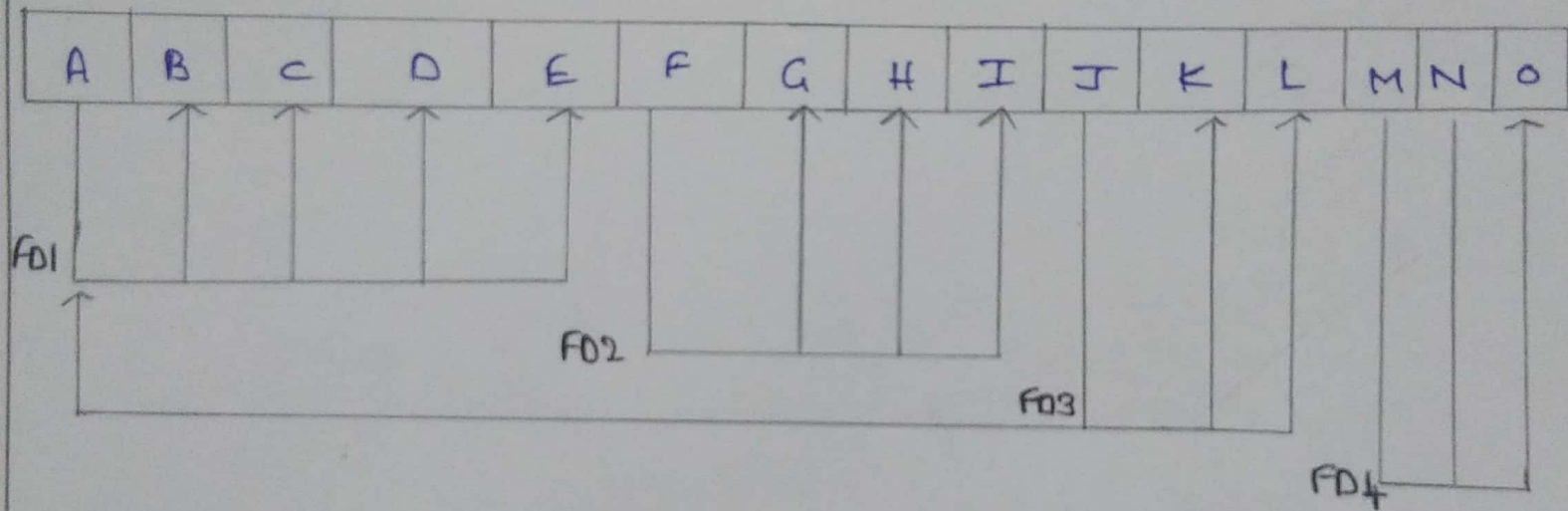


Normalization:

Wholesale

⌊ ^Acust-id, ^Bcust-name, ^Cphone, ^Dadd, ^Eemail,
^Fstock-id, ^Gstor-name, ^Hur-price, ^Iexp-date,
^Jor-id, ^Kord-date, ^Lamount, ^Mst-date,
^Nend-date, ^O⊥-amount }



Functional dependencies:

FD1 : $A \rightarrow B, C, D, E$

FD2 : $F \rightarrow G, H, I$

FD3 : $J \rightarrow A, K, L$

FD4 : $M, N \rightarrow O$

Prime attributes:

$\langle A, B, C, D, E, F, G, H, I, J, K, L, M, N, O \rangle \rightarrow S$

I (remove O)

$\langle A, B, C, D, E, F, G, H, I, J, K, L, M, N \rangle \rightarrow S$

$[M, N \rightarrow O]$

II (remove N)

$\langle A, B, C, D, E, F, G, H, I, J, K, L, M \rangle^+ \not\rightarrow S$

$[M, N \rightarrow O]$

$\exists N \Rightarrow N$ is replaced.

\therefore Closure does not satisfy.

III (remove M)

$\langle A, B, C, D, E, F, G, H, I, J, K, L, N \rangle^+ \not\rightarrow S$

$[M, N \rightarrow O]$

$\Rightarrow M$ is replaced.

\therefore Closure does not satisfy.

IV (remove K, L)

$\langle A, B, C, D, E, F, G, H, I, N, J, M \rangle^+ \rightarrow S$

$[J \rightarrow A, K, L]$

II (remove G, H, I)

$\langle A, B, C, D, E, F, \underline{I} \rangle + \xrightarrow{M, W} S$
[F \rightarrow G, H, I]

VI (remove B, C, D, E)

$\langle A, F, I, M, W \rangle + \rightarrow S$

[A \rightarrow B, C, D, E]

VII (remove A)

$\langle F, I, M, W \rangle + \rightarrow S$

[I \rightarrow A]

$\therefore \langle F, I, M, W \rangle$ are prime attributes.

\rightarrow Candidate key {stock-id, or-id,
st-date, ord-dates}

INF:

No attributes in the relation
are multivalued.

\therefore Given relation is already in

INF.

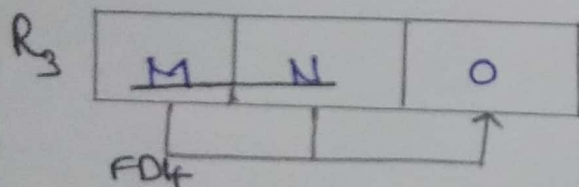
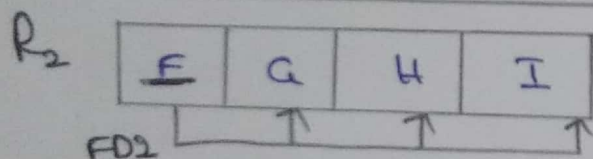
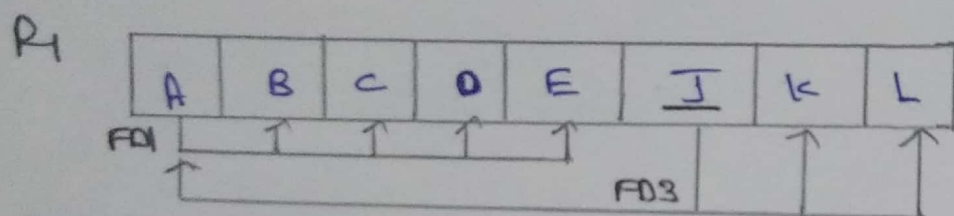
2NF:

There should be no partial functional dependencies.

\therefore The table is not in 2NF.

Partial FDs \rightarrow FD2, FD3, FD4.

Decomposition:



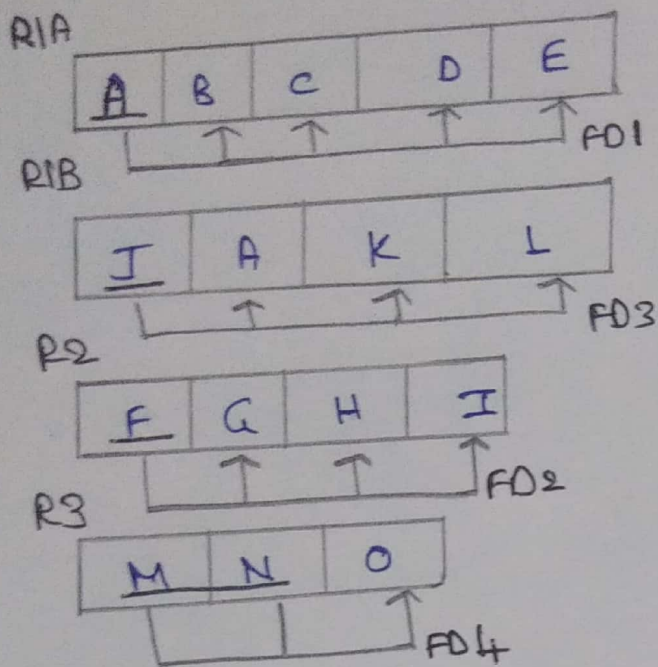
3NF:

There should be no transitive dependency present in the relation.

\therefore The table is not in 3NF.

\therefore FD1, FD3 are transitive dependency.

Decomposition :

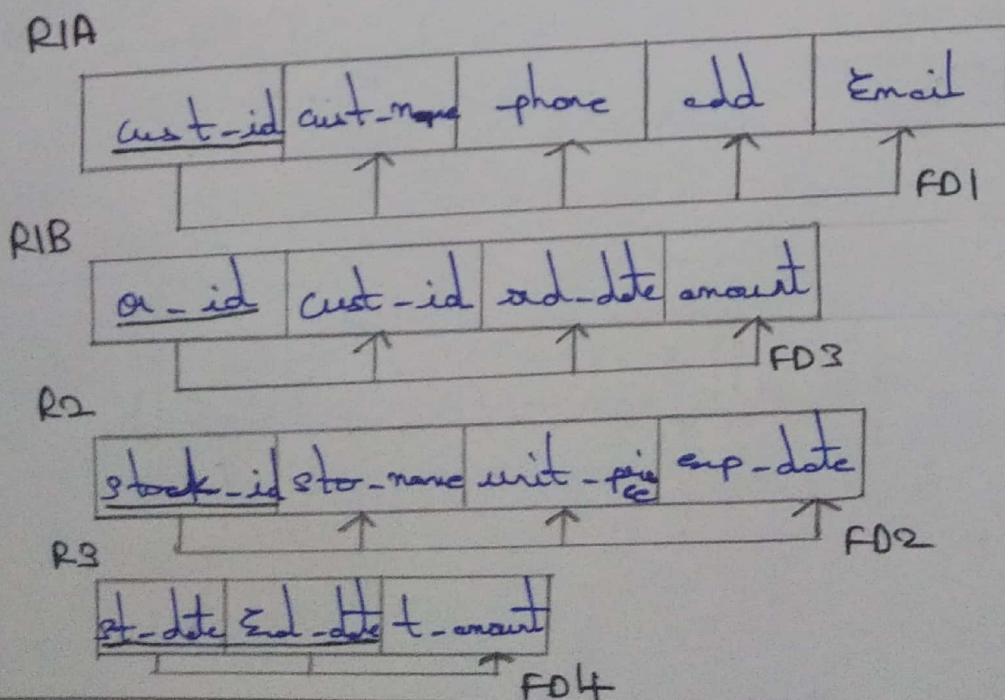


BCNF:

$X \rightarrow A$ holds in R, then
X should be superkey of R.

∴ The relations are in BCNF.

Resultant Relations:



(i) FD preservation property:

There are 4 FDs present before the process of normalization.

FD1, FD2, FD3, FD4

After the normalization process, same 4 FDs are preserved and maintained.

R1A \rightarrow FD1

R1B \rightarrow FD3

R2 \rightarrow FD2

R3 \rightarrow FD4

\therefore FD preservation property

holds true.

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RECORD SHEET

Sheet No.....

(ii) Lossless join property:

After performing join operation
on two relation, the data inserted
was properly retrieved.

\therefore Lossless join property holds
true.