Files

File - named bytes on disk that encapsulate data with some properties: contents, size, owner, last read/write time, protection, etc.

A file can also have a type

- Understood by the file system: block device, character device, link, FIFO, socket, etc.
- Understood by other parts of the OS or runtime libraries: text, image, source, compiled libraries (Unix `.so` and Windows `.dll`), executable, etc.

A file's type can be encoded in its name or contents

- Windows encodes type in name: `.com`, `.exe`, `.bat`, `.dll`, `.jpg`, etc.
- Unix encodes type in contents: magic numbers, initial characters (e.g., `#!` for shell scripts)

File Access Method

Sequential access (used by file systems - most common)
read bytes one at a time, in order (read/write next)

Random access (used by file systems)
random access given block/byte number (read/write bytes at offset n)

Indexed access (used by databases)

- file system contains an index to a particular field of each record in a file
- reads specify a value for that field and the system finds the record via the index

Record access (used by databases)

- file is array of fixed-or-variable-length records
- read/written sequentially or randomly by record number