Questions from item

Generated on:	9/11/20, 7:56 PM
Question bank:	University of Twente
From category:	EWI » B-CS - Computer Science » Mod01 Pearls of Computer Science » Pearl 010 Databases

Question 19756:

1920-resit-databases

Last author:	Keulen, M. van
Max. points:	10
Status:	Approved
Last modified on:	Oct 30, 2019, 8:59:00 AM

Suppose you write in SQL a query joining two tables A and B but you forget the ***join condition***. In other words, you write something like “SELECT * FROM A,B” with no WHERE-clause. What will you get?

a. An intersection of the rows of A and B

b. The set difference between tables A and B

c. 1 pt.
A cartesian product of the rows of A and B ✔

d. A union of the rows of A and B

The processing of SQL queries by the DBMS is done in phases. Which of the items below is ***not*** a query processing phase?

a. Physical query optimization

b. 1 pt.
Conceptual query optimization ✔

c. Parsing

d. Logical query optimization

e. Query plan execution

SQL statements and queries from different applications and users can be processed by the DBMS simultaneously. The DBMS contains mechanisms that make sure that these do not interfere with each other in a bad way by means of guaranteeing ACID properties. Important for this is that the application developer defines one or more SQL statements and queries as a coherent whole for which the ACID properties should be enforced.

What is the technical name for this set of coherent SQL statements and queries?

a. Concurrency group

b. 1 pt.
Transaction ✔

c. Atomic group

d. Isolation

Given the following query for the example database: "SELECT mid, COUNT(*) FROM Dates GROUP BY mid".

What is the technical term for a function like "COUNT"?

a. Calculator

b. Stored procedure

c. Summarizer

d. View

e. 1 pt.
Aggregate ✔

Figure 3 contains an ER-model. Which of the following statements about the relationship "offered" between entities 'Restaurant' and 'Menu' is ***not*** correct?

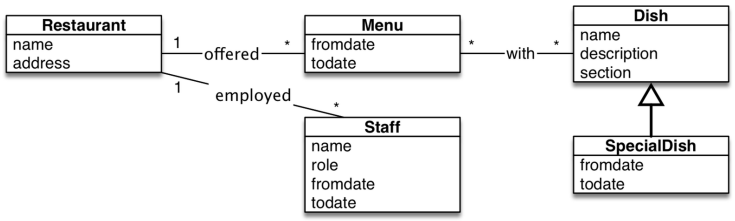

Figure 3: ER model of restaurant chain's database (for Question 3).

a. This is a one-to-many relationship

b. 1 pt.
For each menu, there can exist zero or more restaurants ✔

c. For each restaurant, there can exist zero or more menus

d. In a table structure for this ER-model, the relationship can be represented with one or more attributes in the 'Menu' table

Which of the following constraints specifies a ***semantic constraint*** for the example database?

a. The 'dmr' attribute is of type 'date'

b. For each 'asid' value in the 'MisAst' table, there should be a corresponding row in the 'Astronaut' table.

c. 1 pt.
In the 'Dates' table, for every group of rows with the same 'mid' value, the 'dmr' of a 'return' should be a later date than the dmr of a 'launch'. ✔

d. The 'asid' attribute is unique within the Astronaut table

e. In the 'Mission' table, the maximum length of the string of the 'name' attribute is 20 characters.

Which of the following statements is ***not*** true for a *database*?

a. One DBMS can manage several databases.

b. 1 pt.
Data stored in parts on several computers is not one database but several databases. ✔

c. A box of business cards, i.e., paper cards not stored on a computer, can also be considered to be a database.

d. A database is a collection of data.

Obviously, the attribute 'asid' is the primary key of the 'Astronaut' table in the example database. What is/are the precise ***action(s) of the DBMS*** if I try to add another row in the table with an asid that already exists, for example, by running the statement "INSERT INTO Astronaut (asid,name) VALUES (1,'Someone else')"?

a. An error is given

b. No new row is added to the table ✔

c. The database undergoes a ROLLBACK ✔

d. An ABORT occurs ✔

e. A new row (1,`Someone else') is added to the table

f. The conflicting row (1,`Neil A. Armstrong') is deleted

g. A new row (NULL,`Someone else') is added to the table

Score: 1 pt.

What is the main issue that the ***reference architecture ANSI/SPARC*** addresses?

a. Data reliability

b. Access control

c. Usabilty

d. Concurrency

e. 1 pt.
Data independence ✔

Figure 3 contains an ER-model. For the 'Staff' entity, is the attribute 'name' a ***candidate key***? And for which ***valid reason*** is it or is it not a candidate key?

a. 1 pt.
No, because it is possible that the same person is hired more than once for different periods in time. ✔

b. Yes, because a candidate key need not be a primary key

c. No, because another combination of attributes is always unique in the real world

d. Yes, because the other attributes will always make it unique

e. No, because adding a staff ID attribute (a unique number) would be a better solution here.

f. Yes, because there are no rows in the database with the same name.

Question 19759:

1920-resit-dbdesign

Last author:	Keulen, M. van
Max. points:	10
Status:	Approved
Last modified on:	Oct 30, 2019, 8:59:06 AM
Course quartile + opportunity:	2019-2020 1A opportunity 1

Database design (10 points)

Figure 3 contains part of the data model belonging to a database of restaurant chain storing current and historic information about (a) staff that works/worked in one of their restaurants, and (b) menu's that are or have been offered in one of their restaurants.

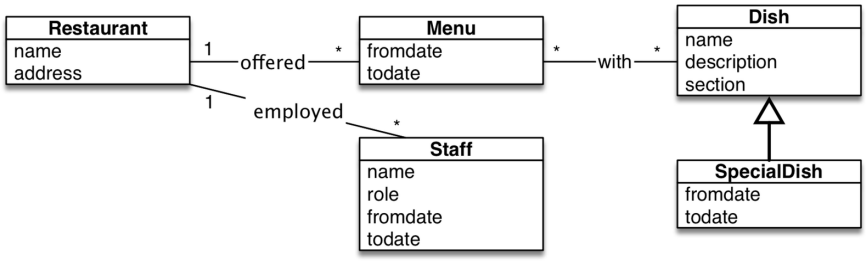

Figure 3: ER model of restaurant chain's database (for Question 3).

We give a bit more information about the meaning of the entities and attributes. For each restaurant we store its name and address (full address including postal code, city, etc.). For all staff we store name, role (i.e., chef, waiter, etc.), and the period they worked by means of a fromdate and todate. For the offered menus, we also store the period that the menu was used by means of a fromdate and todate. For each menu, we store the dishes on the menu with each their name, description and section (i.e., starter, main dish, desert, etc.). There may occur special dishes on a menu such as "Dish of the day" or "Season special" which may be available only during a certain period, again indicated by means of a fromdate and todate. For all mentioned periods it holds that if the todate is NULL, then the period is still ongoing, i.e., the staff member still works there, the menu is still offered, and the special dish is still offered.

Given this ER-model, design a table structure for this model. Give your answer as table with one row per database table and the following columns:

1. the name of the table,
2. the names of the attributes,
3. which attribute(s) form the primary key, and
4. which attribute(s) are foreign keys and what they refer to.

FORMATTING INSTRUCTIONS: The answer box has rich text formatting capabilities. In the second row in the middle, there is an icon that
looks like a 3-by-3 table. Use it to create a table with 4 columns (one column for each of the above) and as many rows you need (one header row with column headings and below it one row per table). Below you find an illustration of the format meant here with already one table filled in.

Table name	**Attributes**	**Primary key**	**Foreign key(s)**
Restaurant	rid, name, address	rid	*none*

Correction criterion	**Points**
Regular DB tables	1 point
Normal attributes	1 point
Primary keys	3 points
One-to-many relationships	2 points
Many-to-many relationship	2 points
ISA-relationship	1 point
Total points:	*10 points*

Question 19735:

1920-resit-sql-moon-1

Last author:	Keulen, M. van
Max. points:	1.25
Status:	Approved
Last modified on:	Oct 29, 2019, 10:22:30 PM
Course quartile + opportunity:	2019-2020 1A opportunity 1

SQL (20 points)

Note: we use the same database as the original test!

In honour of the 50th anniversary of the first man on the moon, we focus on a simplified database that holds data on space missions. A description of the table structure can be found in Figure 1 (all figures including this one is also on your paper handout).

Table	Attributes / Description
Astronaut	**asid**:int, name:text
	Table that holds the astronauts. 'asid' is a unique number for each astronaut. 'name' is the name of the astronaut.
Mission	**mid**:int, name:text
	Table that holds the missions. 'mid' is a unique number for each mission. 'name' is the name of the mission.
MisAst	***mid***:int, ***asid***:int
	Table for storing which astronauts went on which missions. 'mid' refers to the mission. 'asid' refers to the astronaut. "Unmanned" missions do not have a row in this table.
Achievement	**achid**:int, description:text, country:text, *asid*:int, *mid*:int
	Table for storing achievements. 'achid' is a unique number for each achievement. 'description' is a textual description of the achievement. 'country' is the country that obtained the achievement. 'asid' refers to the astronaut associated with the achievement. 'mid' refers to the mission associated with the achievement. Achievements for unmanned missions have a *NULL* value for 'asid'.
Dates	**did**:int, type:text, dmr:date, *mid*:int
	Table that stores important dates for missions. 'did' is a unique number for each date. 'type' describes what the date pertains to. 'dmr' is the date itself (it stands for day/month/year). 'mid' refers to the mission the important date belongs to.

Figure 1: In honour of the 50th anniversary of the first man on the moon, we focus on a table structure of a simplified database that holds date on space missions (Primary keys in **bold**; Foreign keys in *italics*).

The database obviously has a table with astronauts and a table with missions. It has a table "MisAst" that stores which astronauts went on which missions. Unmanned missions do not have a row in this table. Moreover the database stores special dates for each mission such as the launch and return to earth, optionally also date of landing or impact on the moon. To provide some data on

'the space race', a final table holds achievements of missions and astronauts and the country who obtained this achievement.

Figure 2 contains some example data. Notice that there are three unmanned missions and that Svetlana Y. Savitskaya (astronaut 6) has two achievements on her name.

Astronaut

asid	name
1	Neil A. Armstrong
2	Edwin E. Aldrin Jr.
3	Michael Collins
4	Yuri A. Gagarin
5	Valentina Tereshkova
6	Svetlana Y. Savitskaya
7	Sally Ride

Dates

did	type	dmr	mid
20	launch	12/9/1959	10
21	impact	13/9/1959	10
22	launch	12/9/1970	11
23	landing	20/9/1970	11
24	return	24/9/1970	11
25	launch	23/4/1962	12
26	impact	26/4/1962	12
27	launch	16/7/1969	13
28	landing	20/7/1969	13
29	return	24/7/1969	13
30	launch	16/6/1963	14
31	return	19/6/1963	14
32	launch	19/8/1982	15
33	return	10/12/1982	15
34	launch	18/6/1983	16
35	return	24/6/1983	16
36	launch	12/4/1961	17
37	return	12/4/1961	17

Mission

mid	name
10	Luna 2
11	Luna 16
12	Ranger 4
13	Apollo 11
14	Vostok 6
15	Soyuz T-7
16	STS-7
17	Vostok 1

MisAst

mid	asid
13	1
13	2
13	3
14	5
15	6
16	7
17	4

Achievement

achid	description	country	asid	mid
50	1st lunar impact	Russia	*NULL*	10
51	1st lunar soil return	Russia	*NULL*	11
52	1st US lunar impact	US	*NULL*	12
53	1st man on the moon	US	1	13
54	2nd man on the moon	US	2	13
55	1st woman in space	Russia	5	14
56	2nd woman in space	Russia	6	15
57	1st woman space walk	Russia	6	15
58	1st US woman in space	US	7	16
59	1st man in space	Russia	4	17

Figure 2: Example data for the "space mission" database (source: several pages of Wikipedia)

Tip: Figure 4 contains an informal description of the syntax of SQL.

Note: In the requested SQL queries and statements, only use values given in the question, i.e., do not directly use identifier numbers from the example data unless they are explicitly given in the question.

Write an SQL query that gives the country that achieved to put the 'first woman in space'.

Correction criterion	**Points**
SELECT-clause and other SQL features	0.5 point
1 Condition	0.75 point
Total points:	*1.25 points*

Question 19738:

1920-resit-sql-moon-2

Last author:	Keulen, M. van
Max. points:	2.25
Status:	Approved
Last modified on:	Oct 29, 2019, 10:22:35 PM
Course quartile + opportunity:	2019-2020 1A opportunity 1

Write an SQL query that gives the names of all astronauts of the 'Apollo 11' mission.

Correction criterion	**Points**
SELECT-clause and other SQL features	0.5 point
2 Joins	1 point
1 Condition	0.75 point
Total points:	*2.25 points*

Question 19741:

1920-resit-sql-moon-3

Last author:	Keulen, M. van
Max. points:	4.75
Status:	Approved
Last modified on:	Oct 29, 2019, 10:22:39 PM
Course quartile + opportunity:	2019-2020 1A opportunity 1

Write an SQL query that gives the names of all astronauts with how many landings they have (computed from how many 'landing' dates they have in the Dates table).

Correction criterion	**Points**
SELECT-clause and other SQL features	0.5 point
2 Joins	1 point
1 Aggregate	2.5 points
1 Condition	0.75 point
Total points:	*4.75 points*

Question 19744:

1920-resit-sql-moon-4

Last author:	Keulen, M. van
Max. points:	3.25
Status:	Approved
Last modified on:	Oct 29, 2019, 10:22:46 PM
Course quartile + opportunity:	2019-2020 1A opportunity 1

Write an SQL statement that changes the type 'launch' to 'earth launch' in the 'Dates' table.

Correction criterion	**Points**
SELECT-clause and other SQL features	0.5 point
1 Condition	0.75 point
1 Update	2 points
Total points:	*3.25 points*

Question 19747:

1920-resit-sql-moon-5

Last author:	Keulen, M. van
Max. points:	2.75
Status:	Approved
Last modified on:	Oct 29, 2019, 10:22:56 PM
Course quartile + opportunity:	2019-2020 1A opportunity 1

Write an SQL query that gives the following information about the astronaut 'Gagarin' (NB: the query should use exactly this string
'Gagarin', so use SQL's 'LIKE' to find the astronaut whose name contains this string): his full name as given in the 'Astronaut' table, the name of his mission(s), and the dates related to this mission from the 'Dates' table.
The expected answer for the example database is found below. Make sure your query produces the answer in this form (i.e., as one row per date
and these 4 columns).

Yuri A. Gagarin	Vostok 1	launch	12/4/1961
Yuri A. Gagarin	Vostok 1	return	12/4/1961

Correction criterion	Points
SELECT-clause and other SQL features	0.5 point
3 Joins	1.5 points
1 Condition	0.75 point
Total points:	*2.75 points*

Question 19750:

1920-resit-sql-moon-6

Last author:	Keulen, M. van
Max. points:	4.25
Status:	Approved
Last modified on:	Oct 29, 2019, 10:23:08 PM
Course quartile + opportunity:	2019-2020 1A opportunity 1

Write an SQL query that gives for each country the following information: the name of the country and the total number of astronauts involved in missions that obtained an achievement regarding a 'woman' (i.e., any achievement that contains the word 'woman' in the description).

Correction criterion	**Points**
SELECT-clause and other SQL features	0.5 point
1 Join	0.5 point
1 Aggregate	2.5 points
1 Condition	0.75 point
Total points:	*4.25 points*

Question 19753:

1920-resit-sql-moon-7

Last author:	Keulen, M. van
Max. points:	1.5
Status:	Approved
Last modified on:	Oct 29, 2019, 10:23:16 PM
Course quartile + opportunity:	2019-2020 1A opportunity 1

(hard) Write an SQL query that gives the names of the other astronauts who went on the mission with 'Neil A. Armstrong' when he obtained the '1st man on the moon' achievement. The expected answer for the example database has two rows: 'Edwin E. Aldrin Jr.' and 'Michael Collins'.

Correction criterion	**Points**
SELECT-clause and other SQL features	0.5 point
3 Joins	0.5 point
3 Conditions	0.5 point
Total points:	*1.5 points*