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Understanding the digital world 2nd edition

Numerous color illustrations, notes on sources for further exploration, and a glossary explaining technical terms and buzzwords are included.Understanding the Digital World is a must-read for readers of all backgrounds who want to know more about computers and communications. The phone serves as a ...Cover PageTitle PageCopyright PageContentsPrefaceIntroductionPart I: HardwarePart II: SoftwarePart III: CommunicationsPart IV: DataNotesGlossaryIndex It looks like you're offline. Far from it. This is not typical of the world at large, however, where PCs dominate by a wide margin. The Antikythera mechanism, from about 100 BCE, is an astronomical computer of remarkable mechanical sophistication. Can you add one? Functionally, cars have been the same for well over a hundred years. Logically, today's computers are very similar to those of the 1950s, but the physical differences go far beyond the kinds of changes that have occurred with the automobile. Naturally, price is one answer. Using ideas from the Jacquard loom, Hollerith used holes punched in stiff paper cards to encode census data in a form that could be processed by his machines. Still, overall this is a pretty easy read and accessible even for many non-technical readers. PCs tend to be cheaper, the result of fierce competition in a marketplace with many suppliers. Available on iOS & AndroidA brand-new edition of the popular introductory textbook that explores how computer hardware, software, and networks work Computers are everywhere. The goal of this chapter is to understand what a computer is, see what's inside, learn what each part does, and get a sense of what the myriad acronyms and numbers mean. No! I am not going to tell you all of that. You can sense his exasperation in the quotation on the previous page. Babbage spent much of his life trying to build computing devices that would mechanize the tedious and error-prone manual arithmetic calculations needed to create the tables, and even to print them. If you find our work useful, please pitch in. This is an example of what economists call a network effect: the more other people use something, the more useful it will be for you, roughly in proportion to how many others there are. Do we truly understand the power of computers in our world?In this updated edition of Understanding the Digital World, Brian Kernighan explains how computer hardware, software, and networks work. But most are invisible, like those in appliances, cars, medical equipment, transportation systems, power grids, and weapons. Publish Date Mar 30, 2021 Publisher Princeton University Press Edition Availability Add another edition? The first significant one of these all-electronic machines was ENIAC, the Electronic Numerical Integrator and Computer, which was built during the 1940s at the University of Pennsylvania in Philadelphia, by Presper Eckert and John Mauchly. Goldstine, John von Neumann, "Preliminary discussion of the logical design of an electronic computing instrument," 1946. They can also learn about the pitfalls (beyond those their parents have discussed with them) about how to be safe on the internet. With the invention of the transistor in 1947, and then of integrated circuits in 1958, the modern era of computing really began. We understand that not everyone can donate right now, but if you can afford to contribute this Thursday, we promise it will be put to good use. The third chapter explains how computers actually compute: how they process the bits and bytes to make things happen. The title of Chapter 1 is, "What is a Computer?" Covering the CPU and how it works, he describes various forms of storage, including RAM, cache, disk, and other types of secondary storage, and how they all work together. Despite the fact that he wrote the first edition of this book only five years ago, this second edition includes important new material that makes it even more applicable to today's technology and the lightning-fast dissemination of data. Computing in today's sense began in England in the mid-19th century with the work of Charles Babbage. For a variety of reasons, including alienating his financial backers, he never succeeded in his ambitions, but his designs were sound. This distinction between an abstract description and a concrete implementation will come up repeatedly in what follows. He wrote this book to bring much of the information contained in that course to the world at large. Babbage encouraged a young woman, Augusta Ada Byron, the daughter of the poet George Byron, and later Countess of Lovelace, in her interests in mathematics and his computational devices. "Supposing, for instance, that the fundamental relations of pitched sounds in the science of harmony and of musical composition were susceptible of such expression and adaptations, the engine might compose elaborate and scientific pieces of music of any degree of complexity or extent." Ada Lovelace is often called the world's first programmer, and the Ada programming language is named in her honor. Understanding the Digital World combines computer history, technology, and personal story, along with discussions about how today's technology impacts our privacy. Learn more here.Is Understanding the Digital World an online PDF/ePUB?Yes, you can access Understanding the Digital World by Brian W. These technologies have allowed electronic systems to steadily become smaller, cheaper and faster. After this overview of the hardware, he describes algorithms, how they are used to solve problems, and how they get incorporated into computer programs. In the vast majority of his scenarios, I had already implemented many of the protections he covers. As digital equipment has become cheaper and more powerful, widely disparate mechanical systems have been superseded by much more uniform electronic ones. Burks, Herman H. The first computers that truly stored programs and data together were built in England, notably EDSAC, the Electronic Delay Storage Automatic Calculator, at Cambridge in 1949. I read a lot of books. This was intentional on the author's part. Hardware is the solid, visible part of computing: devices and equipment that you can see and put your hands on. I highly recommend this book to anyone who wants to learn more about how computers work and impact privacy and security in the modern world. So even if your technology quotient is fairly low, this book is still understandable. (Parts of ENIAC are on display in the Moore School of Engineering at the University of Pennsylvania.) Babbage saw clearly that a computing device could store its operating instructions and its data in the same form, but ENIAC did not store instructions in memory along with data; instead it was programmed by setting up connections through switches and re-cabling. It was intended to be used for ballistics computations and the like, but it was not completed until 1946, well after the end of World War II. Babbage's machines were complex mechanical assemblies of gears, wheels, levers and rods. The distinction between the functional behavior of something and its physical properties—the difference between what it does and how it's built or works inside— is an important idea. The parts that scared me most often were discussions about how organizations can track our movements on the internet—the effects of this (and tools such as data mining) on our online experiences. Modern computing technology has similarly led to disruption. Can You Chip In?Dear Patron: Please don't scroll past this. Physically, however, cars have changed greatly over a century: they are made of different materials, they are faster, safer, and much more reliable and comfortable. "I wish to God these calculations had been executed by steam." Charles Babbage, 1821, quoted in Harry Wilmot Buxton,Memoir of the Life and Labours of the Late Charles Babbage, 1872. If so, what changed so dramatically in such a short time? (For the record, I have never even sat in a Ferrari, let alone owned one, so I'm speculating about whether there's room for the groceries. Kernighan touches on fundamental ideas from computer science and some of the inherent limitations of computers, and new sections in the book explore Python programming, big data, machine learning, and much more. He looks at the data about ourselves (stored on our computers) that gets transmitted across the internet—with or without our permission. I sometimes do a survey in my class in the first lecture. The Internet Archive is working to keep the record straight by recording government websites, news publications, historical documents, and more. We build and maintain all our own systems, but we don't charge for access, sell user information, or run ads. Famously, the 1880 census had taken eight years to tabulate, but with Hollerith's punch cards and tabulating machines, the 1890 census took only one year to prepare, instead of the predicted 10 years or more. Figure 1.1: Modern implementation of Babbage's Difference Engine. Think about your own computing devices. This book is a good way for them to learn how computers work at a level they can understand. It has a steering wheel that the driver uses to control the car. Herman Hollerith, working with the US Census Bureau in the late 1800s, designed and built machines that could tabulate census information far more rapidly than could be done by hand. Many readers will have some kind of "PC," that is, a laptop or desktop computer descended from the Personal Computer that IBM first sold in 1981, running some version of the Windows operating system from Microsoft. I did park next to one once— Figure 1.1.) Figure 1.1: The closest I've ever come to a Ferrari. Detail from 1836 portrait by Margaret Sarah Carpenter. On the Mac side are perceived reliability, quality, esthetics, and a sense that "things just work," for which many consumers are willing to pay a premium. The Jacquard loom thus could be "programmed" to weave a wide variety of different patterns under the control of instructions that were provided on punched cards; changing the cards caused a different pattern to be woven. I am familiar with using tools like firewalls and strategies such as using good passwords and deleting or deactivating programs and daemons that I am not using. In this updated edition of Understanding the Digital World, Brian Kernighan explains how computer hardware, software, and networks work. Some trends are worth noting, however, especially the exponential increase in how much circuitry and how many devices can be packed into a given amount of space, often for a fixed price. Learn more here.What is the difference between the pricing plans?Both plans give you full access to the library and all of Perlego's features. Kernighan teaches a course at Princeton each year, "Computers in Our World," intended for computer users who are not Computer Science majors. Although there are references to security throughout the book, Kernighan spends a great deal of these latter chapters discussing the many ways in which our data is vulnerable and ways to implement at least some level of protection. Our resources are crucial for knowledge lovers everywhere—so if you find all these bits and bytes useful, please pitch in. Computing machinery has a long history, though most early computational devices were specialized, often for predicting astronomical events and positions. Topics include how computers are built and how they ... Numerous color illustrations, notes on sources for further exploration, and a glossary explaining technical terms and buzzwords are included. The most relevant precursor to today's computers is the Jacquard loom, which was invented in France by Joseph Marie Jacquard around 1800. The slide rule was invented in the early 1600s, not long after John Napier's description of logarithms. A car has an engine that uses some kind of fuel to make the engine run and the car move. The development of electronics in the 20th century made it possible to imagine computers that did not rely on mechanical components. A brand-new edition of the popular introductory textbook that explores how computer hardware, ... This book has made me think more closely about how I work and play on the internet, the methods I use to protect my home network, and how I use my portable devices. For example, one (unproven) theory holds that Stonehenge was an astronomical observatory. Kernighan manages to scare me while simultaneously ensuring that readers understand how to mitigate the threats he discusses. Numerous color illustrations, notes on sources for further exploration, and a glossary explaining technical terms and buzzwords are included. How many have a Mac? Can You Chip In? The Internet Archive is a nonprofit fighting for universal access to quality information. Understanding the Digital World is a must-read for readers of all backgrounds who want to ... What You Need to Know about Computers, the Internet, Privacy, and Security, Second Edition. The history of computing devices is interesting, but I will only mention a little of it here. The Jacquard loom used rectangular cards with multiple rows of holes that specified weaving patterns. The creation of labor-saving machines for weaving led to social disruption as weavers were put out of work; the Luddite movement in England in 1811–1816 was a violent protest against mechanization. Some are highly visible, in laptops, tablets, cell phones, and smart watches. Arithmetic devices like the abacus have been used for millennia, especially in Asia. We have over one million books available in our catalogue for you to explore. Governments and companies increasingly use computers to monitor what we do. There's a loose analogy to cars. There are places to store the fuel and places to store the passengers and their goods. Kernighan in PDF and/or ePUB format, as well as other popular books in Computer Science & Computer Science General. Lovelace wrote detailed descriptions of how to use Babbage's Analytical Engine (the most advanced of his planned devices) for scientific computation and speculated that machines could do non-numeric computation as well, such as composing music. Hollerith founded a company that in 1924 became, through mergers and acquisitions, International Business Machines, which we know today as IBM. A wider range of hardware add-ons, more software, and more expertise are all readily available. Vacuum tubes are electronic devices roughly the size and shape of a cylindrical light bulb (see Figure 1.7 in the next chapter); they were expensive, fragile, bulky, and power hungry. I ask my students which kind is better, and for objective criteria on which to base that opinion. Is the ratio unbalanced because one is superior to the other? The ratio was fairly constant at 10 to 1 in favor of PCs in the early 2000s, but changed rapidly over a few years, to the point where Macs now account for well over three quarters of the computers. It is not all gloom and doom. But the ease with which we can get spied upon (there is no more accurate word for it) is appalling no matter what actions we may take. I especially like to read books about computers, Linux, and the digital world we live in. The architecture has been largely unchanged for decades, while the hardware has changed to an astonishing degree. A brand-new edition of the popular introductory textbook that explores how computer hardware, software, and networks workComputers are everywhere. We'll talk about why. "Inasmuch as the completed device will be a general-purpose computing machine it should contain certain main organs relating to arithmetic, memory-storage, control and connection with the human operator." Arthur W. What led you to your choice when you bought your computer? There's a world of difference between my first car, a well-used 1959 Volkswagen Beetle, and a Ferrari, but either one will carry me and my groceries home from the store or across the country, and in that sense they are functionally the same. Kernighan, one of the leading figures in the creation of Unix, author or co-author of many influential books, and a professor of Computer Science at Princeton University. Babbage was a scientist who was interested in navigation and astronomy, both of which required tables of numeric values for computing positions. I found the new section on artificial intelligence quite enlightening. Kernighan indicates to readers the sections that may get too technical, and you can skip over them. Almost everyone has a "smartphone" that can run programs ("apps") downloaded from Apple's App Store or the Google Play Store. Still others might have a Chromebook running Chrome OS that relies on the Internet for most of its storage and computation. Early electronic computers used vacuum tubes as computing elements. Learn more here.Can/how do I download books?At the moment all of our mobile-responsive ePub books are available to download via the app. The same is true of computers. How many have a PC? ENIAC occupied a large room and required a large amount of electric power; it could do about 5,000 additions in a second. Others will have an Apple Macintosh that runs a version of the macOS operating system. We can look at a computer from at least two viewpoints: the logical or functional organization—what the pieces are, what they do and how they are connected—and the physical structure—what the pieces look like and how they are built. The first chapter is an overview of the structure and components of a computer. There's an analogous debate about phones. I also enjoy reading books on the history of computing about and by and the people who helped make this digital world what it is today. Topics include how computers are built and how they compute; what programming is; how the Internet and web operate; and how all of these affect security, privacy, property, and other important social, political, and economic issues. The next three chapters describe computer hardware, focusing on the logical architecture of computing systems more than on the physical details of how they are built. I also suggested to their parents that they read it, too. These all look different and when you use them they feel different as well, but underneath the skin, they are fundamentally the same. A brand-new edition of the popular introductory textbook that explores how computer hardware, software, and networks workComputers are everywhere. We never see the myriad computers that quietly collect, share, and sometimes leak personal data about us. Let's begin our discussion of hardware with an overview of what a computer is. Figure 1.2: Ada 1960s, but slide rules are now curiosities, replaced by calculators and computers, and my painfully acquired expertise is useless. Understanding the Digital World is a must-read for readers of all backgrounds who want to know more about computers and communications.How do I cancel my subscription?Simply head over to the account section in settings and click on "Cancel Subscription" - it's as simple as that. We'd be deeply grateful if you'd join the one in a thousand users that support us financially. Today's computers are much smaller, cheaper, faster and more reliable than those of 60 or 70 years ago, literally a million times better in some properties. Social networks and advertisers know more about us than we should be comfortable with. Such improvements are the fundamental reason why computers are so pervasive. Criminals all-too-easy access to our data. You can pause it, speed it up and slow it down. More specialized devices like smartphones, tablets and ebook readers are also powerful computers. You'll get no spoilers from me. The debate goes on, with neither side convincing the other, but it raises some good questions and helps to get people thinking about what is different between various kinds of computing devices and what is really the same. An edition of Understanding the Digital World (2017) This edition doesn't have a description yet. The read-aloud reads text aloud for you, highlighting the text as it is being read. With over 1 million books across 1000+ topics, we've got you covered! Learn more here.Do you support text-to-speech?Look out for the read-aloud symbol on your next book to see if you can listen to it. Imagine my excitement when I discovered the new second edition of an important book by Brian W. Kernighan starts with an exploration of the technology itself. For computers, the "how it's built" part changes at an amazing rate, as does how fast it runs, but the "what it does" part is quite stable. Dear Patron: Please don't scroll past this. Kernighan's level of paranoia is sufficient to ensure that readers pay attention while reassuring us that we can still use the internet, our computers, and other devices with a reasonable amount of safety so long as we take the appropriate precautions. The second chapter shows how computers represent information with bits, bytes and binary numbers. Modern implementations of some of his machines, built with tools and materials from his time, can be seen in the Science Museum in London and the Computer History Museum in Mountain View, California (in the figure above). We never see the myriad computers that quietly collect, share, and sometimes leak personal data about us. Figure 1.2: Ada Lovelace. My first inclination after reading this book was to send it to the two of my grandkids that I am hoping to build gaming computers. In later chapters, Kernighan discusses the internet, the TCP/IP protocols that drive it, and some of the tools used to communicate using the internet. After you cancel, your membership will stay active for the remainder of the time you've paid for. The only differences are the price and subscription period: With the annual plan you'll save around 30% compared to 12 months on the monthly plan.We are an online textbook subscription service, where you can get access to an entire online library for less than the price of a single book per month.

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