CS 33007 Introduction to Database System Design, Spring 2021

Final Exam

Instructions:

- *If needed you can use pen and paper. Do not forget to take a snapshot of the paper and attached to the answer script.*
- *You must submit your answer script at Blackboard (Pdf format Preferable).*

Total Points: 50   **Time:** 12:45-2:00PM

Section 01: 20 Points(10+10)

Normalize the following table up to 2nf

Ref No	Name	Address	Status	AccNo
345	C.J Date	23, High Street	Business	120768, 348973
543	F.D Rolland	45, The Ash	Domestic	987645
675	D.R Howe	17, Low Street	Business	745363, 678453, 348973

1 nf conversion:

RefNo	Name	Address	Status	AccNo
345	C.J Date	23, High Street	Business	120768
345	C.J Date	23, High Street	Business	348973
543	F.D Rolland	45, The Ash	Domestic	987645
675	D.R Howe	17, Low Street	Business	745363
675	D.R Howe	17, Low Street	Business	678453
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2nf conversion from normalized form :

RefNo	Name	Address	Status
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RefNo	AccNo
345	120768
345	348973
543	987645
675	745363
675	678453
675	348973

This should be correct, thank you.

Section 02: 20 Points(10+10)

Suppose you need a covering index to support a query.

a) Write a query and create a covering index and show your result.

b) Answer must include the instruction for creating the covering index and index table.

Customer ID	Customer Name	Contact Name	Address	City	Postal Code	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvagen 8	Lulea	S-958 22	Sweden

A: table below

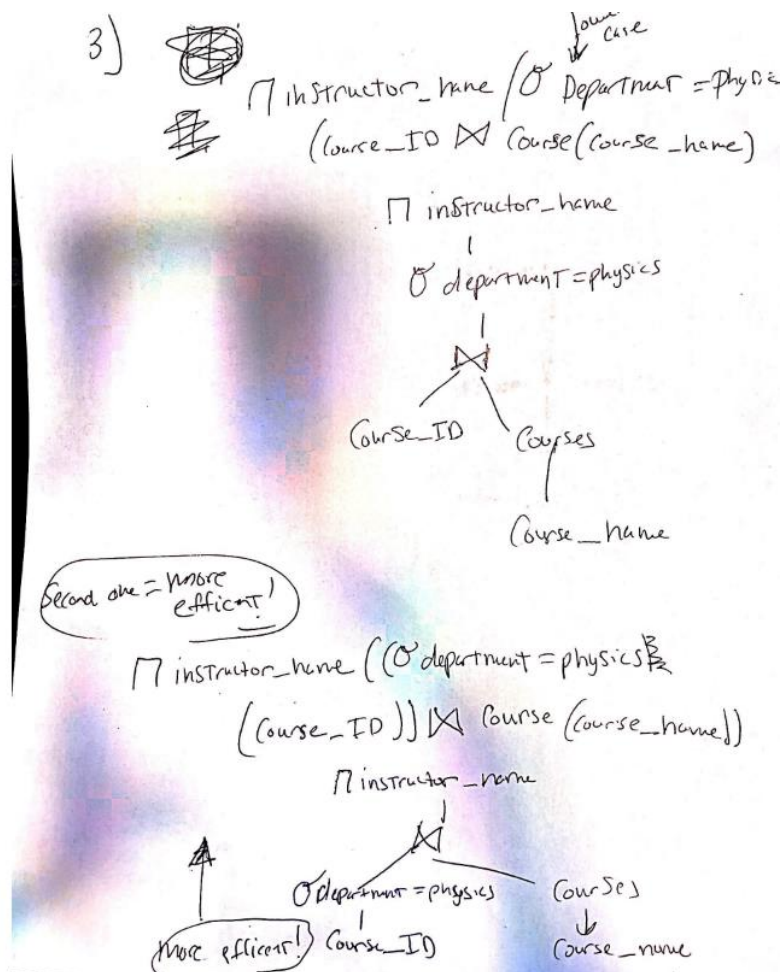| Customer Name	Address	City	Country
Alfreds Futterkiste	Obere Str. 57	Berlin	Germany
Ana Trujillo Emparedados y helados	Avda. de la Constitución 2222	México D.F.	Mexico
Antonio Moreno Taquería	Mataderos 2312	México D.F.	Mexico
Around the Horn	120 Hanover Sq.	London	UK
Berglunds snabbköp	Berguvsvagen 8	Lulea	Sweden

this is all one table.

B. Here is the instructions: Create index idx_customer on customer(contact name, address, city, country)

Section 03: 10 Points(08+02)

Draw the Relational algebra expressions and query-evaluation plans for the following query. Mark the most efficient query-evaluation plan between your plans.

> Find the names of all instructors in the Physics department, along with the titles of the courses that they teach

this should cover the question and second one is more efficient.

Section 04: 10 Points(07+03)

a) Suppose you have to recommend a technology for a new database to keep the BMV (Bureau of Motor Vehicles) record the state of X (Approx. record 100,000). You can use whatever database technology you want (Relational/NOSQL). Share you your recommendation about a choice of technology and your reasoning behind the recommendation.

Answer: I'd recommend using NOSQL because it's a document-oriented database. I feel like this type of database technology would work better for the keeping track of the BMV's records for x State. It also would allow the user to be more in control of the structure of the data and allows for a good use of databases in the agile development.

b) Why is the CAP theorem important?

Answer: cap theorem is important due to its three characteristics: availability , partition tolerance and consistency. Of the three the two most important are availability and partition tolerance, since even if the case of network fault , the distributed system can still function , along with successful handling of requests with reading or write operations , and then displaying if that can or cannot be performed.