

Build tutorial

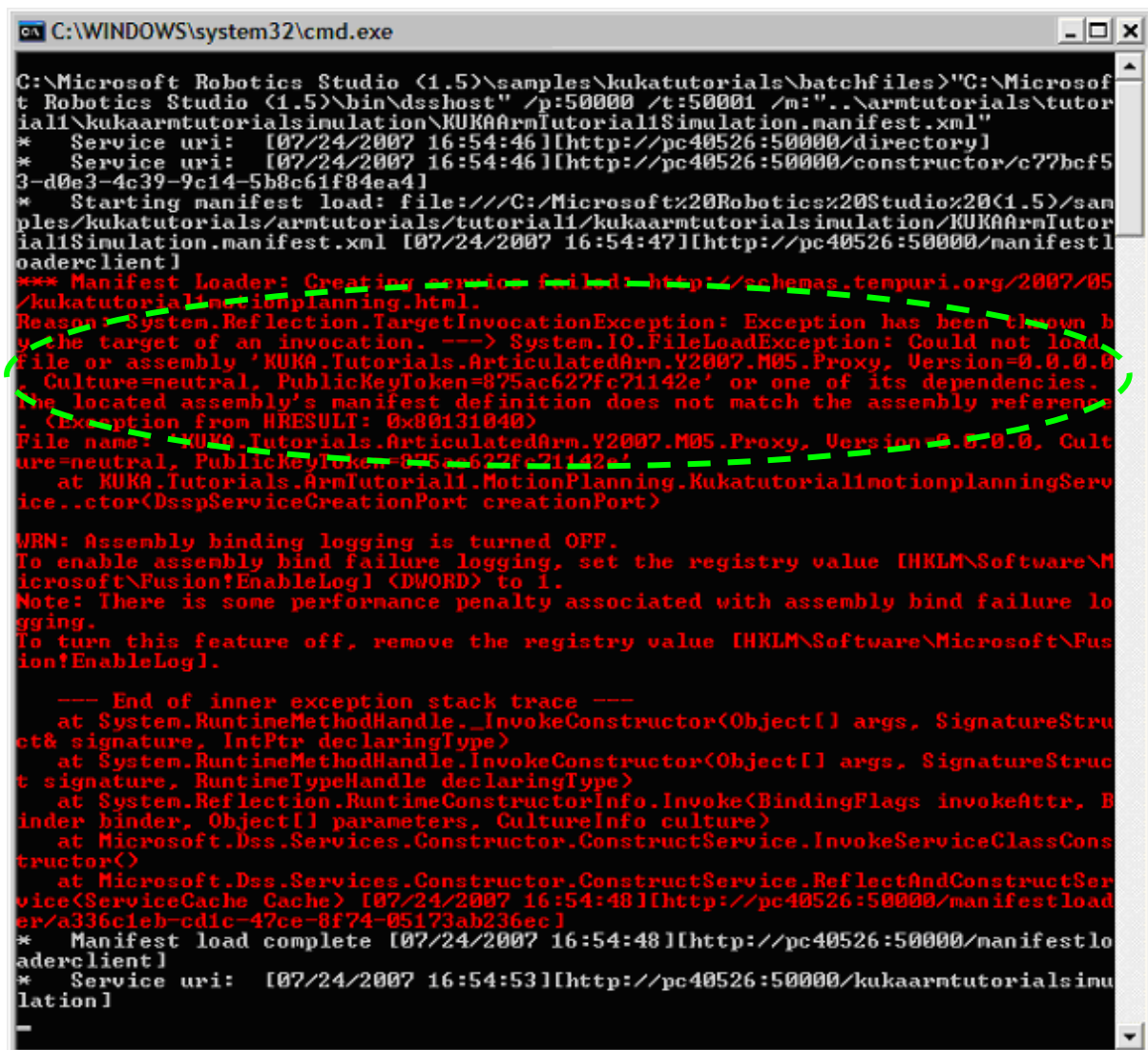
The KUKA Educational Framework is delivered with the source code of all services and the related compiled assemblies.

Rebuilding the Source Code of the Tutorials

Recompiling a single service can result in exceptions when trying to start a tutorial, because we used a different Public Key Token for compiling the service than you do. We could ignore this token by setting the 'Specific Version' flag in the properties of the involved references to 'false', but we encountered different and pretty obscure errors while testing this. To avoid this, we left the 'Specific Version' flag 'true', and handle the reference problems when they arise. This tutorial shows how the education framework code has to be rebuilt so it can be easily changed afterwards.

Example: Arm Tutorial 1

After opening ArmTutorial1 and rebuilding the 'ArticulatedArm' service, which has no dependency to other services or classes of the Educational Framework, you get the following error message when you try to run the tutorial:



```
C:\WINDOWS\system32\cmd.exe
C:\Microsoft Robotics Studio (1.5)\samples\kukatutorials\batchfiles>"C:\Microsoft Robotics Studio (1.5)\bin\dsshost" /p:50000 /t:50001 /m:"..\armtutorials\tutorial1\kukaarmtutorialsimulation\KUKAArmTutorial1Simulation.manifest.xml"
* Service uri: [07/24/2007 16:54:46] [http://pc40526:50000/directory]
* Service uri: [07/24/2007 16:54:46] [http://pc40526:50000/constructor/c77bcf53-d0e3-4c39-9c14-5b8c61f84ea4]
* Starting manifest load: file:///C:/Microsoft%20Robotics%20Studio%20(1.5)/samples/kukatutorials/armtutorials/tutorial1/kukaarmtutorialsimulation/KUKAArmTutorial1Simulation.manifest.xml [07/24/2007 16:54:47] [http://pc40526:50000/manifestloaderclient]
*** Manifest Loader: Creating service failed - http://schemas.tempuri.org/2007/05/kukatutorial1motionplanning.html.
Reason: System.Reflection.TargetInvocationException: Exception has been thrown by the target of an invocation. --> System.IO.FileLoadException: Could not load file or assembly 'KUKA.Tutorials.ArticulatedArm.V2007.M05.Proxy, Version=0.0.0.0, Culture=neutral, PublicKeyToken=875ac627fc71142e' or one of its dependencies. The located assembly's manifest definition does not match the assembly reference. (Exception from HRESULT: 0x80131040)
File name: 'KUKA.Tutorials.ArticulatedArm.V2007.M05.Proxy, Version=0.0.0.0, Culture=neutral, PublicKeyToken=875ac627fc71142e'
at KUKA.Tutorials.ArmTutorial1.MotionPlanning.Kukatutorial1motionplanningService..ctor(DssServiceCreationPort creationPort)

WRN: Assembly binding logging is turned OFF.
To enable assembly bind failure logging, set the registry value [HKLM\Software\Microsoft\Fusion!EnableLog] (DWORD) to 1.
Note: There is some performance penalty associated with assembly bind failure logging.
To turn this feature off, remove the registry value [HKLM\Software\Microsoft\Fusion!EnableLog].

--- End of inner exception stack trace ---
at System.RuntimeMethodHandle._InvokeConstructor(Object[] args, SignatureStruct& signature, IntPtr declaringType)
at System.RuntimeMethodHandle.InvokeConstructor(Object[] args, SignatureStruct signature, RuntimeTypeHandle declaringType)
at System.Reflection.RuntimeConstructorInfo.Invoke(BindingFlags invokeAttr, Binder binder, Object[] parameters, CultureInfo culture)
at Microsoft.Dss.Services.Constructor.ConstructService.InvokeServiceClassConstructor()
at Microsoft.Dss.Services.Constructor.ConstructService.ReflectAndConstructService(ServiceCache Cache) [07/24/2007 16:54:48] [http://pc40526:50000/manifestloader/a336c1eb-cdic-47ce-8f74-05173ab236ec]
* Manifest load complete [07/24/2007 16:54:48] [http://pc40526:50000/manifestloaderclient]
* Service uri: [07/24/2007 16:54:53] [http://pc40526:50000/kukaarmtutorialsimulation]
```

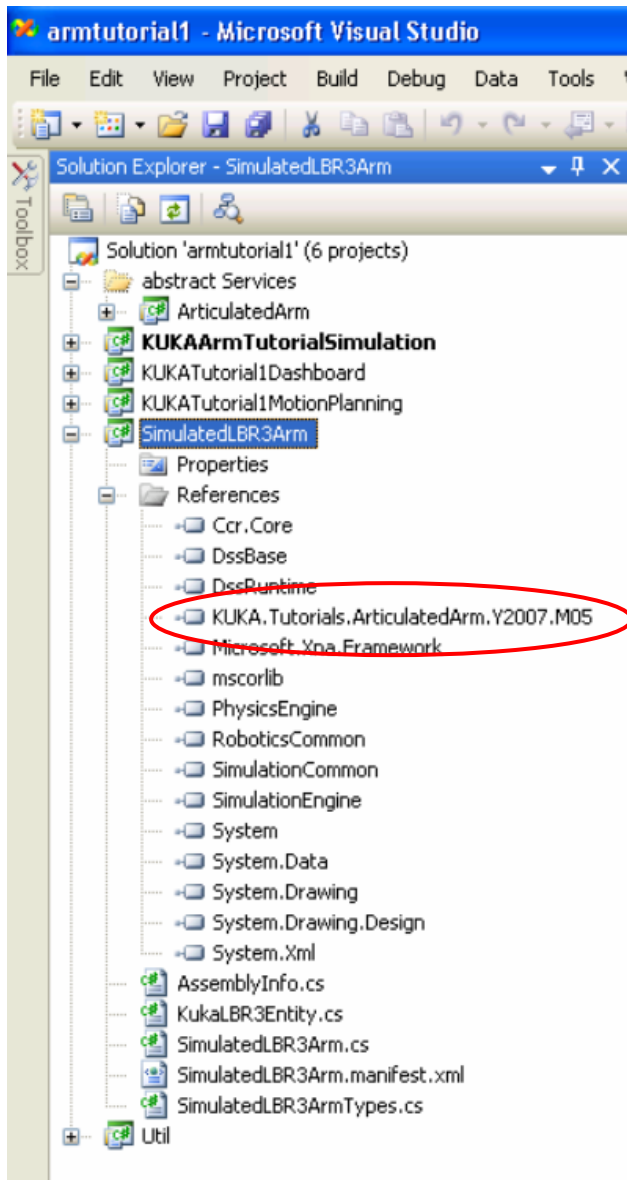
Note the message: “*Could not load file or assembly ‘...ArticulatedArm...Proxy’ ... The located assembly reference does not match the assembly reference...*”. This shows that the current reference to the articulated arm assembly within the project does not match the newly generated articulated arm assembly anymore.

To solve this error you have to rebuild all services that reference the ArticulatedArm service. (Afterwards all services that reference any of the newly build services have to be rebuilt and so on...)

This tutorial shows how to rebuild “ArmTutorial1”, all other tutorials are to be recompiled in a similar way. For this reason every tutorial starts with a table of services, which needs to be recompiled when you want to modify them.

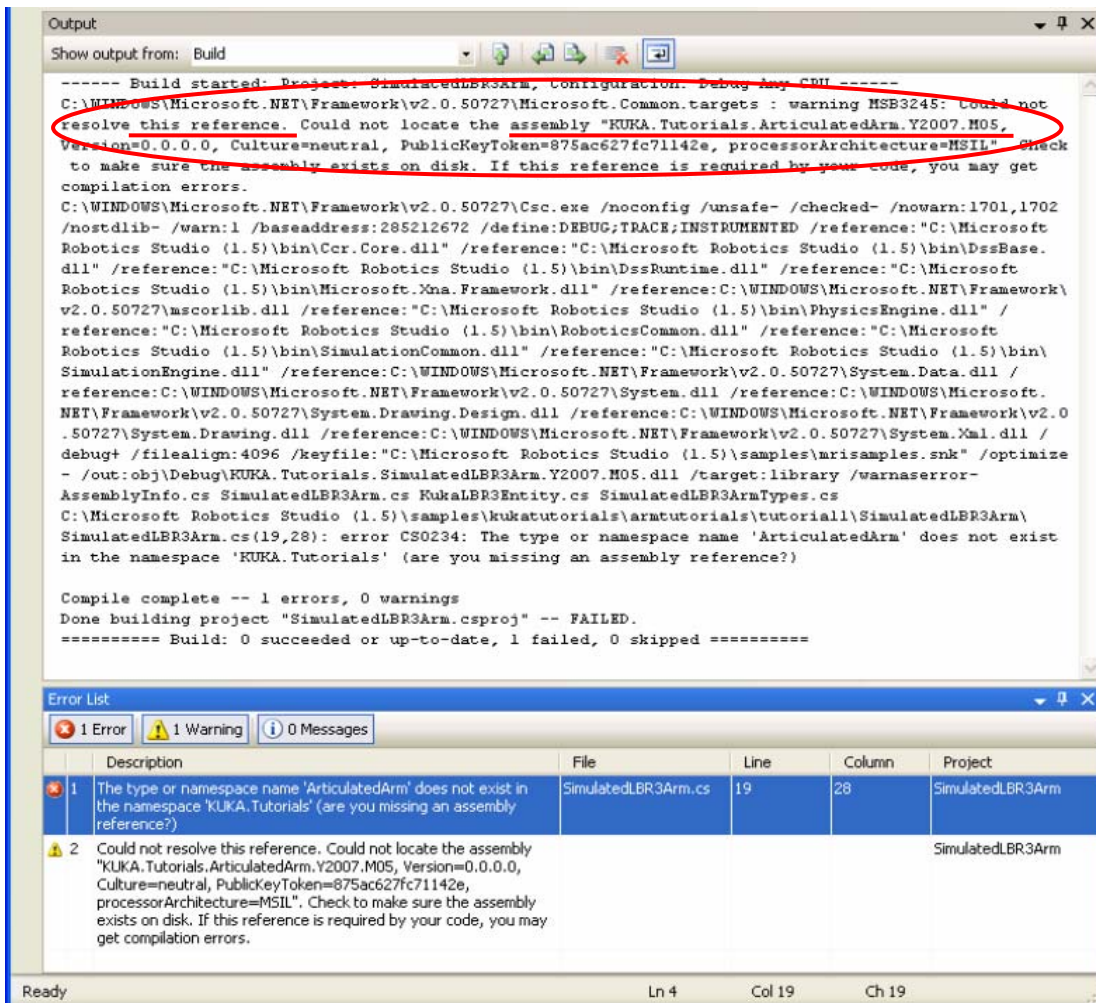
Rebuilding ArmTutorial1

As seen in the figure above, rebuilding the articulated arm service leads to an error when running the tutorial. The tricky thing about this is that the “References” Folder in your project does not indicate a warning, even though we have seen that the reference is not correct anymore:



Seems OK, but is invalid

But when trying to compile it, you get the following errors and warnings:



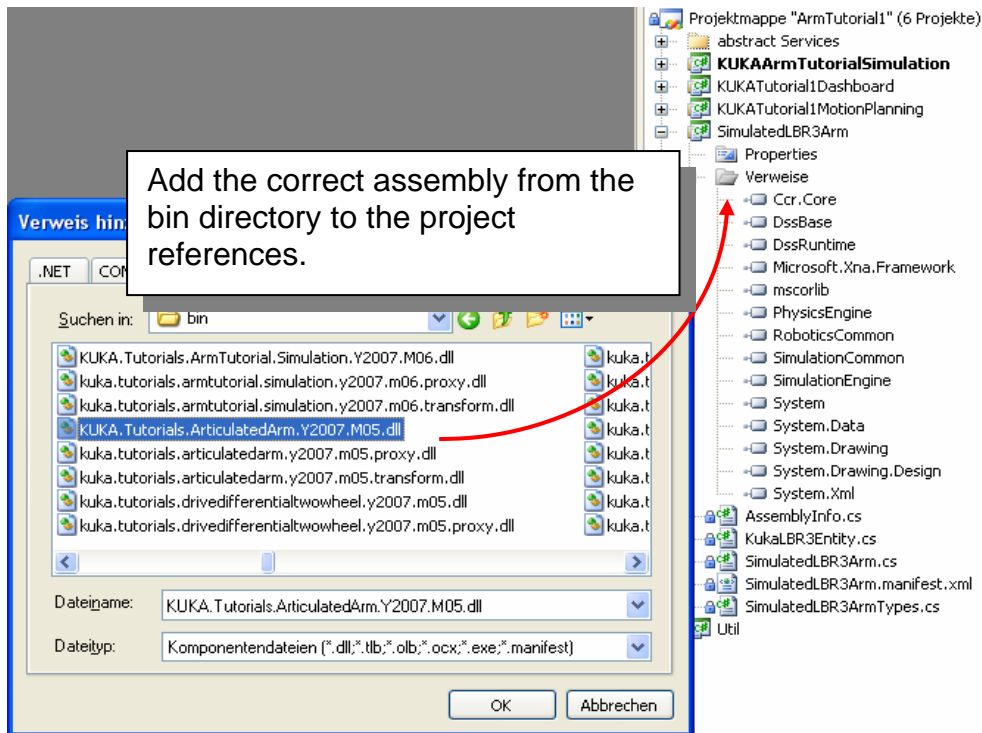
The screenshot shows the Visual Studio Output window and the Error List window. The Output window displays the build process for the project "SimulatedLBR3Arm" in Debug Any CPU configuration. A warning (MSB3245) is highlighted in red, stating: "Could not resolve this reference. Could not locate the assembly 'KUKA.Tutorials.ArticulatedArm.Y2007.M05, Version=0.0.0.0, Culture=neutral, PublicKeyToken=875ac627fc71142e, processorArchitecture=MSIL'. Check to make sure the assembly exists on disk. If this reference is required by your code, you may get compilation errors." The Error List window shows two items: an error (CS0234) and a warning (MSB3245). The error message is: "The type or namespace name 'ArticulatedArm' does not exist in the namespace 'KUKA.Tutorials' (are you missing an assembly reference?)".

```
----- Build started: Project: SimulatedLBR3Arm, Configuration: Debug Any CPU -----
C:\WINDOWS\Microsoft.NET\Framework\v2.0.50727\Microsoft.Common.targets : warning MSB3245: Could not
resolve this reference. Could not locate the assembly "KUKA.Tutorials.ArticulatedArm.Y2007.M05,
Version=0.0.0.0, Culture=neutral, PublicKeyToken=875ac627fc71142e, processorArchitecture=MSIL". Check
to make sure the assembly exists on disk. If this reference is required by your code, you may get
compilation errors.
C:\WINDOWS\Microsoft.NET\Framework\v2.0.50727\Csc.exe /noconfig /unsafe- /checked- /nowarn:1701,1702
/nostdlib- /warn:1 /baseaddress:285212672 /define:DEBUG;TRACE;INSTRUMENTED /reference:"C:\Microsoft
Robotics Studio (1.5)\bin\Ccr.Core.dll" /reference:"C:\Microsoft Robotics Studio (1.5)\bin\DssBase.
dll" /reference:"C:\Microsoft Robotics Studio (1.5)\bin\DssRuntime.dll" /reference:"C:\Microsoft
Robotics Studio (1.5)\bin\Microsoft.Xna.Framework.dll" /reference:C:\WINDOWS\Microsoft.NET\Framework\
v2.0.50727\mscorlib.dll /reference:"C:\Microsoft Robotics Studio (1.5)\bin\PhysicsEngine.dll" /
reference:"C:\Microsoft Robotics Studio (1.5)\bin\RoboticsCommon.dll" /reference:"C:\Microsoft
Robotics Studio (1.5)\bin\SimulationCommon.dll" /reference:"C:\Microsoft Robotics Studio (1.5)\bin\
SimulationEngine.dll" /reference:C:\WINDOWS\Microsoft.NET\Framework\v2.0.50727\System.Data.dll /
reference:C:\WINDOWS\Microsoft.NET\Framework\v2.0.50727\System.dll /reference:C:\WINDOWS\Microsoft.
NET\Framework\v2.0.50727\System.Drawing.Design.dll /reference:C:\WINDOWS\Microsoft.NET\Framework\v2.0.
50727\System.Drawing.dll /reference:C:\WINDOWS\Microsoft.NET\Framework\v2.0.50727\System.Xml.dll /
debug+ /filealign:4096 /keyfile:"C:\Microsoft Robotics Studio (1.5)\samples\mr\samples.snk" /optimize
- /out:obj\Debug\KUKA.Tutorials.SimulatedLBR3Arm.Y2007.M05.dll /target:library /warnaserror-
AssemblyInfo.cs SimulatedLBR3Arm.cs KukaLBR3Entity.cs SimulatedLBR3ArmTypes.cs
C:\Microsoft Robotics Studio (1.5)\samples\kukatutorials\armtutorials\tutorial1\SimulatedLBR3Arm\
SimulatedLBR3Arm.cs(19,28): error CS0234: The type or namespace name 'ArticulatedArm' does not exist
in the namespace 'KUKA.Tutorials' (are you missing an assembly reference?)

Compile complete -- 1 errors, 0 warnings
Done building project "SimulatedLBR3Arm.csproj" -- FAILED.
===== Build: 0 succeeded or up-to-date, 1 failed, 0 skipped =====
```

	Description	File	Line	Column	Project
1	The type or namespace name 'ArticulatedArm' does not exist in the namespace 'KUKA.Tutorials' (are you missing an assembly reference?)	SimulatedLBR3Arm.cs	19	28	SimulatedLBR3Arm
2	Could not resolve this reference. Could not locate the assembly "KUKA.Tutorials.ArticulatedArm.Y2007.M05, Version=0.0.0.0, Culture=neutral, PublicKeyToken=875ac627fc71142e, processorArchitecture=MSIL". Check to make sure the assembly exists on disk. If this reference is required by your code, you may get compilation errors.				SimulatedLBR3Arm

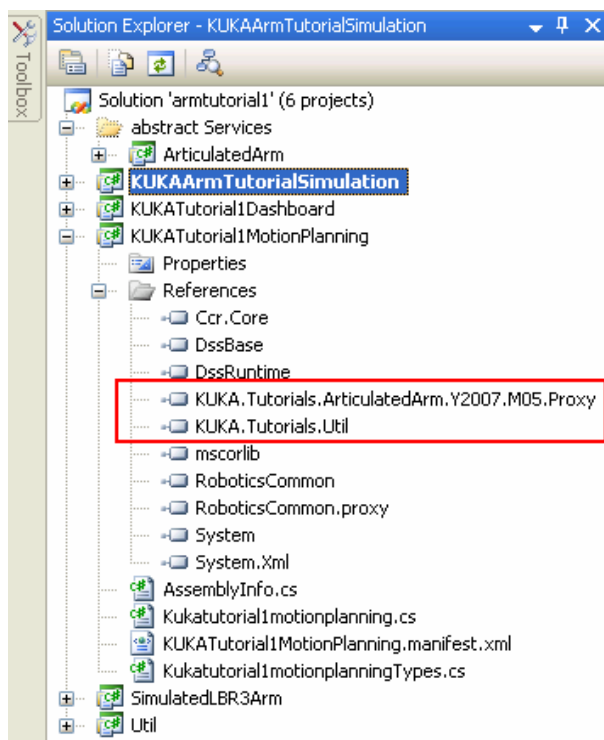
To resolve this problem, you have to delete the reference to the "KUKA.Tutorials.ArticulatedArm.Y2007.M05" and add it to the project again.



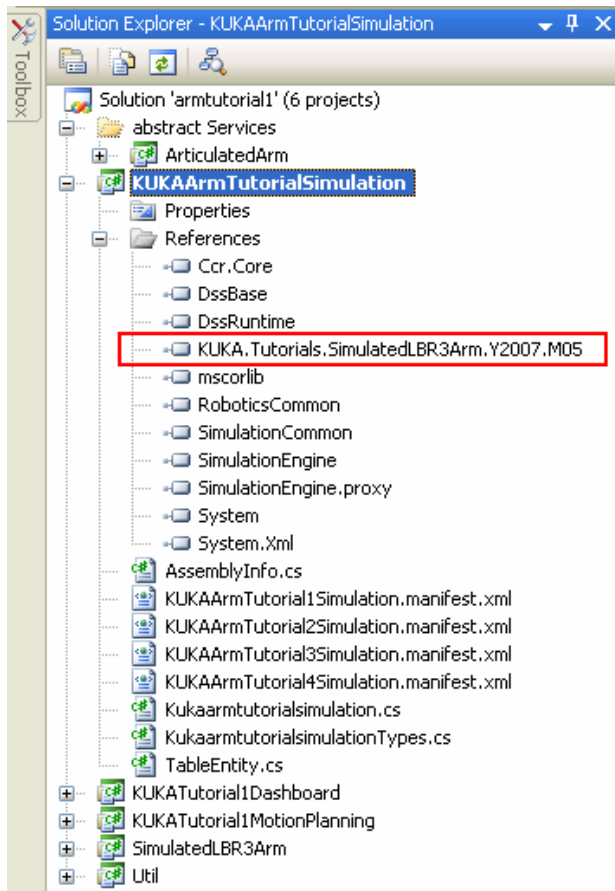
Afterwards you can compile the service. Now the other projects for this tutorial need to be rebuild.

The Util class library can be compiled without adjusting the references. But in the “KUKATutorial1MotionPlanning” project and the “KUKAArmTutorialSimulation” project you have to delete and add the assemblies highlighted in the figures below:

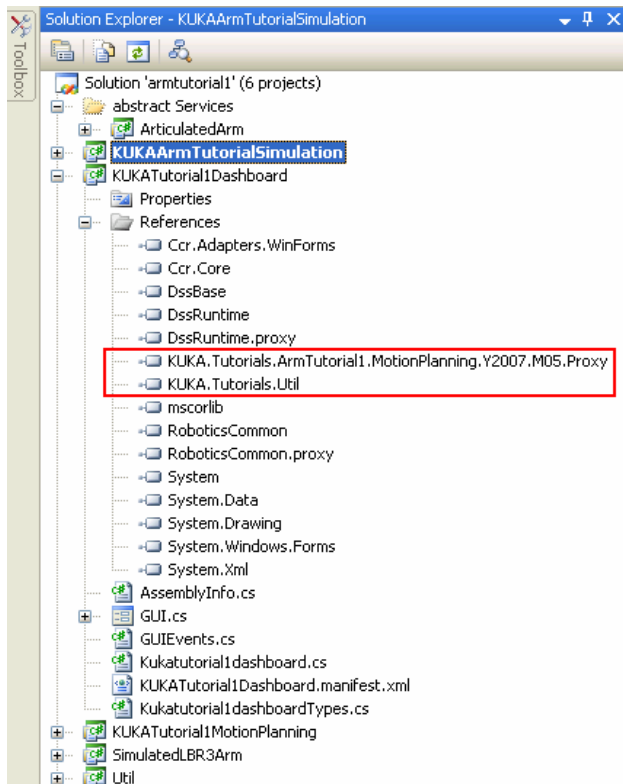
KUKATutorial1MotionPlanning:



KUKAArmTutorialSimulation:



KUKATutorial1Dashboard:



Finally, ArmTutorial1 is executable again. If you now change the source code, you only have to recompile the changed service itself and not all services that have dependencies (as long as you only change the service behaviour and not the state or the supported operations).

Rebuilding the other Tutorials

For rebuilding the other tutorials, you have to remove all assembly references that begin with "KUKA" and add them again. Afterwards, you can compile the services in the order that is shown in the table of each tutorial description.

As an example, the next picture shows the build order for arm tutorial 3. If you went through all the rebuilding for arm tutorial 1 and 2 already, then only column 'A' needs to be rebuild for arm tutorial 3. If you start with arm tutorial 3, then you need to rebuild all the projects that are shown in column 'B'.

Arm Tutorial 3

<i>Arm Tutorial 3 project build order</i>	
<p>A) If you have built all the other projects from the previous solutions step by step, you just need to build the projects in Column A.</p> <p>B) If you haven't built any of the previous tutorial solutions, you need to build all included projects in the order shown in Column B.</p>	
Column A	Column B
<ol style="list-style-type: none"> 1. KUKAUniversalMotionPlanning (in abstract services) 2. KUKATutorial3MotionPlanning 3. KUKATutorial3Dashboard 	<ol style="list-style-type: none"> 1. Util 2. KUKACCommandTypes 3. ArticulatedArm (in abstract services) 4. KUKAUniversalMotionPlanning (in abstract services) 5. SimulatedLBR3Arm 6. KUKAArmTutorialSimulation 7. Transformation 8. KUKATutorial3MotionPlanning 9. KUKATutorial3Dashboard