Semester III (B.Tech.)

Er. No. 2018 308

Academic Year: 2020-21

Jaypee University of Engineering & Technology, Guna
T-1 (Odd Semester 2021)
18B11CI312 - Database Systems

Maximum duration: 1 Hour

Maximum Marks: 15

Notes:
1. This question paper has 5 questions.
2. Write relevant answers only.
3. Do not write anything on question paper.
4. Assume appropriate data if required

Q1. ER Diagram involves some special relationships like recursive relations ship or self-recurrence relationship. What is meant by a recursive relationship type? Explain it by taking an example and with diagram. **[02]**

Q2. For a product manufacturing company following information need to be stored: **[05]**
- For a product it is required to store name, product ID and quantity in stock.
- These products are made up of many components. The following component information is kept; component ID, name, description, suppliers who supply them, and products in which they are used.
- Each component can be supplied by one or more suppliers having supplier ID and Supplier name.
- A supplier can exist without providing components, but a product cannot exist without components. A component does not have to be associated with a supplier and a product. Not all components are used in products
- Considering scenario given above identify following and draw neat and clean ER diagram.
  - i.   Identify all necessary entity types
  - ii. Attributes for each entity type with types of attributes
  - iii. Identify all possible relationships between entity types
  - iv. Participation constraints
  - v.   Cardinality ratio

Q3. What is the use of database catalog in database systems? **[02]**

Q4. Consider the following relations for a database that keeps track of the customers, orders and items in a company: **[03]**
CUSTOMER (Cust#, Cname, Phone, City)
ORDER (Order#, Odate, Cust#, Ord_amt)
ORDER_ITEM (Order#, Item#, Qty)
ITEM (Item#, Item_name, Unit_price)
Specify the following queries in SQL on the above relational database
(a) To create all four relations and specify the query statement for inserting the records in it.
(b) Calculate how many days spent after the order date.
(c) To retrieve the order details in descending order of ordered amount.

Q5. Specify the following relational algebra expression on the COMPANY relational database schema shown in figure 1. Also show the result of each query as it would apply to the database state in the figure.

    ✗ (a) Find the names of all employees who are directly supervised by 'Franklin Wong'

    (b) Find the Sex and names of all employees who have salary greater than 15000.

    ✗ (c) Find the First Name, Last Name, Birth date and Salary of all employees who work either in department 5 or directly supervise an employee who earns more than 30000 in department 5.

EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
John	B	Smith	123456789	1965-01-09	721 Fondren, Houston, TX	M	30000	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	1968-01-19	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000	987654321	4
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000	NULL	1

$- T_1$

T_2

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-05-22
Administration	4	987654321	1995-01-01
Headquarters	1	888665555	1981-06-19

$T_1 \bowtie T_2$

DEPT_LOCATIONS

Dnumber	Dlocation
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Houston

WORKS_ON

Essn	Pno	Hours
123456789	1	32.5
123456789	2	7.5
666884444	3	40.0
453453453	1	20.0
453453453	2	20.0
333445555	2	10.0
333445555	3	10.0
333445555	10	10.0
333445555	20	10.0
999887777	30	30.0
999887777	10	10.0
987987987	10	35.0
987987987	30	5.0
987654321	30	20.0
987654321	20	15.0
888665555	20	NULL

PROJECT

Pname	Pnumber	Plocation	Dnum
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenefits	30	Stafford	4

DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship
333445555	Alice	F	1986-04-05	Daughter
333445555	Theodore	M	1983-10-25	Son
333445555	Joy	F	1958-05-03	Spouse
987654321	Abner	M	1942-02-28	Spouse
123456739	Michael	M	1988-01-04	Son
123456739	Alice	F	1988-12-30	Daughter
123456739	Elizabeth	F	1967-05-05	Spouse

Figure 1:Company Database