四川大学期末考试试题（闭卷）

（2018~2019 学年第 2 学期）　　　　　　　B 卷

课程号：__311142040__　　课程名称：__数据库系统_____　　任课教师：_____

适用专业年级：__软件工程 2017 级__　　　　　学号：_____　　姓名：_____

考生承诺					
我已认真阅读并知晓《四川大学考场规则》和《四川大学本科学生考试违纪作弊处分规定（修订）》，郑重承诺：					

1、 已按要求将考试禁止携带的文具用品或与考试有关的物品放置在指定地点；

2、 不带手机进入考场；

3、 考试期间遵守以上两项规定，若有违规行为，同意按照有关条款接受处理。

考生签名：

题　号	一(10%)	二(25%)	三(20%)	四(15%)	五(10%)	六(20%)
得　分						
卷面总分		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。

评阅教师	得分

Ⅰ**. Please decide whether the following statement is correct. If it is correct, T (TRUE) will be filled in parentheses, otherwise F (FALSE) will be filled in. (10 marks, 1 mark for each)**

1. SQL commands assist with querying data. 〔　　〕

2. There are several different character data types in oracle: The CHAR data type stores character values with a fixed length. The VARCHAR data type stores variable-length character strings. 〔　　〕

3. The NULL value is one of the key features of the relational database. The NULL, in fact, doesn't represent any value at all it represents the lack of a value. 〔　　〕

4. A view is an Oracle data structure constructed with a SQL statement. The SQL statement is stored in the database. Every view contains data. 〔　　〕

5. An index is a data structure that speeds up access to particular rows in a database. An index is associated with a particular table and contains the data from one or more columns in the table. 〔　　〕

6. The foreign key constraint is defined for a table (known as the child) that has a relationship with another table in the database (known as the parent). The value entered in a foreign key must be present in a unique or primary key of another specific table. 〔　　〕

7. The Structured Query Language (SQL) provides basic functions for data manipulation, transaction control, and record retrieval from the database, and most end users interact with Oracle through it. 〔　　〕

8. The HAVING clause works in conjunction with the GROUP BY clause. That is, you cannot have a HAVING clause without a GROUP BY clause. 〔　　〕

9. This SELECT statement will execute successfully.

   SELECT forename, surname, MIN(Salary) FROM employee; 〔　　〕

10. This SELECT statement won't execute successfully.

   SELECT date_ of_ birth, COUNT (*)

   FROM employee

   GROUP BY date_ of_ birth

   HAVING COUNT(*) > 1; 〔　　〕

评阅教师	得分

Ⅱ. Write SQL statements (25 marks, 5marks for each)

Consider the following schemas:

Suppliers (sid: integer, sname: string, address: string)

Parts (pid: integer, pname: string, color: string)

Catalog (sid: integer, pid: integer, cost: real)

The key fields are underlined, and the domain of each field is listed after the fieldname. Therefore sid is the key for Suppliers, pid is the key for Parts, and sid and pid together form the key for Catalog. The Catalog relation lists the prices charged for parts by Suppliers. Write the following queries in relational algebra and SQL statement.

1. Find the names of suppliers who supply some red part.

2. Find the sids of suppliers who supply some red or green part.

3. Find the sids of suppliers who supply some red part or are at 221 Packer Street.

4. Find the sids of suppliers who supply some red part and some green part.

5. Find the sids of suppliers who supply every part.

评阅教师	得分

Ⅲ. Normalization (20 marks total)

You are required to design a relational database from a supplied case study.

Consider the following UNF table Franchise_ Invoice:

Franchise No	Franchise Name	Franchise Address	Fr Tel	Fr Fax	Invoice Number	Invoice Date	Date Due	Order Number	Order Date	Invoice Net
MF001	Midlands	B'ham	345	346	MF001/1	15/02/98	15/03/98	MF001/1	8/1/98	341.50
					MF001/2	23/02/98	23/03/02	MF001/2	15/1/98	200.00
MF002	SE Kent	Ramsgate	678	679	MF002/1	15/02/98	15/03/02	MF002/1	8/1/98	100.00

1. Convert the UNF table Franchise_ Invoice into 1NF. (2 marks)

2. Give functional dependencies according to your reasonable assumptions. Show it's candidate key(s). (8 marks)

3. Mapping it into a set of 3NF relational schemas, show their primary and foreign key(s). (10 marks)

评阅教师	得分

Ⅳ. Concurrent Control (15 marks total)

1. There are two transactions T1 and T2. Their concurrent operations are shown in Figure. (10 marks)

T1	T2
(1)　　Read A=100	
(2)	Read A=100
(3)　　A=A-5 write back	
(4)	A=A-8 write back

　　(1)　Give the result of A for above schedule.

　　(2)　Is the schedule correct or not? Why?

2. The blockade below〔　　〕violates the two-phase lock protocol, why? (5 marks)

　　A. Slock A …Slock B… Xlock C………... Unlock A… Unlock B…Unlock C…

　　B. Slock A …Slock B… Xlock C………... Unlock C… Unlock B…Unlock A…

　　C. Slock A …Slock B… Xlock C ………... Unlock B… Unlock C…Unlock A…

　　D. Slock A… Unlock A …Slock B…Xlock C……… Unlock B… Unlock C

评阅教师	得分

Ⅴ. Briefly-answer questions (10 marks, 5marks for each)

1. Explain the distinctions among the terms super key, candidate key and primary key.

2. What are the ACID properties of transactions?

评阅教师	得分

Ⅵ. Database Design (20 marks total)

Micro loans are small loans, which is beginning to gain popularity especially among borrowers in developing countries. The idea is to bring venture lenders together using information technology. Typically, the loans will be used to finance startup or development of the borrower's company, so that there is a realistic chance for repayment. The money in a loan can, unlike traditional loans, come from many lenders. In this problem, you must create an E-R model that describes the information necessary to manage micro loans. The following information form the basis for creating the model:

● Each borrower and lender must be registered with information about name and address.

● A loan starts with a loan request, which contains information about when the loan should at latest be granted, the total amount being discussed (US-dollars), and how long the payback period is. Also, a description is included of how the money will be used. The rent on the payment is calculated in the loan amount, which is to say, the full amount is not paid.

● Lenders can commit to an optional portion of the total amount of a loan request.

● When the commitments for the loan request covers the requested amount, the request is converted to a loan. If not enough commitments can be reached, the loan request is cancelled. A borrower can have more than one request, and more than one loan at a time, but can at most make one request per day.

● The loan is paid through an "intermediary", typically a local department of a charity, who has a name and an address.

● The borrower chooses when he or she will make a payment. Every payment must be registered in the database with an amount and a date (at most one payment per loan per day). The lenders share the repayment based on how large a part of the loan they are responsible for.

● If the loan is not repaid before the agreed upon deadline, a new date is agreed. The database must not delete the old deadline, but save the history (the deadline can be

overridden multiple times).

- Each lender can for each borrower save a "trust", which is a number between 0 and 100 that determines the lender's evaluation of the risk of lending money to that person. The number must only be saved for the borrowers, for whom there has been made such an evaluation.

1. Make an E-R diagram for the data described above. If you make any assumptions about data that doesn't show from the problem, they must be described. (10 marks)

2. Convert the E-R diagram to 3NF relations. Specify keys and referential integrity constraints. (10 marks)