Introduction
CCNA certification (Cisco Certified Network Associate) is globally accepted as a confirmation of information networking knowledge and skills. The Cisco Networking Academy Program provides a dynamic learning environment and progressive course path designed to advance your understanding of internetworking and prepare you for CCNA certification. This learning environment includes multimedia-rich curriculum, electronic labs (e-labs), interactive study exercises, and online assessments that provide instant feedback. Four courses make up the Networking Academy CCNA course path.

Networking Basics CCNA 1 Labs and Study Guide is the official workbook for the first course in the CCNA program. This book contains exercises that will help you learn the essential information presented in the CCNA 1 Networking Basics course through hands-on labs and other activities. Key learning objectives of CCNA 1 include the following:

- Understanding networks and network components
- Identifying number systems used in networking
- Defining conceptual models
- Creating network media
- Classifying network technologies and protocols
- Understanding network addressing and subnetting
- Configuring local-area networks (LANs)

Networking Basics CCNA 1 Labs and Study Guide is a valuable learning tool designed to supplement version 3.1.1 of the CCNA 1 online curriculum and the Networking Basics CCNA 1 Companion Guide (ISBN: 1-58713-164-1). You are encouraged to take advantage of all of these materials to gain the maximum amount of knowledge from CCNA 1.

Goals and Methods
The main goal of this book is to provide a thorough introduction to information networking. A strong foundation of knowledge and skills is required for advanced learning and success in the networking field. You will be presented with opportunities to investigate important networking topics that must be understood before complex concepts are introduced in later courses. You will find this base of knowledge is also essential in preparing you for CCNA certification.

Each chapter in Networking Basics CCNA 1 Labs and Study Guide contains a Study Guide section and a Lab Exercises section. Each Study Guide section contains exercises designed to focus on crucial networking concepts presented in the corresponding portion of the CCNA 1 online course. These sections may include terminology identification,
concept questions, internet research activities, journal entries, and other exercises designed to help you learn the material.

The Lab Exercises sections focus on providing ample hands-on lab experiments that showcase technologies and concepts introduced in each chapter of the course. In these sections you will find three lab types.

**Curriculum labs** are step-by-step labs designed to introduce you to a new concept. These labs include detailed instructions for completing the lab and often reinforce steps through added explanations. Curriculum labs are integrated into the CCNA 1 online course.

**Comprehensive labs** combine the concepts learned from the course and curriculum labs into new experiments and provide minimal guidance. You are encouraged to complete the curriculum labs before moving on to a comprehensive lab.

**Challenge labs** are unique labs requiring a thorough understanding of the previously learned network concepts. You should complete all curriculum and comprehensive labs before attempting a challenge lab.

After completing all of the exercises and hands-on labs in this book, you will be knowledgeable of a wide-array of networking concepts and well-prepared to continue your networking education in the CCNA courses that follow.

**Who Should Read This Book?**
The primary audience for this book is anyone taking the CCNA 1 course in the Cisco Networking Academy Program. This book contains printed versions of the CCNA 1 curriculum labs as well as other labs and exercises exclusive to the title. Therefore, *Networking Basics CCNA 1 Labs and Study Guide* is often a required course material for Networking Academies.

The secondary audience for this book is anyone interested in learning more about networking basics through self-study or through other networking courses.

**How This Book Is Organized**
This book contains 11 chapters and maps directly to the organization of the CCNA 1 online course. Most chapters build off of content presented in the previous chapters so the content of the course and this book is meant to be read and worked through sequentially.

Chapters 1 through 11 cover the following topics:

**Chapter 1, “Introduction to Networking”**—This introductory chapter opens with information and exercises focusing on technologies and methods used to connect to the world's largest network, the Internet. Next, the importance of understanding number
systems is emphasized through conversion and logic exercises. Eight curriculum labs step you through network configuration identification, a troubleshooting process, and converting number systems. The challenge lab will test your overall understanding of number systems.

Chapter 2, “Networking Fundamentals”—This chapter will introduce you to common networking terminology, the definition of bandwidth, and the concept of networking models. Chapter exercises include identifying network devices, calculating data transfer rates, and working with network models. Two curriculum labs focus on industry-standard network models. The comprehensive lab brings these models and networking devices together.

Chapter 3, “Networking Media”—Network communication requires a method of moving data between devices. Exercises in this chapter focus on the major types of network media and are designed to increase your understanding of signaling methods and media creation. Eleven curriculum labs walk you through the processes of measuring electrical characteristics of copper cabling, creating circuits, and cable creation. You will learn an alternative method to test a cable with the comprehensive lab and learn to create a cable converter through the challenge lab.

Chapter 4, “Cable Testing”—Exercises in this chapter are designed to increase your understanding of signaling properties and methods of testing network cables. Five curriculum labs introduce you to two pieces of cable testing equipment and the tests they can perform.

Chapter 5, “Cabling LANs and WANs”—This chapter presents exercises that focus on the cabling used to create local and wide-area networks. These exercises will challenge you to compare types of networks, identify network cables and components, and investigate types of servers. Ten curriculum labs focus on building LANs and WANs using the proper cabling and devices. You are asked to build a larger LAN in the comprehensive lab.

Chapter 6, “Ethernet Fundamentals”—Learning how Ethernet operates is required to completely understand how today's networks function. Chapter exercises include identifying technology fundamentals, understanding framing, and working with Ethernet addressing. A challenge lab tests your ability to gather MAC address information in your local network.

Chapter 7, “Ethernet Technologies”—This chapter focuses on the family of Ethernet technologies from 10 Mbps Legacy Ethernet to 10 Gbps Ethernet. Ethernet parameter identification exercises will help you learn the similarities and differences in the Ethernet technologies. Three curriculum labs provide information on waveform decoding and using software to capture and analyze Ethernet frames.

Chapter 8, “Ethernet Switching”—Exercises in this chapter are designed to help you understand different modes of switching, identify collision and broadcast domains, and
illustrate data flow. The challenge lab asks you to build a multi-switch network with redundant links and observe an anti-looping mechanism.

Chapter 9, “TCP/IP Protocol Suite and IP Addressing”—This chapter begins with exercises pertaining to the TCP/IP protocol suite before focusing on IP addressing. You will learn the multiple protocols that make up the protocol suite and the various methods used for obtaining an IP address. Three curriculum labs cover the basics of addressing, setting up a DHCP client, and a method used to learn MAC addresses. The comprehensive lab prompts you to use tools and skills learned previously to identify internetworks. The challenge lab focuses on using software to monitor network processes.

Chapter 10, “Routing Fundamentals and Subnets”—Early chapter exercises are designed to increase your understanding of routed and routing protocols. Later exercises focus on subnetting. Four of the five curriculum labs deal with subnetting. Two additional comprehensive labs also focus on subnetting and add address assignment components. Subnetting can be the most difficult concept to grasp in CCNA 1 so be sure to take your time with these exercises and labs.

Chapter 11, “TCP/IP Transport and Application Layers”—The last chapter of the book includes exercises designed to help you understand the functions of the Transport and Application layers of the TCP/IP model. A curriculum lab brings together multiple tools from other labs to investigate particular types of TCP traffic. A challenge lab focuses on client/server applications.

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NOTE: Separate Instructor Edition with Answer Key available.