CS 4400 SAMPLE QUIZ II

The quiz material comes from chapters 5 and 6 in the 4th edition and chapters 7 and 9.3 in the 3rd edition of the text.

1. A relation (from the relational database model) consists of a set of tuples, which implies that

(a) all tuples in a relation must be distinct

(b) every relation has a key

(c) for any two tuples, the values associated with one or more of their attributes must differ

(d) all of the above

2. A relation schema can have

(a) multiple candidate keys

(b) multiple primary keys

(c) no key

(d) none of the above

3. If a set of attributes, K, in relation schema R1 is a foreign key for R1, then

(a) every tuple of R1 has a distinct value for K

(b) K is a key for some other relation

(c) K cannot have a null value for tuples in R1

(d) K is a primary key for R1

4. Given the relational schema consisting of Supplier(Snumber,Sname,City), Part(Pnumber,Pname,Color) and Supplies(Snumber,Pnumber,Qty), which relational algebra query retrieves the Snumber of suppliers who supply part number 7 in a quantity > 50?

(a) $\pi_{Snumber}(\pi_{Pnumber}(Part) \bowtie (\sigma_{Qty>50}(Supplies)))$

(b) $\pi_{Snumber}(\sigma_{Pnumber=7}(Supplies))$

(c) $\pi_{Snumber}(\sigma_{Qty>50}(Supplies) \bowtie (\sigma_{Pnumber=7}(Part)))$

(d) all of the above

5. Given the following two tables, R and S, the result of the division operator, R ÷ S is

R

A	B	C
a1	b1	c1
a1	b2	c2
a1	b1	c3
a2	b2	c1
a2	b2	c2
a2	b2	c3
a3	b3	c3

S

C
c1
c2
c3

(a) A table with columns A and B whose one row is (a2,b2)

(b) A table with only column B whose rows are (b1), (b2) and (b3)

(c) A table with only column A whose rows are (a1) and (a2)

(d) A table with only column A and one row whose value is (a3)

6. The intersection of two relations R(A,B,C) and S(A,B,C) can be computed by

(a) $R \div S$

(b) $R - (R - S)$

(c) $R \cup S$

(d) all of the above

7. The resulting relation from an equijoin operation, which is nonempty, will

(a) always have one or more pairs of attributes in each tuple that have identical values

(b) have fewer attributes than the sum of the attributes of the two operand relations

(c) have the same number of attributes as a natural join between the same operand relations

(d) none of the above

8. Given the relational schema consisting of $Employee(Enumber, Ename, Salary, MgrEnumber)$ and $Department(Dnumber, Dname, MgrEnumber)$ which relational algebra query retrieves the $Ename$ of employees paired with their manager $Ename$?

(a) $\pi_{Ename}(Employee \bowtie Employee)$

(b) $E1 \leftarrow \pi_{Enumber,Ename}(Employee)$
$\pi_{Employee.Ename,E1.Ename}(Employee \bowtie_{MgrEnumber=Enumber} E1)$

(c) $E1 \leftarrow \pi_{Enumber,Ename}(Employee)$
$\pi_{E1.Ename,Dname}(E1 \bowtie_{Enumber=MgrEnumber} Department)$

(d) $E1 \leftarrow \pi_{Enumber,Ename}(Employee)$
$\pi_{Employee.Ename,E1.Ename}(Employee \bowtie E1)$

9. If a relation schema has 5 attributes and 3 of those attributes make up the only key, then how many different superkeys does the relation have?

(a) 2

(b) 3

(c) 4

(d) 5

10. Given the following two tables, R and S, the result of the Cartesian product operator, R X S is

R

A	B
21	11
22	12

S

C
11
12

(a) A table with columns A, B and C whose rows are (21,11,11), (21,11,12), (22,12,11), (22,12,12)

(b) A table with columns A, B and C whose rows are (21,11,11), (22,12,12)

(c) A table with columns A and C whose rows are (21,11), (22,12)

(d) A table with columns A, B and C whose rows are (21,11,12), (22,12,11)

11. Given the relational schema consisting of $Employee(Enumber, Ename, Salary, MgrEnumber)$ and $Department(Dnumber, Dname, MgrEnumber)$ which relational algebra query retrieves the $Ename, Salary$ of employees if the employee has a larger salary than their manager?

(a) $\pi_{Ename,Salary}(Employee \bowtie Employee)$

(b) $E1 \leftarrow \pi_{Enumber,Ename,Salary}(Employee)$
$\pi_{Employee.Ename,Employee.Salary}(Employee \bowtie_{MgrEnumber=E1.Enumber\ And\ Salary>E1.Salary} E1)$

(c) $E1 \leftarrow \pi_{Enumber,Ename,Salary}(Employee)$
$\pi_{Ename,Salary}(E1 \bowtie_{Enumber=MgrEnumber} Department)$

(d) $E1 \leftarrow \pi_{Ename,Salary}(Employee)$
$\pi_{Employee.Ename,E1.Salary}(Employee \bowtie E1)$

12. Given the relational schema consisting of Supplier(Snumber,Sname,City), Part(Pnumber,Pname,Color) and Supplies(Snumber,Pnumber,Qty), which relational calculus query retrieves the Sname of suppliers who supply part number 77?

(a) $\{s.Sname \mid Supplier(s)\}$

(b) $\{t.Snumber \mid Supplies(t) \wedge t.Pnumber = 77\}$

(c) $\{s.Sname \mid Supplier(s) \wedge (\exists t)(Supplies(t) \wedge s.Snumber = t.Snumber \wedge t.Pnumber = 77)\}$

(d) all of the above

13. Given the relational schema consisting of Supplier(Snumber,Sname,City), Part(Pnumber,Pname,Color) and Supplies(Snumber,Pnumber,Qty), which relational calculus query retrieves the Sname of suppliers and the Pname of parts the suppliers supply but only for red parts?

(a) $\{s.Sname, r.Pname \mid Supplier(s) \wedge Part(r)\}$

(b) $\{s.Sname, r.Pname \mid Supplier(s) \wedge Part(r) \wedge (\exists t)(Supplies(t) \wedge s.Snumber = t.Snumber \wedge t.Pnumber = r.Pnumber)\}$

(c) $\{s.Sname, r.Pname \mid Supplier(s) \wedge Part(r) \wedge (\exists t)(Supplies(t) \wedge s.Snumber = t.Snumber \wedge t.Pnumber = r.Pnumber \wedge r.Color = \ 'red')\}$

(d) all of the above

14. Given the relational schema consisting of $Employee(Enumber, Ename, Salary, MgrEnumber)$ which relational calculus query is equivalent to the following relational algebra query:

$$\pi_{Enumber,Salary}(Employee) \bowtie_{Enumber=MgrEnumber} (\pi_{MgrEnumber}(Employee))$$

(a) $\{s.Enumber, s.Salary \mid Employee(s) \wedge (\exists t)(Employee(t) \wedge s.Enumber = t.MgrEnumber)\}$

(b) $\{s.Enumber, t.Salary \mid Employee(s) \wedge Employee(t) \wedge s.Enumber = t.MgrEnumber)\}$

(c) $\{s.Enumber, s.Salary \mid Employee(s) \wedge (\exists t)(Employee(t) \wedge s.MgrEnumber = t.Enumber)\}$

(d) all of the above

15. This operation is commutative

(a) Union

(b) Intersection

(c) Cartesian product

(d) all of the above

16. This operator can only operate on relations with the same schema

(a) Intersection

(b) Equi-Join

(c) Cartesian product

(d) all of the above

17. When we refer to a relation instance as consisting of a set of n-tuples, the n refers to

(a) the number of tuples in the relation

(b) the number of relations in the database

(c) the number of attributes in the relation

(d) the number of bytes in a tuple

18. Given the relational schema consisting of $Employee(Enumber, Ename, Salary, MgrEnumber)$ and $Department(Dnumber, Dname, MgrEnumber)$ which relational algebra query retrieves the number of managers?

(a) $\Im_{COUNT\ MgrEnumber}(Employee)$

(b) ${}_{MgrEnumber}\Im_{COUNT\ Enumber}(Employee)$

(c) $\Im_{COUNT\ MgrEnumber}(\pi_{MgrEnumber}(Employee))$

(d) $\Im_{COUNT\ Enumber}(Employee)$

19. Given the relational schema consisting of $Employee(Enumber, Ename, Salary, MgrEnumber)$ and $Department(Dnumber, Dname, MgrEnumber)$ which relational algebra query retrieves the total salary of all employees for each department?

(a) $\Im_{SUM\ Salary}(Employee)$

(b) $_{Dnumber}\Im_{SUM\ Salary}(Employee \bowtie Department)$

(c) $\Im_{COUNT\ Salary}(\pi_{Salary}(Employee))$

(d) $_{Dnumber}\Im_{COUNT\ Salary}(Employee \bowtie Department)$

20. The number of tuples in the result of a left outer join operation will always be

(a) greater than the number of tuples in the result of the corresponding join operation

(b) at least equal to the number of tuples in the result of the corresponding join operation

(c) less than the number of tuples in the result of the corresponding join operation

(d) greater than the number of tuples in the result of the corresponding right outer join operation

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
d	a	b	c	a	b	a	b	c	a	b	b	c	a	d	a	c	c	b	b