Exam Databases and Cloud Computing

ⓘ This is a preview of the draft version of the quiz

Started: Mar 21 at 12:54pm

Quiz Instructions

Examination in the Master of Applied Data Science

Course title: Databases and Cloud Computing

Semester: Summer 2022

Lecturer: Prof. Dr. Peter Roßbach, Dr. Jörg Gottschlich

Groups: MADS 2021

Examination date: 23.03.2022

Aids: Blank sheets of white paper and pen

Part A: Databases

Question 1 — 15 pts

A broadcasting company wants to create a database, with which the radio stations and broadcasts can be managed.

The company has different radio stations, each with a unique name (e.g. HR1, HR2, etc.), and a larger number of employees, each uniquely assigned to a station. Each employee is identified by a personnel number, name, address and job title (e.g. secretary, archive employee, presenter, etc.).

The stations broadcast different programs, each of which has a specific identification number, a name, a date, and a start and end time. Each broadcast may be hosted by one or more presenters ("Moderator" in German).

Each broadcast consists of a sequence of music tracks, the order of which is determined by recording the start time of the respective track. Each track can also

be used in different broadcasts. A music track is identified by an archive number, its artist, its title and its duration.

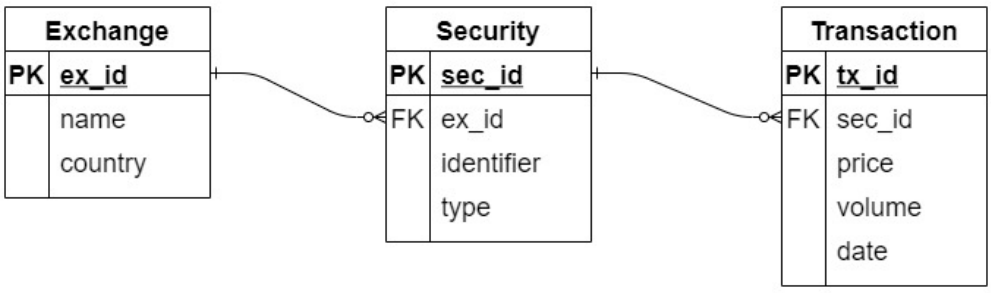
Create a relational data model based on this situation. Please draw or write the data model on a sheet of white paper and upload a scan or a photo of it.

Note: If the upload in Canvas does not work, please send the file via email to p.rossbach@fs.de

Upload Choose a File

Question 2 2 pts

Given the following database of the service "Online Broker":



Notes:

- The security type is an integer. type=1 is stock, type=2 is bond, type=3 is option and type=4 is future.
- The date format is yyyy-mm-dd. It is defined as a string.
- The expression "today" in the tasks refers to the date of the exam.

Create the following SQL query:

Print the identifiers of all securities that are not options and futures.

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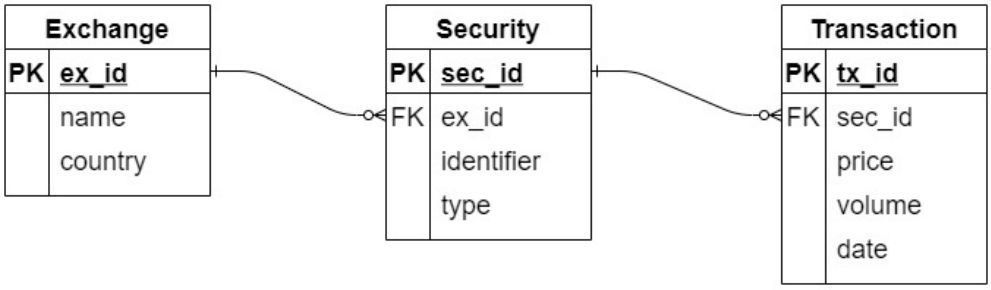
12pt Paragraph B I U A T²

p 0 words </>

Question 3

2 pts

Given the following database of the service "Online Broker":



Notes:

- The security type is an integer. type=1 is stock, type=2 is bond, type=3 is option and type=4 is future.
- The date format is yyyy-mm-dd. It is defined as a string.
- The expression "today" in the tasks refers to the date of the exam.

Create the following SQL query:

List the identifiers of all bonds that have ever been traded at a price below 30.

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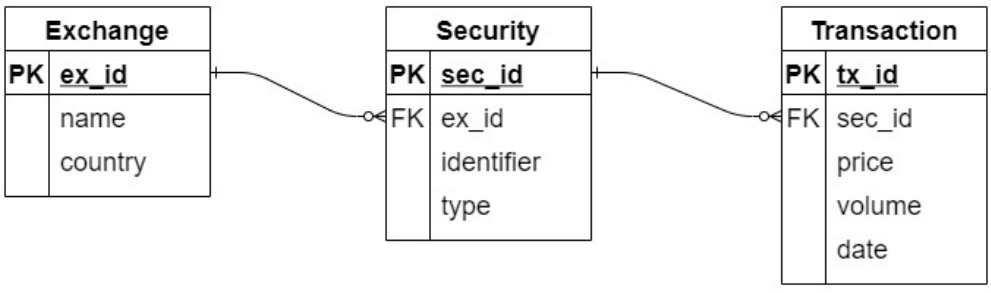
12pt Paragraph

p 0 words

Question 4

2 pts

Given the following database of the service "Online Broker":



Notes:

- The security type is an integer. type=1 is stock, type=2 is bond, type=3 is option and type=4 is future.
- The date format is yyyy-mm-dd. It is defined as a string.
- The expression "today" in the tasks refers to the date of the exam.

Create the following SQL query:

In which countries is the stock called 'Google' traded?

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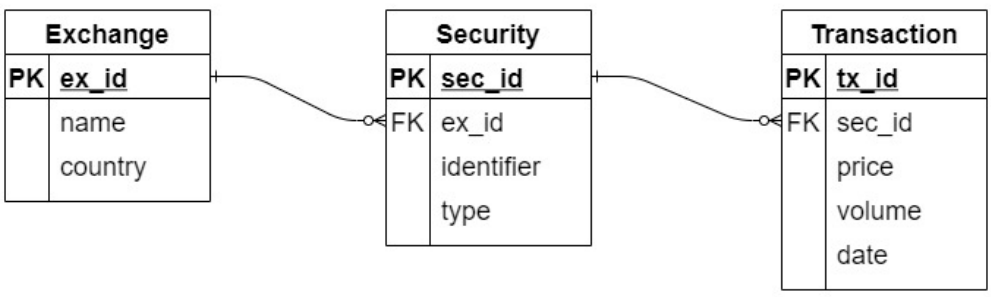
12pt Paragraph

p 0 words

Question 5

3 pts

Given the following database of the service "Online Broker":



Notes:

- The security type is an integer. type=1 is stock, type=2 is bond, type=3 is option and type=4 is future.
- The date format is yyyy-mm-dd. It is defined as a string.
- The expression "today" in the tasks refers to the date of the exam.

Create the following SQL query:

In which countries options are not traded?

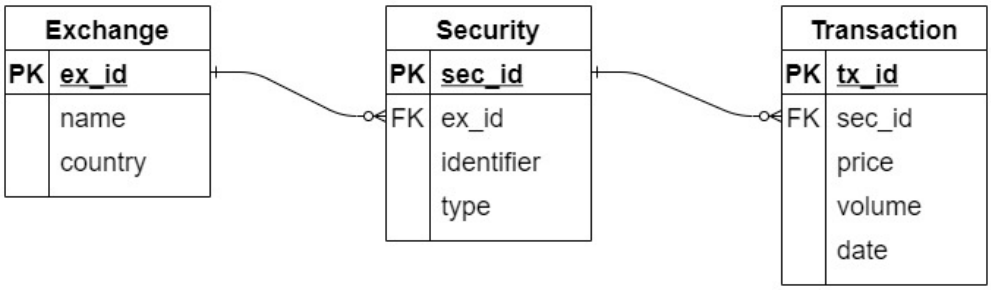
Edit View Insert Format Tools Table

12pt Paragraph

p 0 words

Question 6 3 pts

Given the following database of the service "Online Broker":



Notes:

- The security type is an integer. type=1 is stock, type=2 is bond, type=3 is option and type=4 is future.
- The date format is yyyy-mm-dd. It is defined as a string.
- The expression "today" in the tasks refers to the date of the exam.

Create the following SQL query:

List the identifiers and prices of all futures traded on the NYSE (New York Stock Exchange) yesterday.

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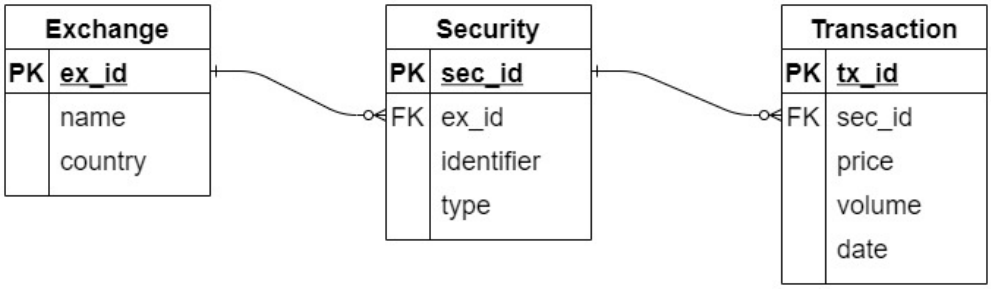
12pt Paragraph

p 0 words

Question 7 3 pts

Given the following database of the service "Online Broker":



Notes:

- The security type is an integer. type=1 is stock, type=2 is bond, type=3 is option and type=4 is future.
- The date format is yyyy-mm-dd. It is defined as a string.
- The expression "today" in the tasks refers to the date of the exam.

Create the following SQL query:

For each type of security, determine the sum of yesterday's trading volume.

Question 8

7 pts

Given the following Python code:

```
1  import mysql.connector
2
3  print("Welcome to our ordering system. In the following you will find
4  mydb = mysql.connector.connect(host="localhost", user="root", passwd="
5  mycursor = mydb.cursor()
6  mycursor.execute("USE restaurant")
7  mycursor.execute("SELECT * FROM menu ORDER BY menu_id")
8  myresult = mycursor.fetchall()
9  for  x1    in myresult:
10     print("Menu ID:", record[0], "Name:", record[1], "Price:", record[
11
12 print("Please enter your order now by successively entering the menu i
   complete if you enter a zero.")
13 mycursor.execute("INSERT INTO orders (orderdate) VALUES (NOW())")
14 mycursor.execute("Select MAX(order_id) from orders")
15 oid = int(mycursor.fetchone()[0])
16 mid = 99
17 while x2 !=0:
18     mid = int(input("Enter the menu id: "))
19     if mid==0:
20         break
21     mycursor.execute("SELECT * FROM menu where menu_id=" + str(mid))
22     myresult = mycursor.fetchone()
23     print("You have chosen:",   x3    )
24     amo = int(input("Please enter the amount (use a zero if you made a
25     query = "INSERT INTO item VALUES (%s,%s,%s)"
26     mycursor.execute(query, (str(oid),    x4    , str(amo)))
27
28 print("Here you can find an overview of your order:")
29 mycursor.execute("SELECT * FROM item where order_id=" + str( x5 ))
30 myresult = mycursor.
31 for record in myresult:
32     print(record)
33 mycursor.execute("SELECT sum(item.amount*menu. x6  ) FROM item, menu W
   menu.menu_id=item.menu_id AND item.order_id=" + str(oid))
34 myresult = mycursor.fetchone()
35 print("The total price for the order is:", myresult)
36
37 mydb. x7
38 mycursor.close()
39 mydb.close()
```

Complete the program by replacing the x1 to x7 with the correct code.

Question 9

8 pts

Derive the underlying database structure/model from the code. Please draw or write the data model on a sheet of white paper and upload a scan or a photo of it.

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Question 10

15 pts

Describe the basic concepts of Key-Value-Stores and Document-oriented Databases. Where do you see the similarities and where are the differences between the two concepts? Illustrate your description with an example.

Part B: Cloud Computing

Question 11

15 pts

What kind of advantages does the adoption of the cloud paradigm offer for a company? Name and explain three major benefits. Point out the links between the different benefits, if applicable.

Question 12

10 pts

Describe and explain at least two typical challenges a company faces when it moves from a traditional IT model to a cloud-native environment.

Question 13

10 pts

In the course, we learned four KPIs for a high-performing software organization. Two of them indicate software delivery acceleration and two ensure sufficient quality of the process. Name and explain one accelerating and one quality-assurance KPI and explain how they interact using an example.

Question 14

10 pts

Chargeback of cloud cost can become challenging and complex within an organization. Why is it important to provide transparent and proper cost allocation to each application team? Name and explain three reasons.

Question 15

3 pts

Which of these are all factors within the 12-Factor-Framework for cloud-native applications?

- ◯ Dev/prod parity (staging), Stateless processes, Explicit isolated dependencies
- ◯ One Codebase, Operating System, Backing Services as resources, Admin processes
- ◯ Logs, Build/Release/Run, Virtualization, Connectivity

Question 16

3 pts

Select all items which belong to the five pillars of a cloud foundation.

- ☐ IAM (Identity and Access Management)
- ☐ Service Ecosystem
- ☐ Security & Compliance
- ☐ DevOps organization
- ☐ Continuous Integration

Question 17

3 pts

Which statements about the ISO27001 standard are true?

- ☐ It describes a management system for Information Security.
- ☐ A risk management process including continuous monitoring and improvement is part of this standard.
- ☐ It has an annex with 114 controls to implement its purpose.

- [ ] It describes a management system for Software Quality.
- [ ] It abandons the need for additional data privacy measures.

Question 18

3 pts

Which statements describe correctly the generative organizational culture according to the cultural typology by Westrum (2004)?

- ◯ Cooperation is high.
- ◯ Responsibilities are narrow.
- ◯ Failure leads to scapegoating.
- ◯ Messengers are “shot”.
- ◯ Novelty leads to problems.

Question 19

3 pts

Which of the following statements are true about the Pet vs. Cattle metaphor?

- ◯ “Pet” describes the traditional approach where a server is precious and unique.
- ◯ If a “cattle” instance fails it leads to service disruption and therefore it must be repaired immediately if it is broken.
- ◯ “Cattle” instances receive manual updates during a maintenance window.

No new data to save. Last checked at 12:54pm

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