

GLOBAL
EDITION



Starting Out With Visual C#

FOURTH EDITION

Tony Gaddis



Digital Resources for Students

Your new textbook provides 12-month access to digital resources that may include VideoNotes (step-by-step video tutorials on programming concepts), source code, web chapters, quizzes, and more. Refer to the preface in the textbook for a detailed list of resources.

Follow the instructions below to register for the Companion Website for Tony Gaddis' *Starting Out with Visual C#, Fourth Edition, Global Edition*.

1. Go to www.pearsonglobaleditions.com/Gaddis
2. Enter the title of your textbook or browse by author name
3. Click Companion Website
4. Click Register and follow the on-screen instructions to create a login name and password

**Use a coin to scratch off the coating and reveal your access code.
Do not use a sharp knife or other sharp object as it may damage the code.**

Use the login name and password you created during registration to start using the digital resources that accompany your textbook.

IMPORTANT:

This prepaid subscription does not include access to MyProgrammingLab, which is available at **www.myprogramminglab.com** for purchase.

This access code can only be used once. This subscription is valid for 12 months upon activation and is not transferrable. If the access code has already been revealed it may no longer be valid.

For technical support go to <https://support.pearson.com/getsupport>

Starting Out with Visual C#, Global Edition

Table of Contents

| | |
|---|--|
| Cover | |
| Inside Front Cover | |
| Title Page | |
| Copyright Page | |
| Locations of VideoNotes | |
| Brief Contents | |
| Contents | |
| Preface | |
| Acknowledgments | |
| About the Author | |
| Attention Students | |
| Chapter 1 Introduction to Computers and Programming | |
| 1.1 Introduction | |
| 1.2 Hardware and Software | |
| 1.3 How Computers Store Data | |
| 1.4 How a Program Works | |
| 1.5 Graphical User Interfaces | |
| 1.6 Objects | |
| 1.7 The Program Development Process | |
| 1.8 Getting Started with the Visual Studio Environment | |
| Tutorial 1-1: Starting Visual Studio and Setting Up the Environment | |
| Tutorial 1-2: Starting a New Visual C# Project | |
| Tutorial 1-3: Saving and Closing a Project | |
| Tutorial 1-4: Opening an Existing Project | |
| Tutorial 1-5: Getting Familiar with the Visual Studio Environment | |
| Key Terms | |
| Review Questions | |
| Programming Problems | |

Table of Contents

Chapter 2 Introduction to Visual C#

2.1 Getting Started with Forms and Controls

2.2 Creating the GUI for Your First Visual C# Application: The Hello World Application

Tutorial 2-1: Creating the GUI for the Hello World Application

2.3 Introduction to C# Code

2.4 Writing Code for the Hello World Application

Tutorial 2-2: Writing Code for the Hello World Application

2.5 Label Controls

Tutorial 2-3: Creating the Language Translator Application

2.6 Making Sense of IntelliSense

2.7 PictureBox Controls

Tutorial 2-4: Creating the Flags Application

Tutorial 2-5: Creating the Card Flip Application

2.8 Comments, Blank Lines, and Indentation

2.9 Writing the Code to Close an Applications Form

2.10 Dealing with Syntax Errors

Key Terms

Review Questions

Programming Problems

Chapter 3 Processing Data

3.1 Reading Input with TextBox Controls

3.2 A First Look at Variables

Tutorial 3-1: The Birth Date String Application

3.3 Numeric Data Types and Variables

3.4 Performing Calculations

3.5 Inputting and Outputting Numeric Values

Tutorial 3-2: Calculating Fuel Economy

3.6 Formatting Numbers with the ToString Method

Tutorial 3-3: Creating the Sale Price Calculator Application with Currency Formatting

3.7 Simple Exception Handling

Tutorial 3-4: Creating the Test Average Application with Exception Handling

3.8 Using Named Constants

3.9 Declaring Variables as Fields

Table of Contents

Tutorial 3-5: Creating the Change Counter Application

3.10 Using the Math Class

3.11 More GUI Details

3.12 Using the Debugger to Locate Logic Errors

Tutorial 3-6 Single-stepping through an Applications Code at Runtime

Key Terms

Review Questions

Programming Problems

Chapter 4 Making Decisions

4.1 Decision Structures and the if Statement

Tutorial 4-1: Completing the Test Score Average Application

4.2 The if-else Statement

Tutorial 4-2: Completing the Payroll with Overtime Application

4.3 Nested Decision Structures

Tutorial 4-3: Completing the Loan Qualifier Application

4.4 Logical Operators

4.5 bool Variables and Flags

4.6 Comparing Strings

4.7 Preventing Data Conversion Exceptions with the TryParse Methods

Tutorial 4-4: Calculating Fuel Economy

4.8 Input Validation

4.9 Radio Buttons and Check Boxes

Tutorial 4-5: Creating the Color Theme Application

4.10 The switch Statement

4.11 Introduction to List Boxes

Tutorial 4-6: Creating the Time Zone Application

Key Terms

Review Questions

Programming Problems

Chapter 5 Loops, Files, and Random Numbers

5.1 More about ListBoxes

5.2 The while Loop

Tutorial 5-1: Using a Loop to Calculate an Account Balance

Table of Contents

Tutorial 5-2: Enhancing the Ending Balance Application

5.3 The ++ and -- operators

5.4 The for Loop

Tutorial 5-3: Using the for Loop

5.5 The do-while Loop

5.6 Using Files for Data Storage

Tutorial 5-4: Writing Data to a Text File

Tutorial 5-5: Appending Data to the Friend.txt File

Tutorial 5-6: Using a Loop to Read to the End of a File

Tutorial 5-7: Calculating a Running Total

5.7 The OpenFileDialog and SaveFileDialog Controls

5.8 Random Numbers

Tutorial 5-8: Simulating Coin Tosses

5.9 The Load Event

Tutorial 5-9: Creating a Load Event Handler

Key Terms

Review Questions

Programming Problems

Chapter 6 Modularizing Your Code with Methods

6.1 Introduction to Methods

6.2 void Methods

Tutorial 6-1: Creating and Calling Methods

6.3 Passing Arguments to Methods

Tutorial 6-2: Passing an Argument to a Method

6.4 Passing Arguments by Reference

Tutorial 6-3: Using an Output Parameter

6.5 Value-Returning Methods

Tutorial 6-4: Writing a Value-Returning Method

Tutorial 6-5: Modularizing Input Validation with a Boolean Method

6.6 Debugging Methods

TUTORIAL 6-6: Practicing the Step Into Command

TUTORIAL 6-7: Practicing the Step Over Command

TUTORIAL 6-8: Practicing the Step Out Command

Table of Contents

Key Terms

Review Questions

Programming Problems

Chapter 7 Arrays and Lists

7.1 Value Types and Reference Types

7.2 Array Basics

Tutorial 7-1: Using an Array to Hold a List of Random Lottery Numbers

7.3 Working with Files and Arrays

7.4 Passing Arrays as Arguments to Methods

7.5 Some Useful Array Algorithms

Tutorial 7-2: Processing an Array

7.6 Advanced Algorithms for Sorting and Searching Arrays

7.7 Two-Dimensional Arrays

Tutorial 7-3: Completing the Seating Chart Application

7.8 Jagged Arrays

7.9 The List Collection

Tutorial 7-4: Completing the Test Score List Application

Key Terms

Review Questions

Programming Problems

Chapter 8 More About Processing Data

8.1 Introduction

8.2 String and Character Processing

Tutorial 8-1: Completing the Password Validation Application

Tutorial 8-2: Completing the Telephone Format Application

Tutorial 8-3: Completing the Telephone Unformat Application

Tutorial 8-4: Completing the CSV Reader Application

8.3 Structures

Tutorial 8-5: Completing the Phonebook Application

8.4 Enumerated Types

Tutorial 8-6: Completing the Color Spectrum Application

8.5 The ImageList Control

Tutorial 8-7: Completing the Random Card Application

Table of Contents

Key Terms

Review Questions

Programming Problems

Chapter 9 Classes and Multiform Projects

9.1 Introduction to Classes

Tutorial 9-1: Creating and Using the Coin Class

9.2 Properties

Tutorial 9-2: Creating and Using the CellPhone Class

9.3 Parameterized Constructors and Overloading

Tutorial 9-3: Creating and Using the BankAccount Class

9.4 Storing Class Type Objects in Arrays and Lists

Tutorial 9-4: Completing the Cell Phone Inventory Application

9.5 Finding the Classes and Their Responsibilities in a Problem

9.6 Creating Multiple Forms in a Project

Tutorial 9-5: Creating an Application with Two Forms

TUTORIAL 9-6: Accessing a Control on a Different Form

Key Terms

Review Questions

Programming Problems

Chapter 10 Inheritance and Polymorphism

10.1 Inheritance

Tutorial 10-1: Creating and Testing the SavingsAccount and CDAccount Classes

10.2 Polymorphism

Tutorial 10-2: Completing the Polymorphism Application

10.3 Abstract Classes

Tutorial 10-3: Completing the Computer Science Student Application

Key Terms

Review Questions

Programming Problems

Chapter 11 Databases

11.1 Introduction to Database Management Systems

11.2 Tables, Rows, and Columns

11.3 Creating a Database in Visual Studio

Table of Contents

Tutorial 11-1: Starting the Phone Book Application and Creating the Phonelist.mdf Database

11.4 The DataGridView Control

Tutorial 11-2: Completing the Phone Book Application

11.5 Connecting to an Existing Database and Using Details View Controls

Tutorial 11-3: Creating the Products Application and Using a Details View

11.6 More About Data-Bound Controls

Tutorial 11-4: Creating the Product Lookup Application

Tutorial 11-5: Creating the Multiform Products Application

11.7 Selecting Data with the SQL Select Statement

Tutorial 11-6: Creating the Product Queries Application

Tutorial 11-7: Creating the Product Queries Application

Tutorial 11-8: Creating the Product Search Application

Key Terms

Review Questions

Programming Problems

Appendix A C# Primitive Data Types

Appendix B Additional User Interface Controls

Appendix C ASCII/Unicode Characters

Appendix D Answers to Checkpoint Questions

Index