Unit 6: Understanding and Assessing Hardware

Your ideal Computing Device

6.1

Moore's Law describes the pace at which CPUs improve by holding more transistors. This rule predicts that the number of transistors inside a CPU will double about every 2 years.

6.2

- A huge number of computing choices are on the market, including tablets, ultrabooks, netbooks, 2-in-1s, laptops, and desktops.
- The kind of technology user you are will determine your device

Evaluating the CPU Subsystem

The **CPU** is composed of 2 units: the **control unit** and the **arithmetic logic unit (ALU)**. The control unit coordinates the activities of all the other computer components. The **ALU** is responsible for performing all the arithmetic calculations (addition, substraction, multiplication, division). Every time the CPU performs a program instruction, it goes through the same series of steps (a machine cycle): **fetch, decode, execute, store.**

6.3

- The **clock speed** of a CPU dictates how many instructions the CPU can process each second.
- A **core** contains the parts of the CPU required for processing. Modern CPUs have multiple cores.
- **Hyperthreading** allows 2 sets of instructions to be run by a single CPU core.
- The CPU's **cache memory** is a form of RAM that is part of the CPU chip itself so retrieving data is much faster than bringing the data in from the computer's RAM.

6.4

- CPU benchmarks are measurements used to compare performance between processors.
- CPU usage is the percentage of time the CPU is working. On Windows systems, the Task Manager utility lets you access this data.

Evaluating the Memory Subsystem

6.5

Random access memory (RAM) is your computer's temporary storage space. RAM is an example of volatile storage. RAM appears in the system on memory modules (like DDR3 and DDR5). Physical memory is the amount of RAM installed in the system. The resource monitor shows how much memory is in use at any time.

6.6

Adding RAM is simply to do and relatively inexpensive. However, there is a limit to how much RAM can be installed in a device.

Evaluating the Storage Subsystem

Major types of nonvolatile storage include mechanical hard drives, SSDs, SSHDs, and optical drives.

6.7

- Mechanical hard drives are the least expensive and the slowest to access information.
- SSD drives are electronic so they have no moving parts, produce no heat, and are many times faster than hard drives. However, they are much more expensive.
- An SSHD drive is a combination of both a mechanical hard drive and an SSD into a single device.
- Optical drives, like Blue-ray and DVDs, use a laser to read pits and bumps on pastic discs

6.8

Your storage needs will depend on the number and types of programs and data you use. It may be better to have several drives connected either in RAID 0 or in RAID 1.

Evaluating Other Sub Systems and Making a Decision

A **video card** translates binary data into images that are displayed on a monitor.

6.9

↳ A video card has specialized video memory that is very fast. Some systems even have multiple video cards.

↳ A video card also has a **graphics processing unit (GPU)** which helps the CPU by handling the graphics workload.

- One video card can support multiple monitors.

A **sound card** can support 3-D sound as well as surround sound like Dolby 7.1

6.10

Dolby 7.1 surround sound has one speaker for low frequency tones and seven additional speakers for a full, immersive experience.

Audio **MIDI** interface unit allows you to connect musical instruments, microphones, headphones to your computer

Evaluating System Reliability and Moving On

6.11

There are many regular maintenance steps you should take to keep your system reliable. They include using an antivirus program, adware removal software, clearing out unnecesary files, and running a disk defragmenter.

A used computer can ber recycled through several manufacrorers or through nonprofit organizations.

6.12

To safely recycle or donate a computer, you must first remove all applications and personal data. There are options in Windows to help with this.