

Username: Pralay Patoria **Book:** Under the Hood of .NET Memory Management. No part of any chapter or book may be reproduced or transmitted in any form by any means without the prior written permission for reprints and excerpts from the publisher of the book or chapter. Redistribution or other use that violates the fair use privilege under U.S. copyright laws (see 17 USC 107) or that otherwise violates these Terms of Service is strictly prohibited. Violators will be prosecuted to the full extent of U.S. Federal and Massachusetts laws.

Chapter 4: Common Memory Problems

The .NET Framework is, quite simply, huge, with many areas affecting memory management and potentially causing memory problems, some of which we'll explore in this chapter. We will start by reviewing the basic type system and how this affects memory usage. We will then take a deep dive into the **Dispose** pattern, exploring how this will impact memory usage and the way the GC (GC) performs.

Along the way, we will also find some surprising things affecting memory. The .NET Framework does a lot for us and some of this adds extra overhead that we easily forget about. How do immutable strings affect memory? What about the overhead of a class header? We will explore these, and other questions, as we consider the differences between classes and structs, and explore the size of an object.

The latest framework version also introduces some new concepts that, while exciting, also present new challenges and potential benefits for memory management. Most of us probably never give a second thought to how a lambda expression affects memory, and the **yield** statement is arguably the least understood keyword added to the language.

Finally, we will explore how some programming styles can affect memory, complicating the GC's job. We will see how excessive references, excessive writes, and long-lived objects can all lead to fragmentation, and make it harder for the GC to function successfully.

This may sound like a daunting journey, but when we are through you will be much better attuned to how your choices affect memory.