

1: Hardware - Wikiversity

Hardware and software are interconnected, without software, the hardware of a computer would have no function. However, without the creation of hardware to perform tasks directed by software via the central processing unit, software would be useless.

The hardware of a computer is infrequently changed, while software and data are modified frequently. The term soft refers to readily created, modified, or erased. These are unlike the physical components within the computer which are hard. When you think of the term computer hardware you probably think of the guts inside your personal computer at home or the one in your classroom. However, computer hardware does not specifically refer to personal computers. Instead, it is all types of computer systems. Computer hardware is in embedded systems in automobiles, microwave ovens, CD players, DVD players, and many more devices. In , only 0. How many other things in your house or your classroom use computer hardware? It is the central circuit board making up a complex electronic system. A motherboard provides the electrical connections by which the other components of the system communicate. The mother board includes many components such as: It is sometimes referred to as the brain of the computer. The first step, fetch, involves retrieving an instruction from program memory. In the decode step, the instruction is broken up into parts that have significance to other portions of the CPU. During the execute step various portions of the CPU, such as the arithmetic logic unit ALU and the floating point unit FPU are connected so they can perform the desired operation. The final step, writeback, simply writes back the results of the execute step to some form of memory. RAM attaches directly to the motherboard, and is used to store programs that are currently running. RAM is a set of integrated circuits that allow the stored data to be accessed in any order why it is called random. There are many different types of RAM. Distinctions between these different types include: It is a computer program that is embedded in a hardware device, for example a microcontroller. As its name suggests, firmware is somewhere between hardware and software. Like software, it is a computer program which is executed by a microprocessor or a microcontroller. But it is also tightly linked to a piece of hardware, and has little meaning outside of it. Most devices attached to modern systems are special-purpose computers in their own right, running their own software. Its case holds a transformer, voltage control, and usually a cooling fan. The power supply converts about volts of AC power to low-voltage DC power for the internal components to use. The most common computer power supplies are built to conform with the ATX form factor. This enables different power supplies to be interchangeable with different components inside the computer. ATX power supplies also are designed to turn on and off using a signal from the motherboard, and provide support for modern functions such as standby mode. There are many different removable media devices. The most popular are probably CD and DVD drives which almost every computer these days has at least one of. There are some new disc drives such as Blu-ray which can hold a much larger amount of information than normal CDs or DVDs. One type of removable media which is becoming less popular is floppy disk. They are inexpensive but also have short life-span. There are a few different kinds of CDs. CD-ROM which stands for Compact Disc read-only memory are popularly used to distribute computer software although any type of data can be stored on them. CD-R is another variation which can only be written to once but can be read many times. CD-RW rewritable can be written to more than once as well as read more than once. The CD writer drive can read and write a CD. Both kinds of CD drives are called optical disc drives because they use a laser light or electromagnetic waves to read or write data to or from a CD. The main uses for DVDs are video and data storage. Most DVDs are of the same dimensions as compact discs. Just like CDs there are many different variations. Its main uses are high-definition video and data storage. Blu-ray discs have similar devices used to read them and write to them as CDs have. Floppy disks are read and written by a floppy disk drive. Floppy disks are a dying and being replaced by the optical and flash drives. Many new computers do not come with floppy drives anymore but there are a lot of older ones with floppy drives lying around. While floppy disks are very cheap the amount of storage on them compared to the amount of storage for the price of flash drives makes floppy disks unreasonable to use. There are a few different types of internal storage. Hard disks are the

most popular type of internal storage. Solid-state drives have grown in popularity slowly. A disk array controller is popular when you need more storage than a single hard disk can hold. Just about every new computer comes with a hard disk these days unless it comes with a new solid-state drive. An SSD emulates a hard disk drive, thus easily replacing it in any application. SSDs are currently more expensive per unit of capacity than HDDs which is why they have not caught on so quickly. It almost always implements hardware RAID. A disk array controller also provides additional disk cache.

2: Internal Computer Hardware – Introduction to Information and Communication Technology

Understanding how computer hardware works is a really helpful skill set in IT support, since an IT department maintains the hardware that a company uses. A solid understanding of these computer internals will come in handy when.

The equipment associated with a computer system is called hardware. Software is a set of instructions that tells the hardware what to do. People, however, are the most important component of a computer system - people use the power of the computer for some purpose. In fact, this course will show you that the computer can be a tool for just about anyone from a business person, to an artist, to a housekeeper, to a student - an incredibly powerful and flexible tool. Software is actually a computer program. To be more specific, a program is a set of step-by-step instructions that directs the computer to do the tasks you want it to do and to produce the results you want. A computer programmer is a person who writes programs. Most of us do not write programs, we use programs written by someone else. This means we are users - people who purchase and use computer software.

Meeting the Machine What is a computer? A six-year-old called a computer "radio, movies, and television combined! A computer is a machine that can be programmed to accept data input, process it into useful information output, and store it away in a secondary storage device for safekeeping or later reuse. The processing of input to output is directed by the software but performed by the hardware. To function, a computer system requires four main aspects of data handling: The hardware responsible for these four areas operates as follows: Input devices accept data in a form that the computer can use; they then send the data to the processing unit. The processor, more formally known as the central processing unit CPU, has the electronic circuitry that manipulates input data into the information people want. The central processing unit executes computer instructions that are specified in the program. Output devices show people the processed data-information in a form that they can use. Storage usually means secondary storage. Secondary storage consists of devices, such as diskettes, which can store data and programs outside the computer itself. Now let us consider the equipment related to these four aspects of data handling in terms of what you would find on a personal computer.

Your Personal Computer Hardware Let us look at the hardware in terms of a personal computer. Suppose you want to do word processing on a personal computer, using the hardware shown in Figure 1. Personal Computer Word processing software allows you to input data such as an essay, save it, revise and re-save it, and print it whenever you wish. The input device, in this case, is a keyboard, which you use to type in the original essay and any changes you want to make to it. All computers, large and small, must have a central processing unit within the personal computer housing. The central processing unit under the direction of the word processing software accepts the data you input through the keyboard. Processed data from your personal computer is usually output in two forms: As you key in the essay on the keyboard, it appears on the screen in front of you. After you examine the essay on the screen, make changes, and determine that it is acceptable, you can print the essay on the printer. Your secondary storage device in this case is a diskette, a magnetic medium that stores the essay until it is needed again. Now we will take a general tour of the hardware needed for input, processing, output, and storage. These same components make up all computer systems, whether small, medium, or large. In this discussion we will try to emphasize the types of hardware you are likely to have seen in your own environment. These topics will be covered in detail in later chapters.

What Goes In Input is the data that you put into the computer system for processing. Here are some common ways of feeding input data into the system: Typing on a keyboard. Computer keyboards operate in much the same way as electric typewriter keyboards. The computer responds to what you enter; that is, it "echoes" what you type by displaying it on the screen in front of you. Pointing with a mouse. A mouse is a device that is moved by hand over a flat surface. As the ball on its underside rotates, the mouse movement causes corresponding movement of a pointer on the computer screen. Pressing buttons on the mouse lets you invoke commands. Scanning with a flatbed scanner, wand reader or bar code reader **Figure 3. Flatbed Scanner** Flatbed scanners act like a copying machine by using light beams to scan a document or picture that is laid upon its glass face. A great way to send pictures through email! Bar scanners, which you have seen in retail stores, use laser beams to read special letters, numbers, or symbols such as the

zebra-striped bar codes on many products. You can input data to a computer in many other interesting ways, including writing, speaking, pointing, or even by just looking at the data. We will examine all these in detail in a later chapter.

The Processor and Memory: Data Manipulation In a computer the processor is the center of activity. The processor, as we noted, is also called the central processing unit CPU. The central processing unit consists of electronic circuits that interpret and execute program instructions, as well as communicate with the input, output, and storage devices. It is the central processing unit that actually transforms data into information. Data is the raw material to be processed by a computer. Such material can be letters, numbers, or facts like grades in a class, baseball batting averages, or light and dark areas in a photograph. Processed data becomes information, data that is organized, meaningful, and useful. In school, for instance, an instructor could enter various student grades data, which can be processed to produce final grades and perhaps a class average information. Data that is perhaps uninteresting on its own may become very interesting once it is converted to information. The raw facts data about your finances, such as a paycheck or a donation to charity or a medical bill may not be captivating individually, but together, these and other acts can be processed to produce the refund or amount you owe on your income tax return information.

Computer memory, also known as primary storage, is closely associated with the central processing unit but separate from it. Memory holds the data after it is input to the system and before it is processed; also, memory holds the data after it has been processed but before it has been released to the output device. In addition, memory holds the programs computer instructions needed by the central processing unit.

What Comes Out Figure 3: Output is usable information; that is, raw input data that has been processed by the computer into information. The most common forms of output are words, numbers, and graphics. Word output, for example, may be the letters and memos prepared by office people using word processing software. Other workers may be more interested in numbers, such as those found in formulas, schedules, and budgets. In many cases numbers can be understood more easily when output in the form of charts and graphics. The most common output devices are computer screens Figure 3 and printers Figure 4. Screens can vary in their forms of display, producing text, numbers, symbols, art, photographs, and even video-in full color. Printers produce printed reports as instructed by a computer program, often in full color. You can produce output from a computer in other ways, including film and voice output. We will examine all output methods in detail in a later chapter.

Secondary Storage Secondary storage provides additional storage separate from memory. Secondary storage has several advantages. Also, memory holds data and programs only temporarily. Secondary storage is needed for large volumes of data and also for data that must persist after the computer is turned off.

Hard Disk Figure 6: Hard Disk Pack The two most common secondary storage mediums are magnetic disk and magnetic tape. A magnetic disk can be a diskette or a hard disk. A diskette is removable so you can take your data with you. Hard disks, shown in Figure 5, have more storage capacity than diskettes and also offer faster access to the data they hold. Hard disks are often contained in disk packs shown in Figure 6 that is built into the computer so your data stays with the computer. Disk data is read by disk drives. Personal computer disk drives read diskettes; most personal computers also have hard disk drives. Modern personal computers are starting to come with removable storage media, like Zip disks. These disks are slightly larger than a diskette and can be inserted and removed like a diskette, but hold much more data than a diskette and are faster for the CPU to access than a diskette. A CD is an optical disk, it uses a laser beam to read the disk. Recently CD-RW drives and disks have become widely available that allow you to create your own CDs by "writing" data such as music and photos to the CD.

Magnetic tape, which comes on a reel or cartridge shown in Figure 7, Figure 7: Magnetic Tape is similar to tape that is played on a tape recorder. Magnetic tape reels are mounted on tape drives when the data on them needs to be read by the computer system or when new data is to be written on the tape. Magnetic tape is usually used for creating backup copies of large volumes of data because tape is very inexpensive compared to disks and CDs. We will study storage media in a later part of the course.

The Complete Hardware System The hardware devices attached to the computer are called peripheral equipment. Peripheral equipment includes all input, output, and secondary storage devices.

AN INTRODUCTION TO COMPUTER HARDWARE pdf

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6: Introduction To Computers

Introduction. Computer Hardware is the physical part of a computer, as distinguished from the computer software that executes or runs on the hardware. The hardware of a computer is infrequently changed, while software and data are modified frequently.

7: Introduction to Computers - Wikiversity

A computer system is an integrated set of hardware and software designed to process data and produce a meaningful result. Every computer performs the basic functions.

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