**Tutorial 6:** WRES1201 – Computer System Architecture

1. Define the terms track, cylinder and sector?
2. Define the terms seek time, rotational delay (latency), access time, and transfer time.
3. What common characteristics are shared by all RAID levels?
4. How is redundancy achieved in a RAID levels?
5. Consider a single platter disk with the following parameters: rotation speed: 7200rpm; number of tracks on one side of platter: 30 000; number of sectors per track: 600; seek time: one ms for every hundred tracks traversed. Let the disk receive a request to access a random sector on a random track and assume the disk head starts at track 0.
   1. What is the average seek time?
   2. What is the average rotational latency?
   3. What is the transfer time for a sector?
   4. What is the total average time to satisfy a request?
6. Consider a magnetic disk drive with 16 surfaces, 512 tracks per surface, and 64 sectors per track. Sector size is 1KB. The average seek time is 6 ms, the track-to-track access time is 1ms, and the drive rotates at 3600 rpm. Successive tracks in a cylinder can be read without head movement.
   1. What is the disk capacity?
   2. What is the average access time?
   3. Estimate the time required to transfer a 5MB file.
   4. What is the burst transfer rate?
7. Consider a 5 drive, 300GB per drive RAID array. What is the available data storage capacity for each of the RAID levels, 0, 1, 2, 3, 4, 5, and 6?