

National University of Computer and Emerging Sciences, Lahore Campus



Course:
Program:
Deadline

Database systems
BS (SE)
21-March-24

Course Code: CS-2005
Semester: Spring 2024

Exam:

Assignment 2+3

Roll No.

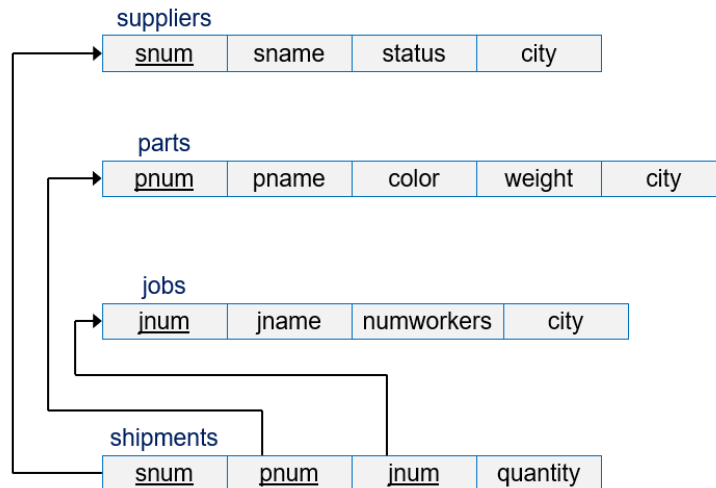
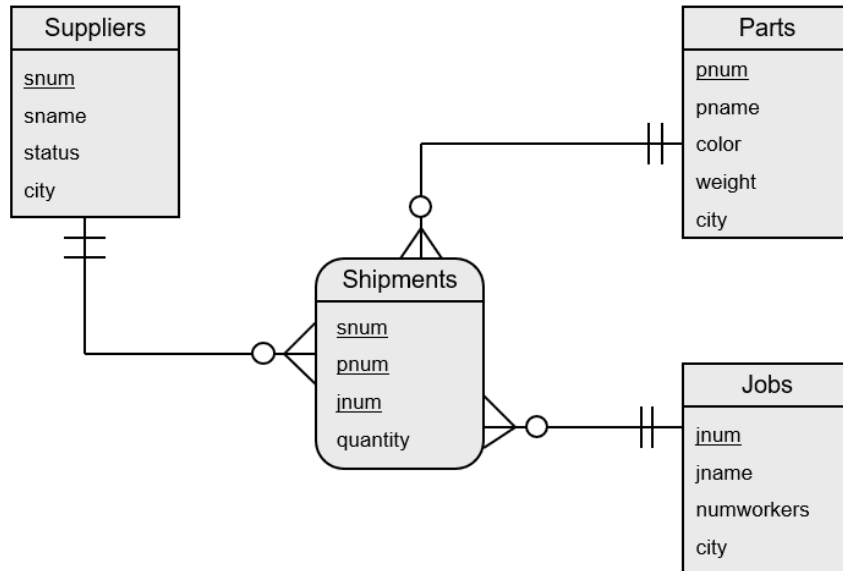
Instruction/Notes:

- This assignment is an individual assignment.
- Clearly mention any assumption you have made.
- You are required to submit the hard copy of your assignment at the start of your class
- For any query please contact your TA

Topic: SQL Queries and Relational Algebra

Question 1.

Read following database scheme carefully. Make understanding of table with primary and foreign key relations.



Sample table data is attached for your reference

supplier	S#	SName	Status	City	shipments	S#	P#	J#	QTY
	S1	SMITH	20	LONDON		S1	P1	J1	200
	S2	JONES	10	PARIS		S1	P1	J4	700
	S3	BLAKE	30	PARIS		S2	P3	J1	400
	S4	CLARK	20	LONDON		S2	P3	J2	200
	S5	ADAMS	30	ATHENS		S2	P3	J3	200
part	P#	PName	Color	City		S2	P3	J4	500
	P1	NUT	RED	LONDON		S2	P3	J5	600
	P2	BOLT	GREEN	PARIS		S2	P3	J6	400
	P3	SCREW	BLUE	ROME		S2	P3	J7	800
	P4	SCREW	RED	LONDON		S2	P5	J2	100
	P5	CAM	BLUE	PARIS		S3	P3	J1	200
	P6	COG	RED	LONDON		S3	P4	J2	500
jobs	J#	JName	numworkers	City		S4	P6	J3	300
	J1	SORTER	20	PARIS		S4	P6	J7	300
	J2	PUNCH	10	ROME		S5	P2	J2	200
	J3	READER	30	ATHENS		S5	P2	J4	100
	J4	CONSOLE	20	ATHENS		S5	P5	J5	500
	J5	COLLATOR	30	LONDON		S5	P5	J7	100
	J6	TERMINAL	20	OSLO		S5	P6	J2	200
	J7	TAPE	10	LONDON		S5	P1	J4	100
						S5	P3	J4	200
						S5	P4	J4	800
						S5	P5	J4	400
						S5	P6	J4	500

Develop **SQL expressions + Relational algebra** for each of the following queries:

1. List the part number for every part that is shipped by more than one supplier.
2. Find the average weight of all parts.
3. For each part list the part number and the total quantity in which that part is shipped and order the results in descending order of the total quantity shipped. Name the total quantity shipped in the result as total Shipped.
4. List only the names of those suppliers who ship a part that weighs more than 200.
5. List the names of those cities in which both a supplier and a job are located.
6. List the names of those jobs that receive a shipment from supplier number S1.
7. List the names of those parts that are not shipped to any job.
8. List the names of those suppliers who ship part number P2 to any job.
9. List the names of those suppliers who ship part at least one red part to any job.
10. List the part number for every part that is shipped more than once (the part must be shipped more than one time).

Question 2:

For the Database state provided, write the **SQL queries and equivalent RA expression**.

Employee

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
100	Steven	King	SKING	515.123.4567	17-06-87	AD_PRES	24000	0	0	90
101	Neena	Kochhar	NKOCHHAR	515.123.4568	18-06-87	AD_VP	17000	0	100	90
102	Lex	De Haan	LDEHAAN	515.123.4569	19-06-87	AD_VP	17000	0	100	90
103	Alexander	Hunold	AHUNOLD	590.423.4567	20-06-87	IT_PROG	9000	0	102	60
104	Bruce	Ernst	BERNST	590.423.4568	21-06-87	IT_PROG	6000	0	103	60
105	David	Austin	DAUSTIN	590.423.4569	22-06-87	IT_PROG	4800	0	103	60
106	Valli	Pataballa	VPATABAL	590.423.4560	23-06-87	IT_PROG	4800	0	103	60
107	Diana	Lorentz	DLORENTZ	590.423.5567	24-06-87	IT_PROG	4200	0	103	60
108	Nancy	Greenberg	NGREENBE	515.124.4569	25-06-87	FI_MGR	12000	0	101	100
109	Daniel	Faviet	DFAVIET	515.124.4169	26-06-87	FI_ACCOUNT	9000	0	108	100
110	John	Chen	JCHEN	515.124.4269	27-06-87	FI_ACCOUNT	8200	0	108	100
111	Ismael	Sciarra	ISCIARRA	515.124.4369	28-06-87	FI_ACCOUNT	7700	0	108	100
112	Jose Manuel	Urman	JMURMAN	515.124.4469	29-06-87	FI_ACCOUNT	7800	0	108	100
113	Luis	Popp	LPOPP	515.124.4567	30-06-87	FI_ACCOUNT	6900	0	108	100
114	Den	Raphaely	DRAPHEAL	515.127.4561	01-07-87	PU_MAN	11000	0	100	30
115	Alexander	Khoo	AKHOO	515.127.4562	02-07-87	PU_CLERK	3100	0	114	30
116	Shelli	Baida	SBAIDA	515.127.4563	03-07-87	PU_CLERK	2900	0	114	30
117	Sigal	Tobias	STOBIAS	515.127.4564	04-07-87	PU_CLERK	2800	0	114	30
118	Guy	Himuro	GHIMURO	515.127.4565	05-07-87	PU_CLERK	2600	0	114	30
119	Karen	Colmenares	KCOLMENA	515.127.4566	06-07-87	PU_CLERK	2500	0	114	30
120	Matthew	Weiss	MWEISS	650.123.1234	07-07-87	ST_MAN	8000	0	100	50
121	Adam	Fripp	AFRIPP	650.123.2234	08-07-87	ST_MAN	8200	0	100	50
122	Payam	Kaufling	PKAUFLIN	650.123.3234	09-07-87	ST_MAN	7900	0	100	50
123	Shanta	Vollman	SVOLLMAN	650.123.4234	10-07-87	ST_MAN	6500	0	100	50
124	Kevin	Mourgos	KMOURGOS	650.123.5234	11-07-87	ST_MAN	5800	0	100	50
125	Julia	Nayer	JNAYER	650.124.1214	12-07-87	ST_CLERK	3200	0	120	50

Departments

DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LocATION_ID
10	Administration	200	1700
20	Marketing	201	1800
30	Purchasing	114	1700
40	Human Resources	203	2400
50	Shipping	121	1500
60	IT	103	1400
70	Public Relations	204	2700
80	Sales	145	2500
90	Executive	100	1700
100	Finance	108	1700
110	Accounting	205	1700
120	Treasury	0	1700
130	Corporate Tax	0	1700
140	Control And Credit	0	1700
150	Shareholder Services	0	1700
160	Benefits	0	1700

Locations

location_id	street_address	postal_code	city	state_province	country_id
1000	1297 Via Cola di Rie	989	Roma		IT
1100	93091 Calle della Te	10934	Venice		IT
1200	2017 Shinjuku-ku	1689	Tokyo	Tokyo Prefectu	JP
1300	9450 Kamiya-cho	6823	Hiroshima		JP
1400	2014 Jabberwocky Rd	26192	Southlake	Texas	US
1500	2011 Interiors Blvd	99236	South San	California	US
1600	2007 Zagora St	50090	South Brun	New Jersey	US
1700	2004 Charade Rd	98199	Seattle	Washington	US
1800	147 Spadina Ave	M5V 2L7	Toronto	Ontario	CA
1900	6092 Boxwood St	YSW 9T2	Whitehorse	Yukon	CA
2000	40-5-12 Laogianggen	190518	Beijing		CN
2100	1298 Vileparle (E)	490231	Bombay	Maharashtra	IN
2200	12-98 Victoria Stree	2901	Sydney	New South Wale	AU
2300	198 Clementi North	540198	Singapore		SG
2400	8204 Arthur St		London		UK
2500	Magdalen Centre, The	OX9 9ZB	Oxford	Oxford	UK
2600	9702 Chester Road	9629850293	Stretford	Manchester	UK
2700	Schwanthalerstr. 703	80925	Munich	Bavaria	DE
2800	Rua Frei Caneca 1360	01307-002	Sao Paulo	Sao Paulo	BR
2900	20 Rue des Corps-Sai	1730	Geneva	Geneve	CH
3000	Murtenstrasse 921	3095	Bern	BE	CH
3100	Pieter Breughelstraa	3029SK	Utrecht	Utrecht	NL
3200	Mariano Escobedo 999	11932	Mexico Cit	Distrito Feder	MX

Jobs

JOB_ID	JOB_TITLE	MIN_SALARY	MAX_SALARY
AD_PRES	President	20000	40000
AD_VP	Administration Vice President	15000	30000
AD_ASST	Administration Assistant	3000	6000
FI_MGR	Finance Manager	8200	16000
FI_ACCOUNT	Accountant	4200	9000
AC_MGR	Accounting Manager	8200	16000
AC_ACCOUNT	Public Accountant	4200	9000
SA_MAN	Sales Manager	10000	20000
SA_REP	Sales Representative	6000	12000
PU_MAN	Purchasing Manager	8000	15000
PU_CLERK	Purchasing Clerk	2500	5500
ST_MAN	Stock Manager	5500	8500
ST_CLERK	Stock Clerk	2000	5000
SH_CLERK	Shipping Clerk	2500	5500
IT_PROG	Programmer	4000	10000
MK_MAN	Marketing Manager	9000	15000
MK_REP	Marketing Representative	4000	9000
HR_REP	Human Resources Representative	4000	9000
PR_REP	Public Relations Representative	4500	10500

1. find the name (first_name, last_name) and the salary of the employees who have a higher salary than the employee whose last_name='Bull'
2. find the name (first_name, last_name) of all employees who works in the IT department.
3. find the name (first_name, last_name) of the employees who have a manager and worked in a USA based department.
4. find those employees who earn more than the average salary. Return employee ID, first name, last name.
5. find those employees whose department is located at 'Toronto'. Return first name, last name, employee ID, job ID.
6. find those employees who report to that manager whose first name is 'Payam'. Return first name, last name, employee ID and salary
7. find all those departments where at least one employee is employed. Return department name
8. find those employees who do not work in the departments where managers' IDs are between 100 and 200 (Begin and end values are included.). Return all the fields of the employees
9. From the following table, find those employees whose salary matches the lowest salary of any of the departments. Return first name, last name and department ID.
10. find the name (first_name, last_name) of the employees who are managers.
11. find those employees whose salary is lower than that of employees whose job title is "MK_MAN". Exclude employees of Job title 'MK_MAN'. Return employee ID, first name, last name, job ID
12. Find the name (first_name, last_name), and salary of the employees whose salary is greater than the average salary.

13. Find the name (first_name, last_name), and salary of the employees whose salary is equal to the minimum salary for their job grade.
14. Find the name (first_name, last_name), and salary of the employees who earns more than the average salary and works in any of the IT departments.
15. Find the name (first_name, last_name), and salary of the employees who earns more than the earning of Mr. Bell.
16. Find the name (first_name, last_name), and salary of the employees who earn the same salary as the minimum salary for all departments.
17. Find the name (first_name, last_name), and salary of the employees whose salary is greater than the average salary of all departments.
18. Find the 3rd maximum salary in the employees table.