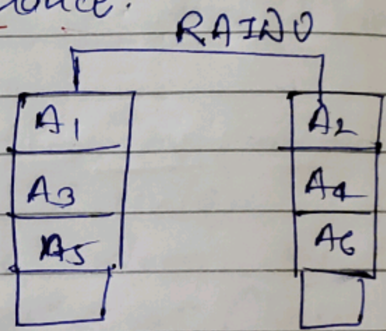
lec 11.5

→ data duplicat^n of disc — multiple disc से — all disc are independent

RAID : REDUNANT ARRAY INDEPENDENT DISC

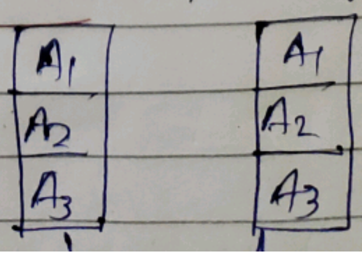
1) RAID 0 : Striping तोड़ना

- ↳ using data striping, no redundant informat^n is maintained.
- ↳ if one disc fail all other will lost.
- ↳ effective space utilizat^n is 100%.
- ↳ has best write performance.
- ↳ least costly
- ↳ poor reliability



2) RAID 1 : Mirroring

- ↳ maintain two identical copy on different disc.
- ↳ most expensive
- ↳ excellent fault tolerance.
- ↳ effective space utilization is 50%.
- ↳ slower write performace due to multiple copy



3) RAID 2 : Parity

- use single designated drive for parity.
- stripping unit in single bit.
- Hammer code is used for parity
  - detect upto 2-bit error or correct 1-bit error
  - can only detect odd no of bit in error

A_1	A_2	A_3	A_4	A_{P_1}	A_{P_2}
B_1	B_2	B_3	B_4	B_{P_1}	B_{P_2}
C_1	C_2	C_3	C_4	C_{P_1}	C_{P_2}

(4) RAID 3 : Byte striping + Parity

- have single check list with parity info

Raid 3

A_1	A_2	A_3	$A_{P(1-3)}$
A_4	A_5	A_6	$A_{P(4-6)}$ $B_{P(3-6)}$
B_1	B_2	B_3	$B_{P(1-3)}$

(check list.

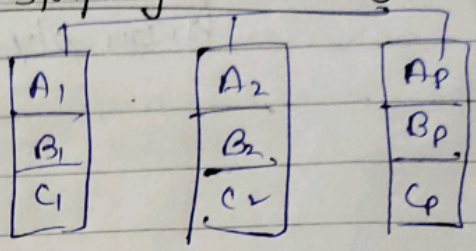
- provide recovery using XOR mechanism.

0 0	→ 0
1 0	→ 1
0 1	→ 1
1 1	→ 0

- facilitate recovery of atmost 1 disc failure.

~~(5) RAID-5 : Distributed Parity~~

(4) RAID - 4 → single parity block (all parity blocks in single disc) - Block striping + Parity



→ provide recovery using XOR mechanism

0 0 → 0
1 0 → 1
0 1 → 1
1 1 → 0.

→ facilitate recovery of at most 1 disc failure.

→ low ~~write~~ performance

(5) RAID-5 → ~~More than one parity~~ all parity blocks in different disc Distributed Parity

→ distribute parity block uniformly over all disc, instead of storing them on a single check disc.

→ several request can be processed in parallel.

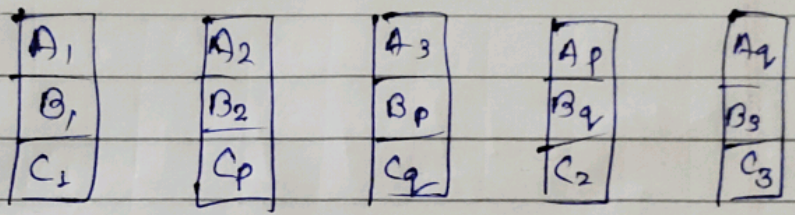
→ allows ~~only~~ recovery of only 1 disc failure.

⑥ RAID: 6 Dual parity.

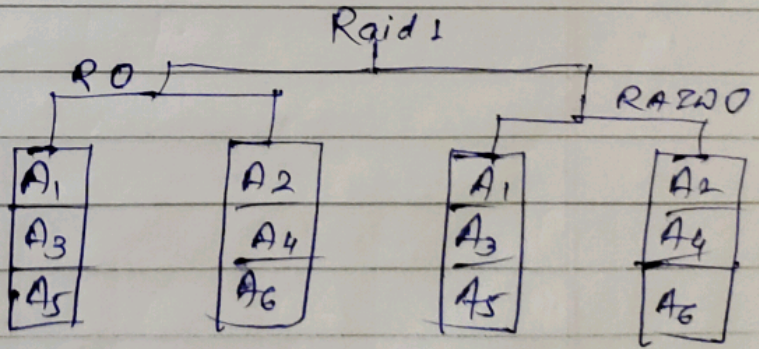
↳ two parity block, distributed across all disc

↳ write performace is poor than RAID 5

↳ use Reed-solomon codes to recover two simultoneus dis failure.



⑦ RAID: 01 : (RAID 0+1) : Mirror of strip



→ minimum 4 disc require

→ achieve both replicat" & sharing of data between disc.