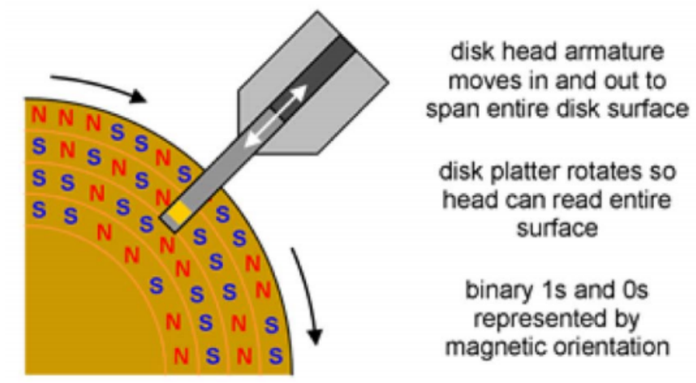
Week 6: Magnetic media

- Hard disks
  – magnetic disk
  – data stored by altering the magnetic orientation of areas of disk
  – surface of disk accessed by spinning disk and moving an arm containing a read/write head
  – performance improvements largely due to increasing density of data (aereal density) and flying height (https://en.wikipedia.org/wiki/Flying_height) (1961 50µm, 2014 3 nm)



Hard disks cont.

data organised as circular tracks (https://en.wikipedia.org/wiki/Track_(disk_drive)), which are composed of sectors

disk head very close to disk, so physical shock can result in a head crash

- Access time = seek time + rotational latency
  Seek time
  – time to move arm so read/write head in over the correct track
  Rotational latency
  – time for correct sector to spin under the read/write head

Fragmentation

– as files are created, expand, contract and are deleted, free space on the hard drive becomes fragmented
– lengthening a file means new allocated sectors may be anywhere on disk (not contiguous). Seek time increases

Transfer rates

– internal transfer rates: from disk to drive's controller board
  • impacted by speed of reading, head movements required, which track is being accessed (outer track larger and moves faster under the head)
– external transfer rates: from controller to computer system
  • caching allows external rate to often be larger than internal rate (in bursts)

Historical: removable magnetic storage

- floppy disks
  – flexible platter
  – 3.5 inch format
  – 1.4 MB

- high density removable disks
  – SyQuest: hard drive with removable disk platter
  – platter in sealed box

- ZIP disk
  – produced by Iomega
  – 100 MB (to 750MB)

- Optical mass storage eventually replaced these alternative portable formats