

Exam exercises for databases (DIGHEL4360 H23)

Exercise 1 – Databases

Given the following table containing data on people and the place they work:

employees:

pid	name	born	salary	start	end	cid	cname
1	Mary Jane	1989	64000	2019-03		2	B&J
2	Joe Smith	1974	58000	2017-01	2019-11	3	Block
3	Yu Wei	1992	55000	2021-10	2023-12	2	B&J
2	Joe Smith	1974	62000	2019-12		4	NeoWork
4	Liv Green	1972	73000	2010-01		1	ALY
1	Mary Jane	1989	57000	2017-08	2019-02	5	Light Inc.

Here, **pid** is a unique ID for people; **name** is the name of the person; **born** contains the year the person was born; **salary**, **start** and **end** describes the salary and start and end time (month-year) for a work contract for the person; **cid** contains the ID for companies that the person was employed by in the work contract; and finally **cname** contains the name of the company denoted by the ID in **cid**.

Make a database (i.e. a collection of tables) that contains the same data as the table above, but without any data duplication. For each table, state which column(s) denote primary keys (if any), and which are foreign keys (references to other table's columns).

Solution

We make the tables by splitting the table into three, one for people, one for companies, and one for work contracts relating people and companies:

people:

pid	name	born
1	Mary Jane	1989
2	Joe Smith	1974
3	Yu Wei	1992
4	Liv Green	1972

pid is the primary key for **people**.

company:

cid	cname
1	ALY
2	B&J
3	Block
4	NeoWork
5	Light Inc.

cid is the primary key for **company**.

contract:

pid	cid	salary	start	end
1	3	64000	2019-03	
2	3	58000	2017-01	2019-11
3	2	55000	2021-10	2023-12
2	4	62000	2019-12	
4	1	73000	2010-01	
1	5	57000	2017-08	2019-02

pid is a foreign key to **people**'s pid-column and cid is a foreign key to **company**'s cid-column.

Exercise 2 – SQL

Given the following table on books sold by a book store:

book_store:

bid	title	genre	published	price	sold
B1	The Alchemist	Adventure	1988	17.99	9
B2	1984	Sci-Fi	1949	13.99	98
B3	The Shining	Horror	1977	19.99	17
B4	Catch-22	Satire	1961	15.99	32
B5	Dune	Sci-Fi	1965	16.99	87
B6	War and Peace	History	1867	17.99	23
B7	History of Time	Non-fiction	1988	19.99	53
B8	Dracula	Horror	1897	13.99	7
B9	Sapiens	History	2011	20.99	76

where **bid** is a unique ID for books, **title** is the book's title, **genre** is the book's genre, **published** contains the year the book was published, **price** contains the price the book is currently sold for, and **sold** contains the number of copies sold by that book.

1. What would the following query return:

```
SELECT title, price
FROM book_store
WHERE published = '2011';
```

2. What would the following query return:

```
SELECT title, price*10 AS nok
FROM book_store
WHERE genre = 'Sci-Fi' OR
      published < '1950';
```

3. What would the following query return:

```
SELECT max(published) AS newest
FROM book_store
WHERE genre = 'Horror';
```

4. Write an SQL-query that finds the title and genre of the book with ID B10.
5. Write an SQL-query that finds the title, price and year published for all Fantasy-books that have a price greater than 15.00.
6. Write an SQL-query that finds the total amount of money that the book store has sold for. Give the column containing the result the name total_sold.

Solution

1

title	price
Sapien	20.99

2

name	nok
1989	139.9
Dune	169.9
War and Peace	179.9
Dracula	139.9

3

newest

1965

4

```
SELECT title, genre
FROM book_store
WHERE book_id = 'B10';
```

5

```
SELECT title, price, published
FROM book_store
WHERE genre = 'Fantasy' AND price > '15.00';
```

6

```
SELECT sum(price * sold) AS total_sold
FROM book_store;
```