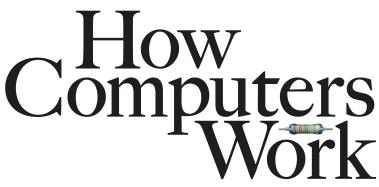


TENTH EDITION





Interactive Web Version

The How Computers Work, Interactive Web Version is an enhanced digital copy of the How Computers Work print book, which can be accessed via a web browser. It includes many new and exciting features that take the one-of-a-kind How Computers Work print book experience to the next level. Here's a look at just a few of the new features you'll find in the Interactive Web Version:

Designed for the Web—This new digital edition of *How Computers Work* is built from the ground up to work in today's most popular web browsers. Whether you use Windows, Mac, or a tablet, you'll find a viewing experience that works for you.

Animations—See first-hand how morphing software morphs a photo or how video compression and resolution changes the quality of a digital video. Watch as an interactive firewall blocks dangerous data, while letting safe packets through. Have you ever wondered just how a transistor physically controls the flow of electrons to turn itself on and off? You'll see it in action here!

Interactive Elements—Directly interact with more than a dozen of the topics covered in this book. Drag data into a processor to see how it divides up a work load and computes an answer. Or use a virtual laser to photoetch a micochip. You'll even control the flow of light through an LCD monitor as you learn how it generates an image!

How to Purchase the Interactive Web Version:

Register this eBook to unlock a single-use discount, which will allow you to purchase a copy of the Interactive Web Version of *How Computers Work* (ISBN: 9780133096781) for only \$4.99, a savings of \$25!*

Follow the steps below:

- **1.** Go to quepublishing.com/register and log in or create a new account.
- **2.** Enter the ISBN: 9780789749840. (NOTE: please enter the print book ISBN provided to register the eBook you purchased)
- **3.** Answer the challenge question as proof of purchase.
- **4.** Click on the "Access Bonus Content" link in the Registered Products section of your account page, to be taken to the page where your discount code is available.
- **5.** Go to www.quepublishing.com/title/9780133096781.
- **6.** Add the product to your Cart.
- 7. Click on "Proceed To Checkout".
- 8. Enter your discount code in the "Enter a New Discount Code" box.
- **9.** Complete payment information.

How Computers Work

Table of Contents

Table of Contents
Introduction

Part 1: What Makes a Computer a Computer

Chapter 1: The Ghostly LEGOs of Computing

How Waves Take the Universe on a Joy Ride

How Information Rides the Waves

How Electromagnetism Is the Ghost in the Machine

How We Control Electricity

How Computers Create Our World Using Numbers

Chapter 2: How Computers Remember

How a Little Transistor Does Big Jobs

Writing Data to RAM

Reading Data from RAM

How Flash Memory Remembers When the Switch is Off

Chapter 3: How a Little Microprocessor Does Big Things

How a Processor Tracks Numbers

How a Processor Does Math

How a Processor Moves Data

How Multi-Core Processors Work

How Desktop CPUs Keep It Complex

How Mobile CPUs Keep It Simple

Chapter 4: How Motherboards Conduct a Symphony of Data

How a Motherboard Brings It All Together

How the Chipset Directs Traffic

How PCI-Express Breaks the Bus Barrier

Part 2: SoftwareThe Computers Own Poetry

Chapter 5: How Words Are Stitched into Programs

How a Program Is a Roadmap



How Software Interpreters Generate Action

How a Compiler Churns Out Software

Chapter 6: How Applications Work So You Can Play

How Text SHOUTS and Whispers

How Databases Track Everything

How Databases Pack it In

How Databases Make Connections

How Spreadsheets Solve Formulas

How Numbers Become Pictures

How Art Is Compressed to Save Space

How Imaging Software Paints by Numbers

How Photo Editors Revive Old Memories

How Apps Fuel Mobile Devices

Chapter 7: How Games Create New Worlds

How Computers Plot a 3D World

How 3D Gets Dressed

How Shaders Control the World

How Games Populate New Worlds

Chapter 8: How Security Software Fights Off Invaders

How Computer Hackers Break In

How Spyware Reports Everything You Do

How Viruses Invade Your Computer

How Viruses Hitch Rides in Your Email

How Antivirus Software Fights Back

How Firewalls Keep Hackers Out

How Spammers Find You

How Antispam Software Sniffs Out Phony Email

How Prime Numbers Protect Prime Secrets

Part 3: How Computers Evolve

Chapter 9: The Origins of Computer DNA

Fossils of the Premobilian Era

Persistent Relics: The Mouse

Persistent Relics: The Keyboard



How the Workaday Floppy Drive Ruled

How the CRT Was the Grande Dame of Displays

How the Impact Printer Was Right on the Spot

The Unlikely Progenitor to the Internet: The Dialup Modem

How Cabling Was Worse: Serial

How Cabling Was Worse: Parallel

How the Power Supply Hasnt Changed

How the iPhone Made It Slick

Chapter 10: How Small Mutations Pay Off Big

How USB Really Is Universal

How Little Bits Add Up to Big Changes

How File Compression Makes Files Smaller

How Solid State Drives Command the Instant

How Solid State Drives Take Out the Trash

How PCs Use Light to Remember

How Optical Disc Drives Write with Light

Chapter 11: Honey, Ive Shrunk the PC

How Computers Get Smaller and Better

How iPods Dish Out Media

How elnk Puts Words on Your eReader

How All Those Smarts Got Packed into a Smartphone

How Google Glass Makes Us Cyborgs

Chapter 12: Evolution of the Super Computer

How Video Cards Break the Game Barrier

How Overclocking Multiplies Time

How a PC Keeps Its Cool

How Advanced Cooling Refrigerates Your PC

How Jailbreaking Frees Your Devices

Chapter 13: How Cameras Capture Memories

How Digital Cameras Capture the Moment

How Autofocus Clears the Picture

How Cameras Choose an Exposure

Part 4: How Computers Expand Our Senses



Chapter 14: How We Stay in Touch

How Your Smartphone Knows Where You Are

How Devices Recognize Our Touch

How Glass Becomes Strong and Supple

How Game Controllers Let You Play

How Game Controllers Let You Feel the Force

How Smartphones Get Good Vibrations

How Devices Capture Light

How a Flatbed Simplifies Scanning

How Codes Keep Track of Everything (Everything!)

How Optical Character Recognition Works

Chapter 15: How a Computer Creates Visions

How an LCD Creates Glowing Colors

How Plamsa Displays Glow

How DLP Spins Colors

How OLED Lights Up a New Generation of Displays

How 3D Makes You Duck

Chapter 16: How Computers Tickle Your Ears

How Your Device Listens

How Speakers Sound Off

How Digital Sound Tricks Your Ear

How 3D Audio Surrounds You

Part 5: The Little Net That Grew

Chapter 17: How Networks Tie Computers Together

How Computers Connect to Each Other

How Data Travels Between Computers

How Wi-Fi Makes the Internet Portable

How Bluetooth Keeps Devices Connected

How NFC Lets Smart Devices Make Close Calls

Chapter 18: How the Internet Brings Us the World

How Broadband Crams in the Data

How DSL Turbocharges a Phone Line

How Cable Brings the Internet to Your Neighborhood



How Fiber Optics Lights Up the Future

How Computers Make Phone Calls

How Cellular Evolved

How Networks Talk with Each Other

How Information Travels the Internet

How Online Services Serenade You

How Movies Flow into Your Home

Chapter 19: How the Web Puts It All at Your Fingertips

How a Browser Opens Pages

How a Browser Displays Web Pages

How Cookies Trade Crumbs of Data

How Google Knows Everything

How eBay Sells Everything

Chapter 20: How We Keep in Touch the Internet Way

How Email Outraces Snail Mail

How Facebook Lets Your Cat Go Viral

How Twitter Changes Communication

How Internet File Sharing Works

How BitTorrents Spread the Wealth

How Clouds Encompass Us All

Part 6: How Printers Put Data in Our Hands

Chapter 21: How Black and White Printing Works

How Printers Make Cookie Cutter Text

How Outline Fonts Set the Imagination Free

How a Printer Writes with Light

Chapter 22: Printing Gutenberg Never Imagined

How Printers Create Color

Ho an Ink-jet Sprays Images

How a Printer Spits Out Photographs

How a Laser Printer Creates in Color

How a Solid Ink Color Printer Works

How Printers Create in 3D

Part 7: So, Whats Next?



Index

