Birla Institute of Technology & Science-Pilani
Hyderabad Campus
2nd semester 2016-17
Database Systems (CSF212) Test-2(Regular)

Dt: 31.03.2017 AN Weightage: 20% Time: 60 Mins Type: Close Book

Instructions: (i) No additional sheets will be supplied. Hence use the space in main booklet accordingly. (ii) For all answers, concept related content, neatness and the presentation carry marks as applicable. (iii) For all theory questions, allot the time and space according to the weightages.

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1. With a simple example explain what is *deletion anomaly*? [4]

2. Look at the following relation (Book).

Book

Bookid	**Tiltle**	**Author**	**Publisher**	**Price**	**Pub_location**
14236	Networks	John Miller	PHI	570	Delhi
14345	Number Theory	Pradeep Sethi	Tata Mc	700	Mumbai
14785	Optimization	KL Punmia	PHI	500	Delhi
15769	Social Economics	Dheeraj Singh	Pearson Ed	480	Hyderabad
15988	Cryptography	Tonny Keeth	Tata Mc	670	Mumbai

Now, assume that the relation is decomposed into- R1(*Bookid, Title, Price*); R2(*Bookid, Title, Author, Publisher*); R3(*Publisher, Pub_location*). Let ***b*** be the *relation state* of the relation ***Book***, consisting of above 5 tuples. Now, give the *Projection* of ***b*** on R1, R2 and R3. [4]

3. Find the highest NF satisfied by the following Relation with given set of FDs (F).
   R1(A,B, C, D, E) F={ AB→D; AB→ C; C→{E,A}}, and {AB} is the key.
   If R1 is not in BCNF, bring it to BCNF by applying appropriate decomposition.
   [4]

4. List the Inference Rules that constitute Armstrong's Inference Rules. Give Pseudo Transitive Rule (IR6) and show how you can prove it with Armstrong's IRs. [4]

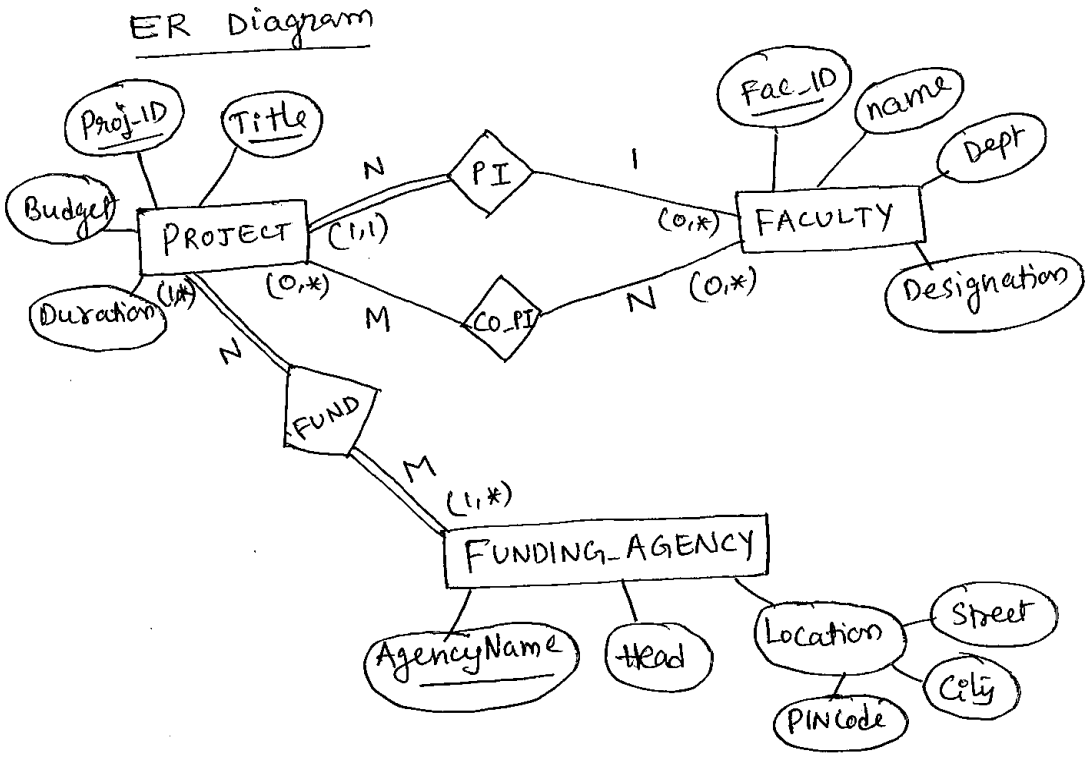
5. (i) With a simple example explain why LD (Local Depth) of a bucket can't be greater than GD (Global Depth) of an Extendible Hashing scheme?
   (ii) Explain why and when overflow buckets are required even in case of in Linear hashing, which is a dynamic hashing technique? [4]

6. Assume a disk-pack having 9 single-sided disks, and 128 cylinders. If each track contains 960 sectors, and the block size is 2048 Bytes. Each sector contains one block. Now give the (i) capacity of each Cylinder in MB, and (ii) the total capacity of the disk-pack in GB. Take as 1KB=1024Bytes , 1MB=1024KB , and 1GB=1024MB. We assume uniform structure for all surfaces. (Note: you need to give the final computed figure in MB/GB, do not leave calculations incomplete). [4]

7. Assume that we have a relational R with schema R(A,B,C,D,E,F,G) , with the following set (F) of functional dependencies. F={ A →{BCG}; C →{D,E}; B →F} . If R is decomposed into three relations- R1(A,B,C), R2(C,E,G), R3(A,D,E,F). Now check if this decomposition is lossless or not. [8]

[Note: Give complete working with full detailing at each step].

8. Look at the following ER Diagram. This ER Diagram captures description about Projects being done by Faculty in an Institution. Funding agencies fund Projects. The Acronym PI stands for Principal Investigator, and CO_PI is for Co-Principal Investigator. Faculty become PI and CO_PI for Projects. Now map the ER diagram to Relational schemas, with all necessary details and constraints depicted in ER diagram below. [8]



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