國 立 臺 北 科 技 大 學

九十八學年第一學期電機系博士班資格考試

資料庫試題

注意事項：

1. 本試題共【10】題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在試卷答案欄內，否則不予計分。
4. 考試時間：二小時。

1. [10 points] Under what conditions can an attribute of a binary relationship type be migrated to become an attribute of one of the participating entity type?

2. [10 points] Discuss the various reasons that lead to the occurrence of null values in relations.

3. [10 points] How are the OUTER JOIN operations different from the (inner) JOIN operations?

4. [10 points] Why can we not infer a functional dependency from a particular relation state?

5. [10 points] Prove that any relation schema with two attributes is in BCNF.

6. [10 points] Consider the following relation:

   CAR_SALE(*Car#*, *Date_sold*, *Salesman#*, *Commission%*, *Discount_amt*)

   Assume that a car may be sold by multiple salesmen and hence {*Car#*, *Salesman#*} is the primary key. Additional dependencies are:

   Date_sold→*Discount_amt*   and   *Salesman#*→*Commission%*.

   Based on the given primary key, is this relation in 1NF, 2NF, or 3NF? Why or why not? How would you successively normalize it completely?

7. [10 points] Which of the following schedules is (conflict) serializable? For each serializable schedule, determine an equivalent serial schedule.
   (a) r1(z); w2(x); r2(z); r2(y); w1(x); w3(z); w1(y); r3(x)
   (b) r1(x); w2(y); r1(z); r3(z); w2(x); r1(y)

8. [10 points] What is the certify lock? Explain why it is needed for multi-version 2PL. What are the advantages and disadvantages of using certify locks?

9. [10 points] Why does SQL allow duplicate tuples in a table or in a query result?

10. [10 points] Why can we have at most one primary or clustering index on a file, but several secondary indexes?