DATA 201
Database Technologies for Data Analytics
Checkpoint Exam #1 Solutions

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Question 1

☐ Original unnormalized table:

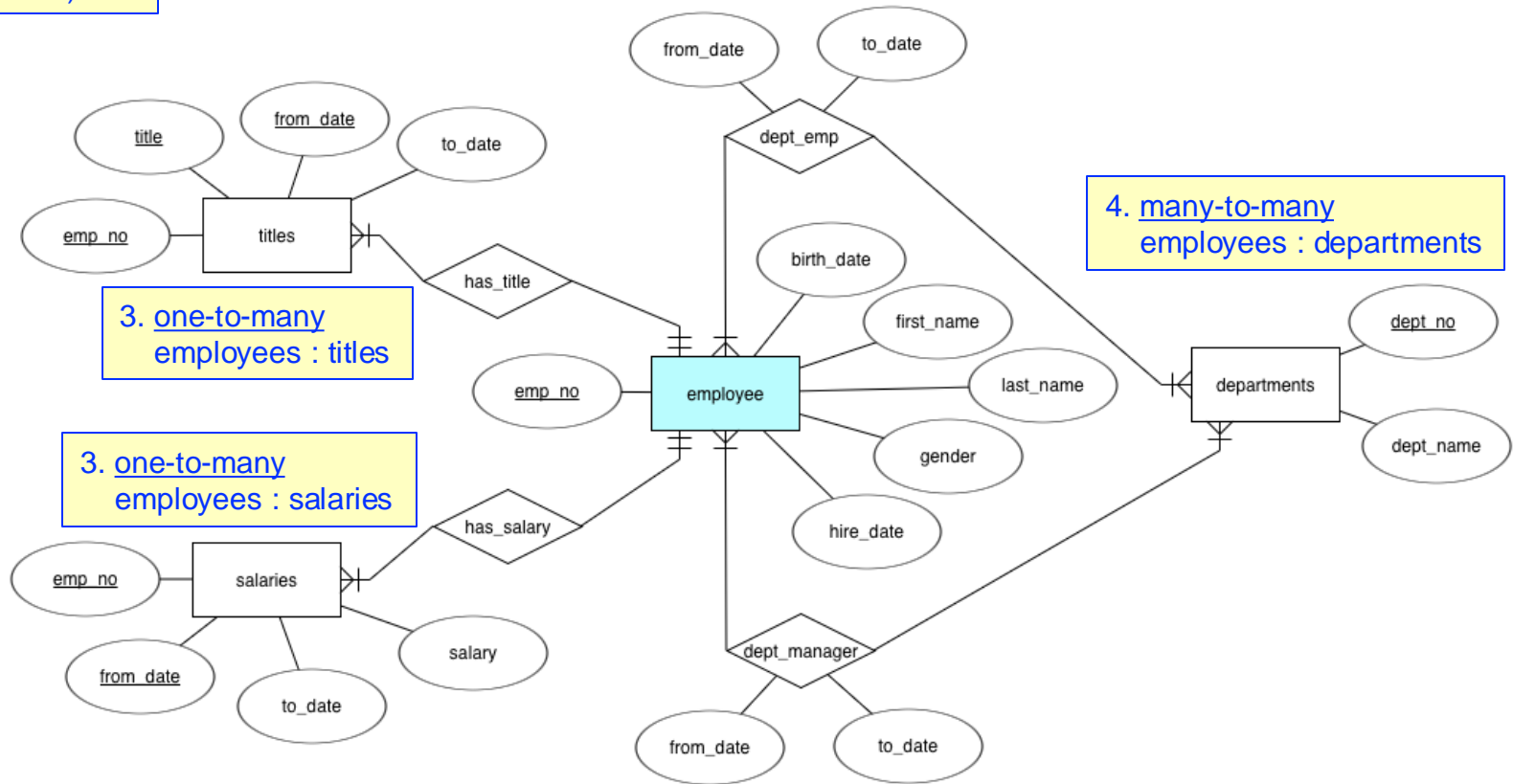| student_id	student_name	...	advisor_id	advisor_name

☐ The primary key is only a single column, so there are <u>no partial functional dependencies</u>. Therefore, the table is already 2NF.

☐ Break out the <u>transitive functional dependency</u> advisor_id ➔ advisor_name to achieve 3NF.

student_id	student_name	...	advisor_id

advisor_id	advisor_name

Questions 2 - 4

2. one-to-one (none)

3. one-to-many employees : titles

3. one-to-many employees : salaries

4. many-to-many employees : departments

Question 5

Which employees have a salary greater than 151,000? Display employee number, last name, first name, and the name of the employee's department. Do not show an employee and department pair more than once. Order by department name, employee last name, and first name.

Query result

```
SELECT DISTINCT emp_no, last_name, first_name,
                dept_name
FROM employees
JOIN salaries USING (emp_no)
JOIN dept_emp USING (emp_no)
JOIN departments USING (dept_no)
WHERE salary > 151000
ORDER BY dept_name, last_name, first_name
```

emp_no	last_name	first_name	dept_name
109334	Alameldin	Tsutomu	Sales
80823	Baca	Willard	Sales
276633	Birdsall	Shin	Sales
266526	Chenoweth	Weijing	Sales
205000	Griswold	Charmane	Sales
237542	Hatcliff	Weicheng	Sales
253939	Luders	Sanjai	Sales
493158	Meriste	Lidong	Sales
254466	Mukaidono	Honesty	Sales
43624	Pesch	Tokuyasu	Sales
238117	Stanfel	Mitsuyuki	Sales
47978	Whitcomb	Xiahua	Sales

Question 6

Which departments have employees whose salaries are greater then 145,000? Order by department name and do not show a department more than once.

Query result

```
SELECT DISTINCT dept_name
FROM departments
JOIN dept_emp USING (dept_no)
JOIN employees USING (emp_no)
JOIN salaries USING (emp_no)
WHERE salary > 145000
```

dept_name
Marketing
Sales

Question 7

Who are all the past and current department managers? Show the managers' employee numbers and first and last names, and the department numbers and names. Order by manager last name, first name, and department name.

Query result

```
SELECT emp_no, last_name, first_name,
       dept_no, dept_name
FROM dept_manager
JOIN employees USING (emp_no)
JOIN departments USING (dept_no)
ORDER BY last_name, first_name, dept_name
```

emp_no	last_name	first_name	dept_no	dept_name
110085	Alpin	Ebru	d002	Finance
111692	Butterworth	Tonny	d009	Customer Service
110344	Cools	Rosine	d004	Production
110567	DasSarma	Leon	d005	Development
110420	Ghazalie	Oscar	d004	Production
111784	Giarratana	Marjo	d009	Customer Service
110511	Hagimont	DeForest	d005	Development
110765	Hofmeyr	Rutger	d006	Quality Management
111035	Kaelbling	Przemyslawa	d007	Sales
111534	Kambil	Hilary	d008	Research
110386	Kieras	Shem	d004	Production
110114	Legleitner	Isamu	d002	Finance
110022	Markovitch	Margareta	d001	Marketing
110039	Minakawa	Vishwani	d001	Marketing
110725	Onuegbe	Peternela	d006	Quality Management
110183	Ossenbruggen	Shirish	d003	Human Resources
110854	Pesch	Dung	d006	Quality Management
110800	Quadeer	Sanjoy	d006	Quality Management
110228	Sigstam	Karsten	d003	Human Resources
111877	Spinelli	Xiaobin	d009	Customer Service
111400	Staelin	Arie	d008	Research
111939	Weedman	Yuchang	d009	Customer Service
110303	Wegerle	Krassimir	d004	Production
111133	Zhang	Hauke	d007	Sales

Question 8

Who are all the past and current managers of each department? Show the department number and name, the managers' employee numbers, last and first names, and the from and to dates. Order by department number and by from date.

This query is similar to the one in the previous question, but the result set must be structured to focus on the departments rather than on the department managers.

Query result

```
SELECT dept_no, dept_name,
       emp_no, last_name, first_name,
       from_date, to_date
FROM departments
JOIN dept_manager USING (dept_no)
JOIN employees USING (emp_no)
ORDER BY dept_no, from_date
```

dept_no	dept_name	emp_no	last_name	first_name	from_date	to_date
d001	Marketing	110022	Markovitch	Margareta	1985-01-01	1991-10-01
d001	Marketing	110039	Minakawa	Vishwani	1991-10-01	9999-01-01
d002	Finance	110085	Alpin	Ebru	1985-01-01	1989-12-17
d002	Finance	110114	Legleitner	Isamu	1989-12-17	9999-01-01
d003	Human Resources	110183	Ossenbruggen	Shirish	1985-01-01	1992-03-21
d003	Human Resources	110228	Sigstam	Karsten	1992-03-21	9999-01-01
d004	Production	110303	Wegerle	Krassimir	1985-01-01	1988-09-09
d004	Production	110344	Cools	Rosine	1988-09-09	1992-08-02
d004	Production	110386	Kieras	Shem	1992-08-02	1996-08-30
d004	Production	110420	Ghazalie	Oscar	1996-08-30	9999-01-01
d005	Development	110511	Hagimont	DeForest	1985-01-01	1992-04-25
d005	Development	110567	DasSarma	Leon	1992-04-25	9999-01-01
d006	Quality Management	110725	Onuegbe	Peternela	1985-01-01	1989-05-06
d006	Quality Management	110765	Hofmeyr	Rutger	1989-05-06	1991-09-12
d006	Quality Management	110800	Quadeer	Sanjoy	1991-09-12	1994-06-28
d006	Quality Management	110854	Pesch	Dung	1994-06-28	9999-01-01
d007	Sales	111035	Kaelbling	Przemyslawa	1985-01-01	1991-03-07
d007	Sales	111133	Zhang	Hauke	1991-03-07	9999-01-01
d008	Research	111400	Staelin	Arie	1985-01-01	1991-04-08
d008	Research	111534	Kambil	Hilary	1991-04-08	9999-01-01
d009	Customer Service	111692	Butterworth	Tonny	1985-01-01	1988-10-17
d009	Customer Service	111784	Giarratana	Marjo	1988-10-17	1992-09-08
d009	Customer Service	111877	Spinelli	Xiaobin	1992-09-08	1996-01-03
d009	Customer Service	111939	Weedman	Yuchang	1996-01-03	9999-01-01

Question 9

Who is the current manager of the
Quality Management department?
Show the manager's employee
number, last name, first name, and
the starting date of the manager.

Query result

```
SELECT emp_no, last_name, first_name,
       dept_name, from_date
FROM dept_manager
JOIN departments USING (dept_no)
JOIN employees USING (emp_no)
WHERE dept_name = 'Quality Management'
  AND to_date = '9999-01-01'
```

emp_no	last_name	first_name	dept_name	from_date
110854	Pesch	Dung	Quality Management	1994-06-28

An alternative solution is to display
all the managers sorted by from
date in descending order, but limit
the result to one row.

Query result

```
SELECT emp_no, last_name, first_name,
       dept_name, from_date
FROM dept_manager
JOIN departments USING (dept_no)
JOIN employees USING (emp_no)
WHERE dept_name = 'Quality Management'
ORDER BY from_date DESC
LIMIT 1
```

emp_no	last_name	first_name	dept_name	from_date
110854	Pesch	Dung	Quality Management	1994-06-28

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Question 10

Among the first group of female employees to be hired, who is the youngest in age? Show the employee number, last name, first name, birthdate, and hire date. Because there can be ties, display the employee whose name comes first alphabetically.

Query result

```
SELECT emp_no, last_name, first_name,
       birth_date, hire_date
FROM employees
WHERE gender = 'F'
ORDER BY hire_date ASC,
         birth_date DESC,
         last_name ASC,
         first_name ASC
LIMIT 1
```

emp_no	last_name	first_name	birth_date	hire_date
110725	Onuegbe	Peternela	1961-03-14	1985-01-01

Sorting in this order:
1. ascending hire date to put the <u>first hired</u> female employees at the top of the result set
2. descending birth date to put the <u>youngest</u> at the top of those females
3. ascending last name and ascending first name to put the <u>first name alphabetically</u> at the top