EXPERIMENT - 2

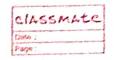
Aim: To study lessy and leseless decomposition in DBMs.

THEORY: Decomposition in Patabase Management system is to break a relation into multiple relations to bring it into an appropriate normal form. It helps to remove redundancy, inconsistencies, and anomalies from a database. The decomposition of a relation Rina relational scheme is the process of replacing the original relation Rich two as more relations is a relational schema. Each of these relations is a relational schema. Each of these relations contains a sibsect of the attributes of R.

=) Hierarchial decomposition: Hierarchial decomposition
in database management system (DBMS) is an approach
to organizing and structuring data based on a
hierarchical model. It involves breating down complex
data into smaller smore manageble units using
a parent—child relationship.

In a hierarchical or decomposition, data is organized
in a tree-like structure, when each node represents

in a tree-like structure, when each node represents a record or entity, and the links between nedes represent the parent-child relationship. The top-level reale is called the root and subsequent nodes are children of their respective parent podes.



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-	anni	Decen	position.

When a relation is decomposed into two or more relational schema, the loss of information is marroidable when the original relation is retrieved. Let us see an example—

	Emp IP	Emp Name	Emp Age	Emplocation	Dept-ID	Dept Name
-	Egel	James	28	Paris	Dept 1	garations
-	E002	Smith	31	Ukraine	Dept 2	HR
1	Eeo3		33	Texas	Dept 3	Finance

Decompose the above table into two-tables:

i) < Emp Details

	Emo-ID	Eno Name	Emp-Age	Emp-location
	E001	James	28	fons
-	F002	Smith	31	JE Ukraine
-	E003	Alex	33	Texas
-				

ii) < Dept_ Details>

	Dept - ID	Dept-Name	
	Depti	operations	
	Dept2	LR	
	Dept3	Finance	

Now you wen't be able to join the above tables, since "Emp-ID" ight part of the "Dept Details" relation Therefore, the above relation has lossy decomposition Therefore, The above relation how larry decomposition.

Localer Decomposition:

Decemposition is lossless if it is peasible to reconstruct relation R decomposed tables using joins, This is the preferred choice. The information will not lose from the relation when decomposed. The join would result in the some original relation

Let us see on example:

	Emo I	nfo>				
	Fora-ID	Eno-Name	Emp. Age	Emp-location	Dept-TD	Deat-Name
		5	1 0		,	,
	Eool	James	28	Paris	Dept 1	operation
-	F002	Smith	31	Ukraine	Dept2	UR
-	E003	Alex	33	Texas	Dept 3	finance
-						

Decompose the above table into two tables:

is cEmpl	Details >			
EmpID	Emprome	Emp-Age	Emp-location	
Fool	Somes	28	Paris	
E002	Smith	31	Ukraine	
Eas3	Alex	33	Texos	

41	그리고 있다. 하는 생각 등 생각이 있다고 생각	
111	< Dept Detai	152
1	Dyline	U

м				
	Dept-ID	Eme-ID	Dept_Name	-
	Dept	E001	operations	
	Dept 2	E002	HR	
	Dept 3	E003	Finance	
				Ī

Nour ratural Jain is applied on the above two tables. The resurt will be the original table.

Therefore the above relation had lossless decomposition

The report, the above relation had lossless decomposition i'e so loss of information.

=) Identification between losseers and lossy securposition:

Losgless	lorry
	8
1) The decomposition R. R. R. R3	1) The decomposition R. Re, Re, R3R-
	for a relation schemak is lossy if
	these natural join result into
result the original relations.	addition of extraneous tuples with
11	original relation R -
	RCRIMRIMR3 DAR
2) There is no love information as	
the relation obtained after	or extremeous tuples are added
natural join of decomposition	into the relation after natural
is equilateral to original relation	join of decomposition Thus, it
Thus, it is do referred as	is also referred as careless
non- additive join decomposition.	decomposition.
y	
	The All gradient per trading and the first perfect that the first perfect the first perfect that the first perfect

3) The commen attribute of 3)
The sub relations is a sul superkey of any one of the of relation:

3) The common attribute of the sub relation is not a superkey of any of the sub-relation.

=) Lorry and Lorrier secomposition for BCNF:

Let there be a relation m (A,B,C,D,E) with functional dependencies A+C,D; B+E; A,E+F

Erry functional dependency in relation m violater

BCNF because none of the fot left hand sides

So, he start by splitting M an the function dependency.

ATCID to obtain:

M. (A.C.D) where A+C,D

M. (A.B, F.F) where B+E, and A.E+F and A.B+EF

(This is a desired functional dependency since B+E

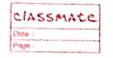
and A.E+F)

Now, M, is BLNF because A is a superky and
there are other functional dependencies in that
relation violating BCNF. M2 is not BCNF because

B-F & A, E-F violate BCNF. He can break M2 an
B-E to obtain M2 and My.

M, (A,C,D) Where A-C,D
M3 (B,E) Where B-E

My (A,B,F) Where only trivial functional dependency remain



Now, M., M. and My are larrier BCNF decomposition of M. of the relation were M. (A.C.D), M. (B.E), M. (B.E.F.). Then it would be a lossy secomposition.

=> Hoolman's Algorithm:

9t is used to check whether a decomposition of a relation is lossy or lossless. 9t is a test ber lossless (non-additive) join property.

Here, a universal relation R, a decomposition

D= {R, R2, R3, ... Rn} of R, and of set For functional dependencies or defined where

R= (A1, A2, A3, ... An)

Algorithm:

1) (reate on initial matrix I with one now i for each relation in Ri in D, and one column i for each attribute Aj in R.

(x - Yex R = (A,B,C,D), FD = (F)B, B-1C, (-> D)

and R is decomposed into R,(A,B), R2(B,C) and R3(C,D)

		A	ß	C	D	
	R			Mag . To		
	R2	Ablancy,	7. 1. 1.	1 . 10		
3	R3				19 P	
			j			

2) fex 1(1,7):= bij bot all matrix entries if										
2) Set $J(i,j) := bij$ for all matrix entries, if relation Ri includes attribute Aj then set $S(i,j) = q_i$										
1	2	?	4							
Δ	ß	(D							
0.	0	bia	bu							
	1		- 1							
01	032	-95								
	A a. b21	A B a, a, b21 a2	A B C a, a, b,3 b21 a2 a3	i induder attri A B C D a, a, b,3 b,4 b21 a2 a3 b24 b31 b32 a3 a4						

- 3) For each functional dependency X-y in F, for all roses in S which have the same symbol in the columns corresponding to attribute in X make the symbols in each column that correspond to an attribute is 4 be some is all these roses as fellows:
- i) If any of the row have m"a" symbol, for the column, set the other roses to that some "a" symbol in the column.
- is only of the ross, choose are of the "b" symbols.

 That appear in one of the ross for the attribute and set other ross to that some "b" symbol in the column.
- 4) Repeat the following loop until a complete loop
 execution results is no change to 5:

 5) If a row is made up entirely of "a" symbol,
 then the decomposition has the lossless join property
 otherwise the decomposition is lossy.

CIASSMATE Date: Page:

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3	R1 R2 R3	1	3 ch del:	3 (b13) a3 a3	624					
		. \	-_2	3	4				: 1	
1 2 3	R ₁ R ₂ R ₃	A a. b.21	B 92 92 b32	a3 a3	D 04 (52) (52) 04			the o	de compos	ied
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