of data. A **byte** of data is roughly equal to one alphabetic (A) or numeric (1) character of information (see Table 3.3). Thus, a typical hard disk can hold billions of letters or numbers (alphanumeric characters) as stored data. In the physical world, the hard disk might be analogous to a number of very large multiple-drawer file cabinets. The surfaces of hard disks are so sensitive that ordinary airborne contaminants such as dust or a strand of hair can interrupt the flow of information if it gets caught between the drive head and the disk itself. Hard disks are therefore usually fixed inside the computer’s case and encased in their own protective housing. Because they are permanently fixed inside the computer, hard disks are also sometimes called fixed disks.

Permanently fixing the hard disk inside the computer does not make it immune to problems. Problems can and do affect the data you store on a disk. Because any electronic or mechan-

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**TABLE 3.2 COMPARISON OF STORAGE MEDIA**

<table>
<thead>
<tr>
<th>Storage Media</th>
<th>Characteristics</th>
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</table>
| **FLOPPY DISK**                    | - Disk of Mylar inside rigid plastic shell  
- Magnetic film on both sides of Mylar stores data  
- Up to 1,444,000 bytes (1.44 megabytes) of data can be stored on a high-density 3.5” disk  
- Disks must be prepared to accept data (formatted) before using  
- Has been the most popular portable storage medium  
- Some computers no longer include floppy disk drives but have replaced them with additional removable or optical media |
| **HARD DISK**                      | - Stack of metal platters (disks) permanently mounted inside the computer box  
- Platters are coated with magnetic material on both top and bottom of disk  
- Sensitive to contaminants, so the disk and drives are permanently encased and mounted in the system unit  
- Storage capacity ranges but is typically multiple gigabytes (billions of bytes) of data  
- Usually designated the C drive, it is the primary mass storage area for both programs and data |
| **REMOVABLE MEDIA**                | - Portable hard disk and disk cartridges that can be added to a computer system  
- Cartridges vary in size from 250-megabyte cartridges to 1-gigabyte cartridges  
- Cartridges must be used with storage drives mounted in or added to the system unit  
- A portable hard disk is a self-contained disk and drive that plugs into one of the ports in the system unit  
- Portable hard disks can vary from a few to hundreds of gigabytes in capacity  
- Both types of removable media are convenient for transporting large multimedia files |
| **CD-ROM, CD-R, CD-RW**            | - Optical discs of plastic on which microscopic holes have been burned using a laser  
- Holes and flat areas are read by a laser mounted in a CD drive  
- CD-ROMs are read-only, making them a one-way storage media, unlike disks  
- CD-Rs are special-purpose CDs that can be written on once and read multiple times; they require a recordable drive to create them but can be read by any CD drive  
- CD-RWs are specially constructed CDs that are rewritable; CD-RW drives are necessary to store and erase data on CD-RWs; CD-RWs can be read by most CD drives  
- CDs can store up to 650 megabytes of data  
- Often used for multimedia storage because of their large capacity for storing audio, video, and textual data |
| **DVD-ROM, DVD-R, DVD-RW**         | - DVDs are optical media that can store up to 17 gigabytes of data depending on the format of the DVD  
- DVD-ROMs are read-only; after initial recording, data cannot be stored on them  
- DVD-Rs are recordable but require a DVD writer  
- Three competing formats are available: DVD-R/RW and DVD-RW are competing formats with similar features; DVD-RAM offers additional features but is incompatible with some players  
- DVD-Rs and DVD-RWs can record approximately 2 hours of quality video |