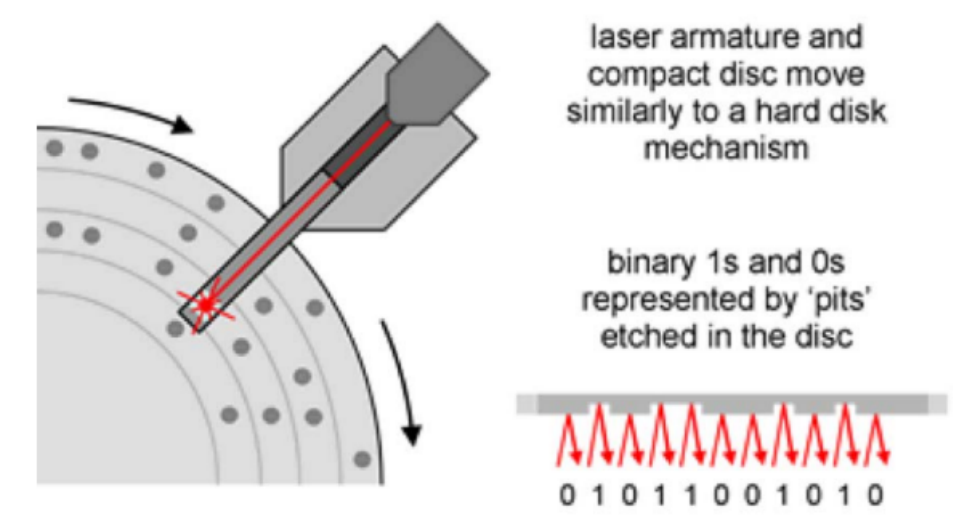
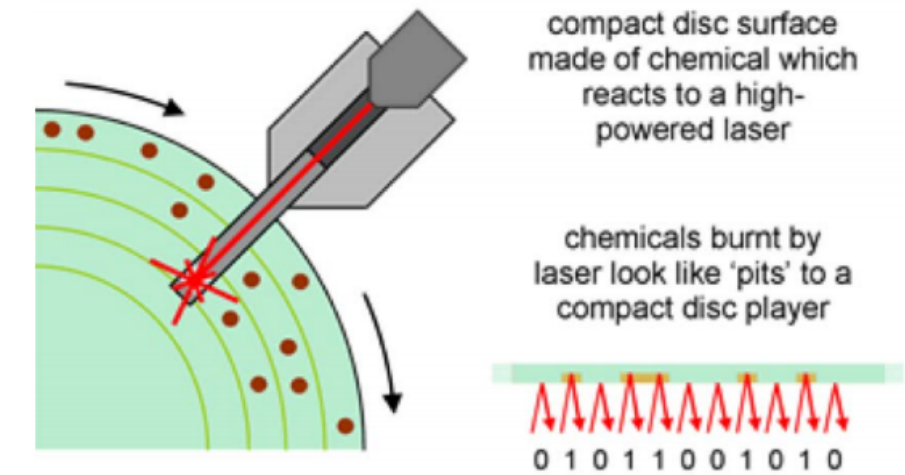


Week 6: Optical media ⚡

- CD (Compact Disk)
 - designed for storing music
 - soon inspired computer optical mass storage standards
 - encodes binary data as presence/absence of pits in a reflective surface
 - pits physically stamped to disk surface
 - read by a laser light (pit changes reflectivity of surface)
- mass produced by a metal "master" mould



- CD-ROM (Read Only Memory CD)
 - computer data version of CD standard
 - 650 MB
- DVD-ROM (Digital Versatile Disk, Read Only Memory)
 - introduced 1995
 - computer data version of DVD standard
 - ~4.7 GB for single-layered DVD-ROM
 - dual-layer has semitransparent top layer. Laser can be refocused to shine through it and focus on lower layer (~ 8.5GB)
- Blu-Ray
 - introduced 2006
 - 25GB per layer. Dual layer standard at 50 GB
- Recordable optical formats
 - instead of stamping pits into a disk to alter reflectivity, change chemical makeup of disk
 - disk surface is sensitive to high intensity laser light
 - early versions (CD-R, DVD-R) were write-once (WORM: write once read many)



- Re-writable (CD-RW, DVD-RW) chemicals later developed
- Unlike magnetic hard drives, optical media can be ejected
 - platter is not securely fixed to chassis of drive
- Seek time
 - ~10 times worse than for hard drive
 - seeks more common as data density not as high as on magnetic hard drive
 - disk wobble means heads have to keep realigning
- Rotational latency
 - ~ 5 to 10 times worse than for hard drive (as disk not held as securely)
- Fragmentation
 - depending on file system used, and if recording to CD-R or CDRW, fragmentation may or may not be an issue
- Transfer rate
 - optical disk rotation rate varies depending on the track being read in order to keep the same number of bits per second presented to the read/write head
 - results in consistent transfer rate