7.8 Magnetic Tape

- First-generation magnetic tape was not much more than wide analog recording tape, having capacities under 11MB.
- Data was usually written in nine vertical tracks:

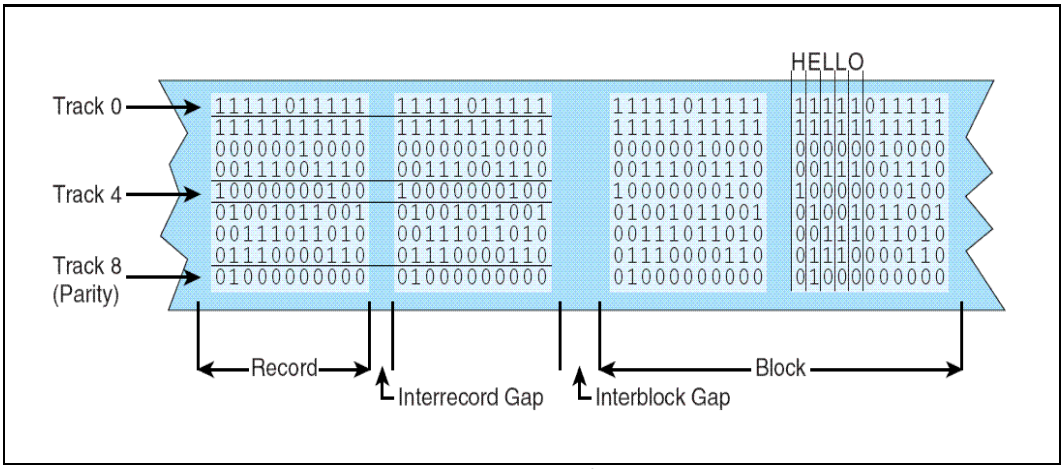

Figure 7.23 A Nine-Track Tape Format

- Today's tapes are digital, and provide multiple gigabytes of data storage.
- Two dominant recording methods are serpentine and helical scan, which are distinguished by how the read-write head passes over the recording medium.
- Serpentine recording is used in digital linear tape (DLT) and Quarter inch cartridge (QIC) tape systems.
- Digital audio tape (DAT) systems employ helical scan recording.

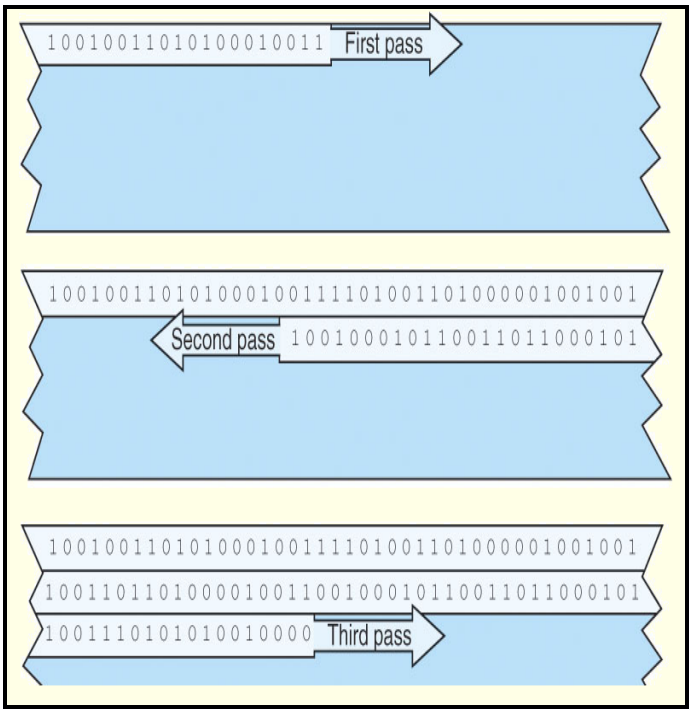

Figure 7.24 Three Recording Passes on a Serpentine Tape

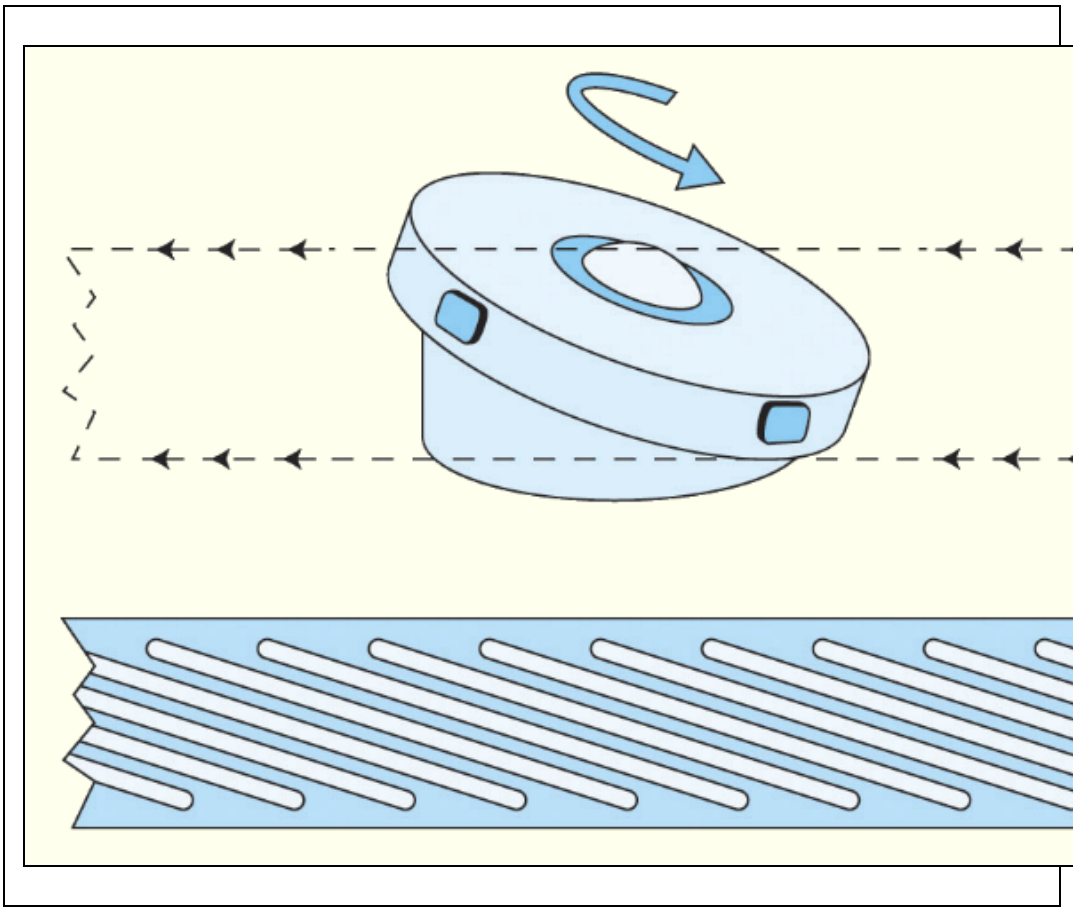

Figure 7.25 A Helical Scan Recording
a) The Read/Write Heads on Capstan
b) Pattern of Data Written on the Tape

- Numerous incompatible tape formats emerged over the years.
  - Sometimes even different models of the same manufacturer's tape drives were incompatible!
- Finally, in 1997, HP, IBM, and Seagate collaboratively invented a best-of-breed tape standard.
- They called this new tape format Linear Tape Open (LTO) because the specification is openly available.
- LTO, as the name implies, is a linear digital tape format.
- The specification allowed for the refinement of the technology through four "generations."
- Generation 5 was released in 2010.
  - Without compression, the tapes support a transfer rate of 208MB per second and each tape can hold up to 1.4TB.
- LTO supports several levels of error correction, providing superb reliability.
  - Tape has a reputation for being an error-prone medium.