Exam Group A

Name	Lastname	Student Code	Date
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Database Modelling

A CrossFit gym wants to build a database to keep track of their activities. Every day there is a Workout of the day that is performed by every class (class last 1 hours, and can have a special theme). A class, which can host at most 12 people, has always a coach assigned who is responsible to supervise the attendees. At the end of each day, the rank of the workout scores for each attendees is registered to keep track of the progress. Indeed, workouts can be executed more than ones over the years, thus should be identified accordingly. Finally, the gym also offers special programs for clients who are interested to participate in competitions. The programs include additional workouts to the class' ones.

1. Identify the entities
2. Identify their relationships
3. Provide the conceptual schema
4. Provide the Logical Schema

NOTE: Every decision should be motivated

Relational Algebra/SQL Queries

Given the relational schema below translate the following queries in relational algebra and SQL (**No Need to report the results**)

1. Give all the shows' titles
2. Give all the artworks from Florence
3. Give the creator of the painters exposed in Paris in august
4. Give the titles of artworks whose creator's name is also the title of a show.
5. Give all the shows from a city that is not the hometown of any artist

Artist = (Name, Birthday, Nationality, City)
ArtWorks = (Title, Date, Type)
Shows = (ShowTitle, ArtWork, Location, StartDate, EndDate)

Artist

Name	Birthday	City
Leonardo Da Vinci	14/04/1452	Vinci
Michelangelo	06/03/1475	Caprese
Raffaello	01/01/1483	Urbino
Donatello	01/01/1386	Florence

Artworks

Title	Date	Type	Creator	City
Mona Lisa	1503	Painting	Leonardo	Paris
David 1	1504	Sculpt	Michelangelo	Florence
La Fornarina	1518	Painting	Raffaello	Rome
David 2	1386	Sculpt	Donatello	Florence
Daniele da Volterra	1545	Painting	Michelangelo	Rome

Shows

ShowTitle	Atitle	Location	Start Date	End Date
MyRenaissance	La Fornarina	Florence	01/01/2023	01/04/2023
MyRenaissance	David 1	Lyon	01/01/2023	01/04/2023
Michelangelo	Mona Lisa	Paris	01/05/2023	30/07/2023
Raffaello	La Fornarina	Rome	01/06/2023	01/09/2023
Michelangelo	Daniele da Volterra	Paris	01/07/2023	01/09/2023

Multiple Choice Questions

1. ---------- hides the complexity of data structures to represent data in the database from users through several levels of data abstraction.
   1. A Data Model
   2. A Data Format
   3. A Data Abstraction
   4. A data fragment
2. ------- is the overall structure of the database in terms of entities and relationships
   1. Physical Schema
   2. Logical Schema
   3. Instance
   4. Transaction
3. ------- is the actual content of the database at a particular point in time
   1. Logical Schema
   2. Physical Schema
   3. Transaction
   4. Instance
4. Which of the following is a component of the database architecture
   1. Query Writer
   2. Storage Manager
   3. Database Analyst
   4. Transaction Storage
5. Explain what the **Query Processor** component does.

6. What is the difference between super-key, candidate key, and foreign key

7. A transaction is...
   1. a unit of program execution that accesses and possibly updates various data items.
   2. the only possible consequence of ACID properties
   3. a program that accesses and updates various relations to compromise data integrity
   4. a process that executes queries over an instance