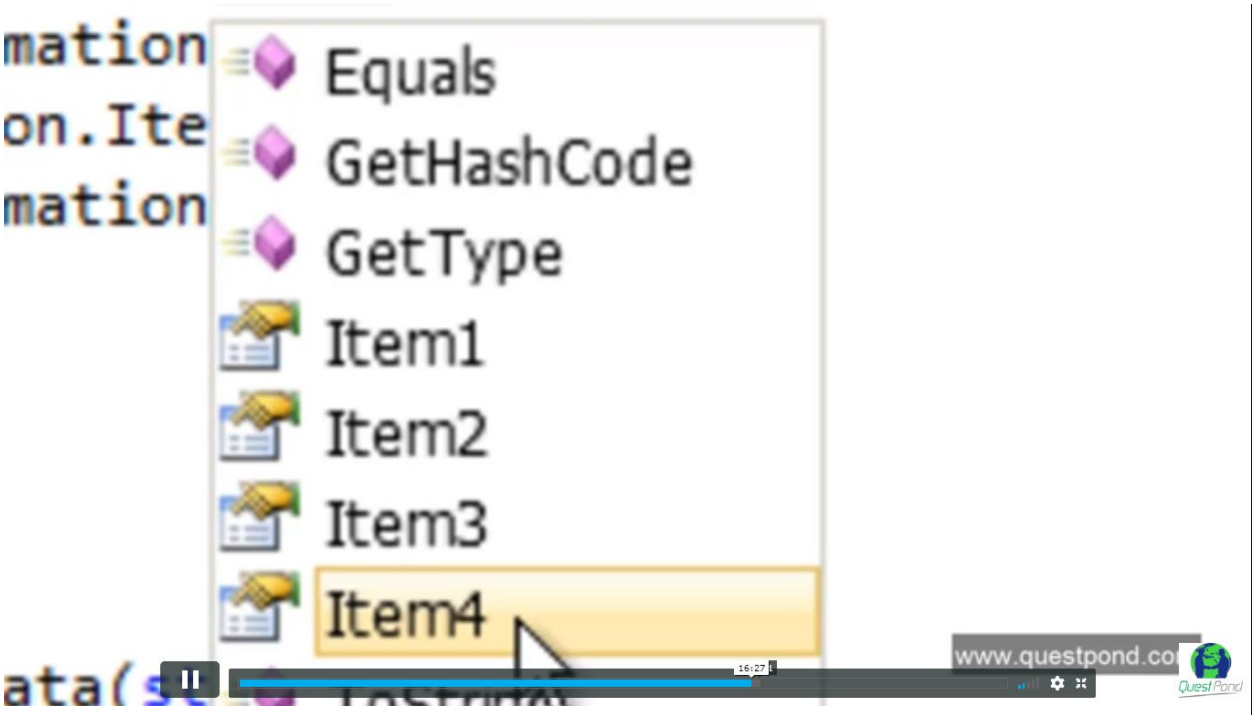



```
}

static Tuple<string,string,string,double> ParseData(string s
{
    string[] ArrayData = new string[3];
    ArrayData = strData.Split(' ');
    return Tuple.Create<string,string,string,double>(
            ArrayData[0],
            ArrayData[1],
            ArrayData[2],
            Convert.ToDouble( ArrayData[3]));

}
```




```
string str = "Shivprasad H Koirala 92839283";

var myInformation = ParseData(str);

Console.WriteLine("First name : " + strFirstName);
Console.WriteLine("Middle name : " + strMiddleName);
Console.WriteLine("surName :" + strSurname);
Console.WriteLine("Phonenumber : " + Phonenumber.ToString());
Console.ReadLine();
```

```
tatic Tuple<string,string,string,double> ParseDa
```

```
string str = "Shivprasad H Koirala 92839283";

var myInformation = ParseData(str);

Console.WriteLine("First name : " + myInformation. strFirstNa
Console.WriteLine("Middle name : " + strMiddleName
Console.WriteLine("surName : " + strSurname);
Console.WriteLine("Phonenumber : " + Phonenumber.T
Console.ReadLine();
```

Equals
GetHash
GetType
Item1
Item2
Item3
Item4
ToString

```
tatic Tuple<string,string,string,double> ParseData(st
```



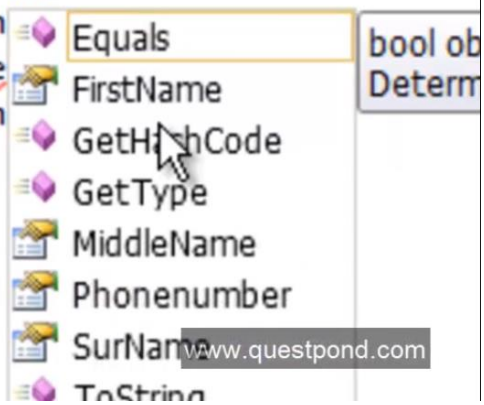
```
    var myInformation = ParseData(str);

    Console.WriteLine("First name : " + myInformation.Item1);
    Console.WriteLine("Middle name : " + myInformation.Item2);
    Console.WriteLine("surName : " + myInformation.Item3);
    Console.WriteLine("Phonenumber : " + myInformation.Item4);
    Console.ReadLine();



}

static object ParseData(string strData)
{
    string[] ArrayData = new string[3];
    ArrayData = strData.Split(' ');
    return new {FirstName=ArrayData[0],MiddleName=ArrayData[1],SurName=ArrayData[
}
```

```
    }

    static object ParseData(string strData)
    {
        string[] ArrayData = new string[3];
        ArrayData = strData.Split(' ');
        return new {FirstName=ArrayData[0],MiddleName=ArrayData[1],SurName=ArrayDa


    }

    T Cast<T>(object obj, T type)
    {
        return (T)obj;
    }

}
```

```
string str = "Shivprasad H Koirala 92839283";

var myInformation = Cast(ParseData(str), new { FirstName = "",
                MiddleName ="",
                SurName = "",
                Phonenumber = 0});

Console.WriteLine("First name : " + myInformation.Item1);
Console.WriteLine("Middle name : " + myInformation.Item2);
Console.WriteLine("surName : " + myInformation.Item3);
Console.WriteLine("Phonenumber : " + myInformation.Item4);
Console.ReadLine();
```



```
mation = Cast(ParseData(str), new { FirstName = "",
     MiddleName ="",
     SurName = "",
     Phonenumber = 0});

teLine("First name : " + myInformation.);
teLine("Middle name : " + myInformation
teLine("surName : " + myInformation.Ite
teLine("Phonenumber : " + myInformation
dLine();
```



```
 started: Project: ConsoleAnonandTuples, Configuration: Debug x
nandTuples -> G:\Anonandtuples\ConsoleAnonandTuples\ConsoleAnon
uild: 1 succeeded, 0 failed, 0 up-to-date, 0 skipped ==========
```