

國立臺北科技大學
九十六學年第一學期電機系博士班資格考試

資料庫試題(公告用)

填學生證號碼

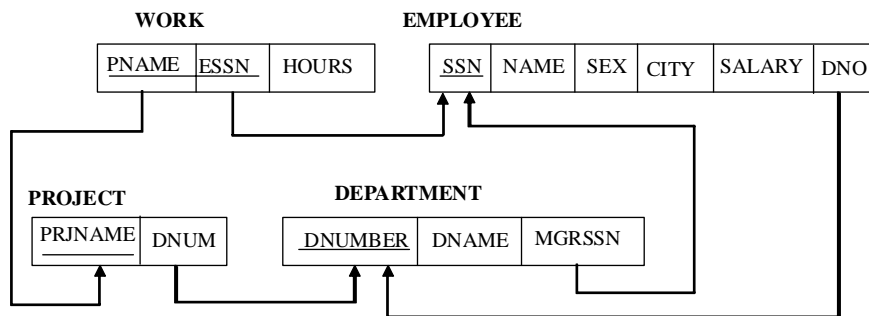
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注意事項：

1. 本試題共【9】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%) Explain the difference between a weak and a strong entity type.
2. Consider the COMPANY database schema of the following figure.



Specify the following queries in SQL.

- i. (5%) Find the names of all employees who live in the same city as do their managers.
- ii. (5%) Retrieve the average salary of all female managers.
- iii. (5%) For each project, list its name and the number of Dept. 5 employees working in the project.
- iv. (5%) Which projects employ more than 2 people?

3. (10%) Define Boyce-Codd normal form. How does it differ from 3NF?
4. For the schedules: $r_1(A)$; $r_2(A)$; $r_3(B)$; $w_1(A)$; $r_2(C)$; $r_2(B)$; $w_2(B)$; $w_1(C)$, answer the following questions [We denote a transaction T_i reads or writes data item X as $r_i(X)$ or $w_i(X)$.]:
- (5%) What is the precedence graph for the schedule?
 - (5%) Is the schedule conflict-serializable?
5. (10%) Explain the distinction between the terms serial schedule and serializable schedule.
6. (10%) What is a cascadeless schedule? Why is cascadelessness of schedules desirable?
7. Consider the following two transactions:
- | | |
|--|--|
| $T1$: read(A);
read(B);
if $A = 0$ then $B := B + 1$;
write(B). | $T2$: read(B);
read(A);
if $B = 0$ then $A := A + 1$;
write(A). |
|--|--|
- (5%) Add read_lock, write_lock and unlock instructions to transactions $T1$ and $T2$, so that they obey the two-phase locking protocol.
 - (5%) Can the execution of these transactions result in a deadlock?
8. (10%) Suppose that we are using extendable hashing on a file that contains records with the following search-key values:
- 2, 3, 5, 7, 11, 17, 19, 23, 29, 31
- Show the extendable hash structure for this file if the hash function is $h(x) = x \bmod 8$ and buckets can hold **three** records.
9. (10%) When a transaction is rolled back under timestamp ordering, it is assigned a new timestamp. Why can it not simply keep its old timestamp?