

REVIEW LESSON

MTA Course: Windows Development Fundamentals

Lesson name: Windows Development Fundamentals 2.5B

Topic: Debug a Windows Services application (One 50-minute class period)

File name: WinDevFund_RL_2.5B

Lesson Objective:

2.5: Debug a Windows-based application. *This objective may include but is not limited to:* using breakpoints and debugging techniques to identify issues in code; debugging a Windows Services application.

Preparation Details

Prerequisite student experiences and knowledge

This MTA Certification Exam Review lesson is written for students who have learned about Windows® application programming. Students who do not have the prerequisite knowledge and experiences cited in the objective will find additional learning opportunities using resources such as those listed in the Microsoft resources and Web links at the end of this review lesson.

Specifically, students are expected to be familiar with the debugging tools available in Visual Studio®, as reviewed in Lesson 2.5A. Also, students must understand the fundamentals of Windows Services applications; they may complete the “Hands-on Activity” to help review about Windows Services.

Instructor preparation activities:

- Pair the students up so that no time is lost after the Microsoft PowerPoint® presentation.
- If you prefer a hands-on activity rather than the quiz questions, you may assign the “Hands-on Activity” described in the “Additional activities (homework or enrichment)” section below.

Resources, software, and additional files needed for this lesson:

- WinDevFund_PPT_2.5B

The optional Hands-on Activity requires:

- Microsoft Visual Studio® 2008, or
 - Microsoft Visual Basic® 2008, Express Edition
(<http://www.microsoft.com/express/downloads/#2008-Visual-Basic>)
 - Microsoft Visual C#® 2008, Express Edition
(<http://www.microsoft.com/express/downloads/#2008-Visual-CS>)

Note: The Windows Service template and associated functionality is not available in the Standard edition of Visual Studio.

Teaching Guide**Essential vocabulary:**

breakpoint—a signal that tells the debugger to suspend execution of a program temporarily at a designated point; this allows the developer to examine a variety of data related to the program.

OnStart method—a member of the *ServiceBase* class that is invoked when a services application is started.

Windows Services application—a long-running application that does not show a user interface.

Lesson Sequence**Activating prior knowledge/lesson staging (Anticipatory Set—5–10 minutes)**

1. *Student prompt (as indicated in the slideshow):* “Imagine that you are debugging an application that uses a *While* loop—whenever you run the application, it seems to get stuck in an infinite loop. Explain how you might go about finding the problem.”
 - The question is too vague for a single correct answer, and student responses will vary.
 - Take a few minutes to discuss the students’ ideas. Though they may not be appropriate for the debugging services, it is good to get students thinking about debugging.

Lesson activity (25 minutes)

1. Teacher Instruction (15 Minutes)
 - Use the PowerPoint slideshow to discuss debugging service applications.
2. Quiz Questions (10 minutes)
 - Place students in pairs. Each pair should create four “quiz questions.” The questions should be short and should focus on basic knowledge, rather than complex application of that knowledge.

Note: if students have reviewed lesson 2.5A prior to this, consider allowing them to create questions about debugging all Windows-based applications instead of just questions related to debugging Windows Services applications.

Assessment/lesson reflection (10 minutes)

Note: If time allows, it is strongly recommended that students be given additional time both for generating questions and answering the questions generated by their peers. See the section “Additional activities (homework or enrichment)” for more information.

1. Students take turns asking questions, and the rest of the class tries to answer them.
 - If time is short, the question-generation process itself can be considered the closure activity. You can check their questions to make sure they understand the material.

Microsoft resources and Web links**MSDN Library: Debugging Windows Service Applications**

([http://msdn.microsoft.com/en-us/library/aa984342\(VS.71\).aspx](http://msdn.microsoft.com/en-us/library/aa984342(VS.71).aspx))

MSDN Library: How to: Debug Windows Service Applications

(<http://msdn.microsoft.com/en-us/library/7a50syb3.aspx>)

MSDN Library: How to: Debug the OnStart Method

(<http://msdn.microsoft.com/en-us/library/cktt23yw.aspx>)

MSDN Library: Debugging Managed Code

(<http://msdn.microsoft.com/en-us/library/awtaffxb.aspx>)

Additional activities (homework or enrichment):

- **“Quiz Game”** —If time allows, give students more time to create questions, and direct them to create questions about all aspects of service applications. Then—perhaps on the following day—have a game-show-style review of the material. Suggested procedures:

- The first pair of students asks the second pair one of their quiz questions. If they answer correctly—and the validity of the question is not disputed by the class—they get a point. If the question is disputed by the class (for being unclear or inaccurate, for example), the “asking” pair *loses* a point.
 - Then, the second pair asks a question of the third pair, repeating the procedure.
 - Continue around the room as time allows. The pair that finishes with the most points wins.
- **Hands-on Activity**—Consider having your students create a simple Windows Services application; the MSDN Library provides a Walkthrough at <http://msdn.microsoft.com/en-us/library/zt39148a.aspx>. Then have them try the debugging procedures as described at <http://msdn.microsoft.com/en-us/library/7a50syb3.aspx>.

Additional notes to the teacher:

- It is strongly recommended that this lesson be used after Lesson 2.5A. The “Quiz Game” activity could then be expanded to cover all aspects of debugging, rather than just debugging Windows Services applications.