四川大学期末考试试题（闭卷）

（2014~2015 学年第 2 学期）

课程号：**311038040** 课程名称：**数据库系统（A 卷）** 任课教师：________

适用专业年级：**软件工程 2013 级** 学号：________ 姓名：________

考试须知

四川大学学生参加由学校组织或由学校承办的各级各类考试，必须严格执行《四川大学考试工作管理办法》和《四川大学考场规则》。有考试违纪作弊行为的，一律按照《四川大学学生考试违纪作弊处罚条例》进行处理。

四川大学各级各类考试的监考人员，必须严格执行《四川大学考试工作管理办法》、《四川大学考场规则》和《四川大学监考人员职责》。有违反学校有关规定的，严格按照《四川大学教学事故认定及处理办法》进行处理。

题　　号	一(10%)	二(10%)	三(30%)	四(20%)	五(30%)	卷面成绩
得　　分						
阅卷时间						

注意事项：1. 请务必将本人所在学院、姓名、学号、任课教师姓名等信息准确填写在试题纸和添卷纸上；

2. **请将答案全部填写在本试题纸上；**

3. 考试结束，请将试题纸、添卷纸和草稿纸一并交给监考老师。

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评阅教师	得分

1. Multiple Choices. (Total marks: 10)

1. Which of the following SQL commands can be used to change, add, or drop column definitions from a table? ______

   (a) ALTER TABLE (b) CHANGE TABLE (c) UPDATE TABLE (d) MODIFY TABLE

2. If functional dependences $A \rightarrow C$, $AB \rightarrow D$ and $A \rightarrow B$ hold, _________ does not hold.

   (a) $AB \rightarrow C$ (b) $AB \rightarrow CD$ (c) $A \rightarrow D$ (d) $B \rightarrow D$

3. In a two-phase locking protocol, what happens when a transaction requests a conflicting lock? ______

   a) The transaction immediately acquires the lock from the current lock-holder.
   b) The transaction proceeds without acquiring the lock.
   c) The transaction is blocked to acquire the lock.
   d) The transaction is aborted immediately.

4. What attributes does a subclass have? ______

   a) Just the attributes from the superclass
   b) All the attributes of its superclass, and possibly more
   c) A subset of the attributes of its superclass
   d) None of the attributes of its superclass

5. An insertion operation will _____ if the inserted primary key has a NULL value.

   (a) succeed with warning (b) fail (c) crash the system (d) succeed without warning

评阅教师	得分

2. Relational Algebra. (Total marks: 10)

Consider the following relations, and write the results of relational algebra expressions.

Relation ***r***:

A	B	C
A	2	A
A	3	B
B	2	C

Relation ***s***:

B	D
2	100
3	200

1） $r \times s$ **(Marks: 3)**

2） $r \bowtie s$ **(Marks: 3)**

3） $\Pi_{A,B}(r) \div \Pi_{B}(s)$ **(Marks: 4)**

评阅教师	得分

3. Queries. (Total marks: 30)

Consider the following relational schemas describing an atlas(地图集) :

continent (name, area)
country (name, continent, population)
city (name, country, province)

Write **SQL** statements in to perform the following instructions.

(1) List the name of the countries of the continent whose name begins these letters:'as' in alphabetical order.
(2) Give the number of cities for each country in the continent whose name is 'asia' in ascending order.
(3) List the name of all countries with more than ten cities.
(4) Give the name of the country that has the most cities.
(5) Give the name of the largest population continent.
(6) List the countries name in the continent 'asia' that have a larger population than any of the countries of 'europe'.

评阅教师	得分

4. Normalization. (Total marks: 20)

1. The following table stores information about students and projects they participate in a university.

student_project

s_id	name	proj_id	proj_name	proj_budget
98988	Tanaka	4	SCC	8,000
98988	Tanaka	5	YK	5,000
76653	Aoi	5	YK	5,000

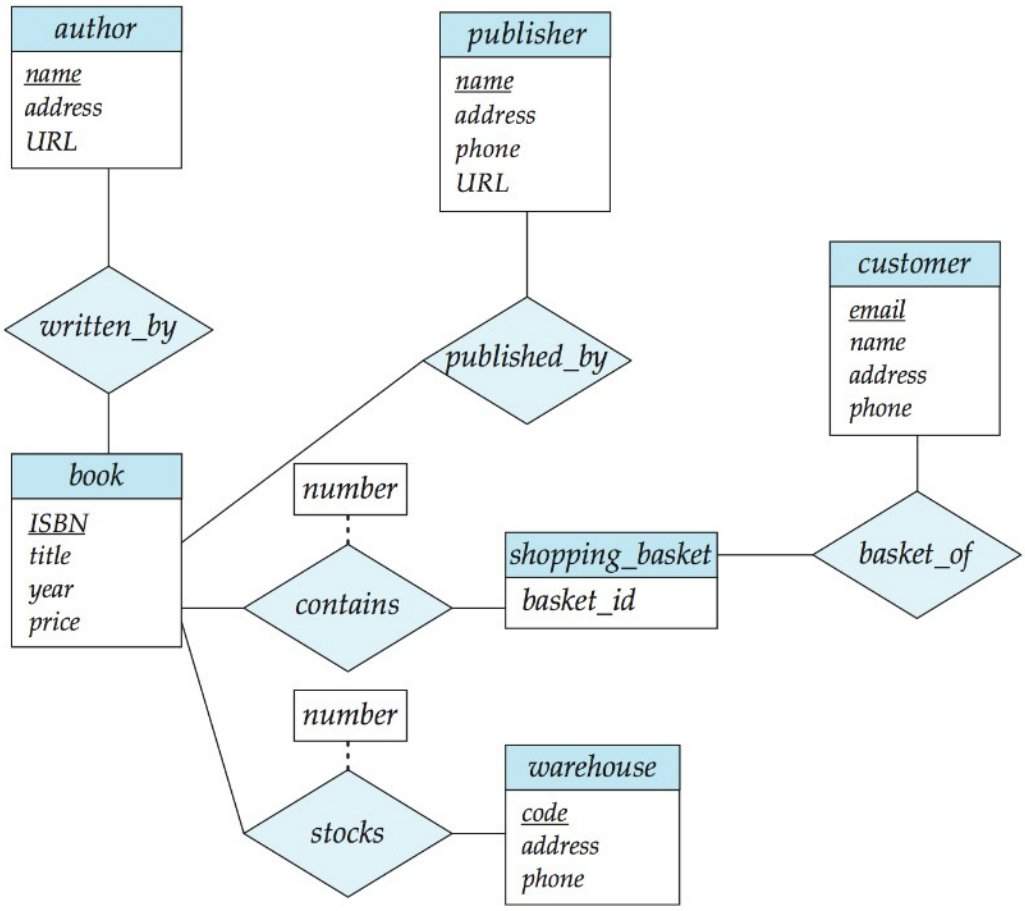
1) Identify **functional dependencies** of the table **EMP_DEPT** according to your reasonable assumptions. **(Marks: 6)**

2) Identify the **candidate key(s)** of the table **EMP_DEPT**. **(Marks: 6)**

3) IS the relation schema **student_project** in **BCNF**? Why? Is it in **3NF**? Why? If it is not in 3NF, bring it to a set of relations at least in 3NF; specify primary keys and referential integrity constraints for each relation. **(Marks:8)**

评阅教师	得分

5. Database Design (Total marks: 30)



1. Consider above figure, which models an online bookstore. Convert the E-R diagram to 3NF relations. Specify keys and referential integrity constraints. (Marks:15)

2. Consider the following information about a university database:

   - Professors have an id, a name, a date of birth, a rank, and a research specialty.
   - Projects have a project number, a sponsor name (e.g. NSF), a starting date, an ending date, and a budget.
   - Graduate students have an id, a name, a date of birth, and a degree program (e.g. M.S or Ph.D).
   - Each project is managed by one professor (known as the project's principal investigator).
   - Each project is worked on by one or more professors (known as the project's co-investigators).
   - Professors can manage and/or work on multiple projects.
   - Each project is worked on by one or more graduate students (known as the project's research assistant).
   - When graduate students works on a project, a professor must supervise their work on the project. Graduate students can work on multiple projects, in which case they will have a (potentially different) supervisor for each one.

   Design an E-R diagram that captures the information above.　(Mark: 15)

注： 试题字迹务必清晰，书写工整。

教务处试题编号：311-28