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Module 12 HW
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1. RAID systems rely on redundancy to achieve high availability.
   This is true for RAID levels 1, 3, 4, 5, and 6. RAIL level 1 relies on all data being stored on a mirroring, redundant disk which allows the data to be saved if a disk goes down. RAID 3 stores the redundant data in a disk which has the sum of all the data in the other disks. When a disk fails, you simply subtract data from the good disks, and what is remaining must be the information on the failed disk. RAID 4 uses the same redundant feature as RAID 3, except it does not access all of the disks for a single write. RAID 5 uses a similar redundant scheme to RAID 3 as well, but with a twist that allows for more efficient data writes. RAID 6 is similar to RAID 5, except with twice the redundancy. Therefore RAID 1-6 all rely on redundancy to achieve high availability.
2. RAID 1 (mirroring) has the highest check disk overhead.
   This is true as well. RAID 3-6 all use a system where the redundant data is stores as a sum of all the data, while RAID 1 creates a direct copy of the data to create redundancy. This is also the most expensive solution, since it requires the most disks.
3. For small writes, RAID 3 (bit-interleaved parity) has the worst throughput.
   This is true, since small writes will have to access all the disks in a group. For RAID 1, small writes will typically only access 2 disks in an array: the one the data is being written to and the redundant one. For RAID 4, you reduce the overhead by changing the parity disk only by the change in the disk you are writing data to. RAID 5 uses a similar scheme as RAID 4. RAID 6 uses a similar scheme as well, but with two parity disks. Since RAID 1, 4, 5, and 6 all require accessing fewer disks in an array they will have better throughput for small writes due to the fact that the other disks in the array can do processes in parallel in comparison to RAID 3.
4. For large writes, RAID 3, 4, and 5 have the same throughput.
   This is true if the write is large enough to require all the disks in the array. RAID 3, 4, and 5 all have the same factor of redundancy, therefore the only way to increase throughput would be to run processes in parallel. If we assume that the write is large enough to access all the disks, there is no way to run processes in parallel, therefore RAID 3, 4, and 5 will have the same throughput for large writes.