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Assignment 2

1. Delete anomaly exists as the employee with id 105 is the only employee with emp\_dept\_no D004 and with emp\_dept\_name of HR. If he is deleted, all information on that dept number and name will be lost.

2. The relation is not 2NF as the 1st and 2nd rows have teacher\_id=111 and both of those result in subject\_no=1 despite them having different subject values, meaning the subject\_no only depends on the teacher\_id.

3. It is in 2NF as it only has a single primary key. It cannot be concatenated which is necessary for 2NF to be tested.

4.1. Total cylinder capacity = (512 B+128 B)\*20 (blocks) \*15 (disks)\*2 (double-sided disks) = 384000 Bytes

Useful cylinder capacity = 512\*20\*15\*2 = 307200 Bytes

4.2. Time to transfer 20 random blocks = 20\*(S+RL+BTT)=20\*30+12.5+1) = 870ms

Time to transfer 20 consecutive blocks with 2x buffering = S+RD+20\*BTT = 30+12.5+20\*1=62.5ms

It is 870-62.5=87.5 ms faster to use double buffering to transfer 20 consecutive blocks than to transfer 20 random blocks.

5. See attached.