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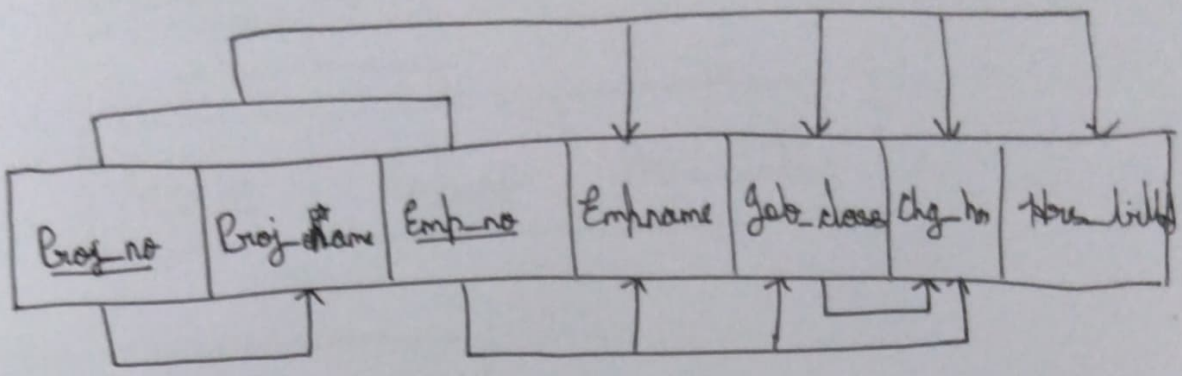
Q.3 (A)

→



Solution :-

Normalized Relation,

Employees (Proj_no , Emp_no , Proj_name, Emp_name, Job_Class, Chg_hr, Hrs_Billed)

With set of FDs

Proj_no , Emp_no → Proj_name, Emp_name, Job_Class , Chg_Hr, Hrs_Billed }

Emp_no → Emp_name , Job_Class , Chg_Hr

Proj_no. → Proj_name

Job_Class → Chg_Hr .

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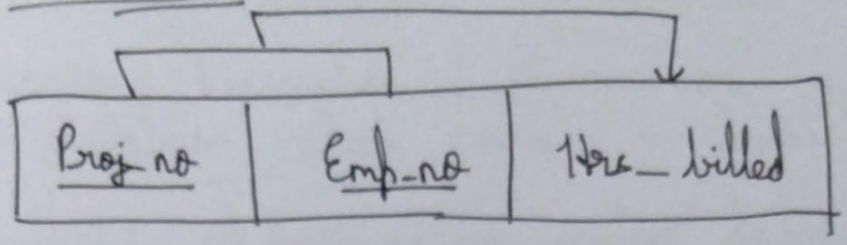
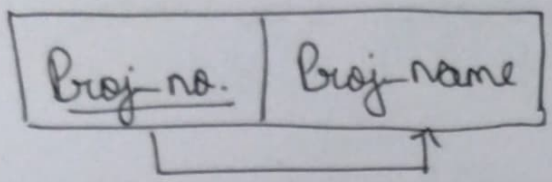
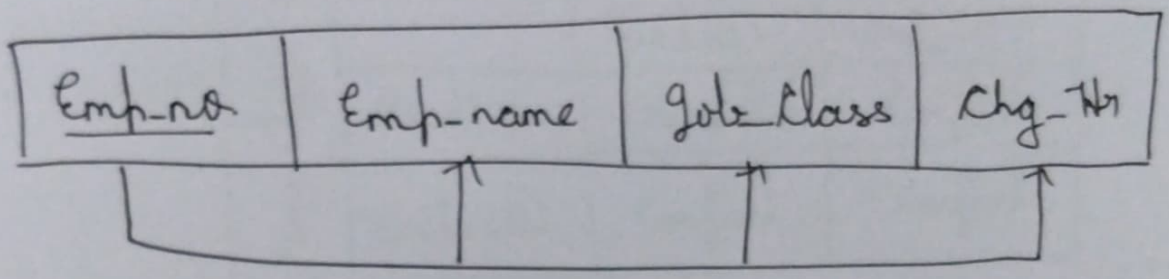
Q. 3 (A)

Relation in 3NF







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→ Conflict Serializability:- The database system must control concurrent execution of transactions which ensure the the database state remains in consistent state.

i] Conflict:- A pair of consecutive database actions (reads, writes) is in conflict if changing their order would change the result of at least one of the transactions.

		Transaction T_j	
		Read(D)	Write(D)
Transaction T_i	Read(D)	No conflict	Conflict
	Write(D)	Conflict	Conflict

Consider schedule S has two consecutive instructions I_i and I_j from trasactions T_i and T_j respectively If I_i and I_j access to different data items then they will not conflict and can be swapped, without any problem.

If I_i and I_j access to same data item D then consider following consequences:

I_i = READ(D), I_j = READ(D) then no conflict as they only read value.

This operation is called as non conflicting swap.

I_i = READ(D), I_j = WRITE(D) then they conflict and cannot be swapped.

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Q. 3 (B)

I_i = Write (D), I_j = Read (D) then they conflict and cannot be swapped.

I_i = Write (D), I_j = Write (D) then they conflict and cannot be swapped.

So we can say that instructions conflict if both consecutive instructions operate on same data item and from different transactions and one of them is WRITE operation.

If I_i and I_j access to different data item D then consider following all consequences no conflict as they only read or writing different values.

I_i = READ (D) / WRITE (D), I_j = READ (P) / WRITE (P)

then no conflict as they only reading or writing different data.

The following set of actions is conflicting:

T_1: R (X), T_2: W (X), T_3: W (X)

while the following set of actions is non conflicting:

T_1: R (X), T_2: R (X), T_3: R (X)

T_1: R (X), T_2: W (Y), T_3: R (X)

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Q.3 (B)

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View Serialization :-

If a concurrent schedule is view equivalent to a serial schedule of same transactions then it is view serializable.

Conditions for view equivalence :

Let D = Data item

S_1, S_2 = Transaction schedules

T_i, T_j = Database transactions

-> Schedules S_1 and S_2 are view equivalent if they satisfy following conditions for each data item (D):

a] If T_i reads value of D written by T_j in S_1, then T_i also reads value of D written by T_j in S_2.

b] If T_i writes final value of D in S_1, then T_i also writes final value of D in S_2.

c] S_1 and S_2 must have same transactions included and also they are performing same operations data. If T_i reads initial value of D in S_1, then T_i also reads initial value of D in S_2.