Week 1 Quiz

1. Which of the following represents a source system that contains structured Data ?
   - A collection of customer feedback saved in a text file.
   - A JSON file containing user profiles, where each profile lists attributes like "firstName", "lastName", and "address" in a key-value format.
   - A relational database containing customer information, where each row represents a customer and each column represents a customer attribute such as name, address, and phone number.
   - A video file of a lecture.

2. What does CRUD stand for?
   - Copy, Replace, Undo, Destroy
   - Compute, Retrieve, Upload, Download
   - Create, Read, Update, Delete
   - Connect, Receive, Utilize, Disconnect

3. What is a database management system (DBMS)?
   - A DBMS is the software layer that sits on top of the physical database storage and allows you to manage and interact with the data.
   - A DBMS is a graphical user interface that illustrates the database content.
   - A DBMS is the set of rules that defines how to write queries to access data in a database.
   - A DBMS is an API that standardizes the connection to any type of database.

4. According to this week's videos, what are the benefits of applying normalization to relational databases? Select all that apply.
   - Minimizes redundancy
   - Ensures data integrity
   - Improves data query (i.e. retrieval) speed

5. Which of the following statements about primary and foreign keys is true?
    - A primary key and a foreign key are the same and serve the same purpose in a database.
    - A foreign key is a secondary key that helps the primary key uniquely identify each row in its own table.
    - Primary keys are used in relational databases and foreign keys are used in NoSQL databases.
    - A foreign key of a table can reference the primary key of another table.

6. Which of the following statements about relational databases and NoSQL databases is true?
    - Complex join operations are supported by both relational and NoSQL databases.
    - Relational databases do not have to follow a strict schema like NoSQL databases.
    - Relational and NoSQL databases are both typically ACID compliant
    - Relational databases operate under the principle of strong consistency, while NoSQL databases operate under the principle of eventual consistency.

7. You've learned about the four principles of ACID compliance: atomicity, consistency, isolation, and durability. Which of the following represents a scenario that demonstrates the isolation principle?
    - If there is a constraint that the bank balance should be a positive integer, any transaction that will make the balance go below zero should fail.
    - The data stored in a bank transaction database will never be lost, even when there's a power loss.
    - A bank transaction that moves money from Account A to Account B should run with updates to both account balances or fail without updating either account balance.
    - Given that an account balance is $20, if two transactions each deducting $10 from the account occurred at the same time, the account balance will be $0 not $10 after the two transactions are completed.

8. Which of the following source systems can store unstructured data? Select all that apply.
    - Document store
    - Key-value store
    - Object storage
    - File system

9. Which of the following statements is true about logs?
    - Logs only contain error messages that are generated by an application.
    - Many database systems will have logs that you can use to track changes in the database.
    - Logs are used to support downstream analytics use cases but not machine learning use cases.
    - Logs store a sequence of records in a random order.

10. Message queues and event-streaming platforms are both examples of event-streaming architectures. Which of the following statements best describe the similarities between the two? Select all that apply.
    - You could encounter them as source systems or use them as ingestion tools.

      Correct: Nice job! When you work with event systems as a source system, it could be that your upstream source is a simple event producer, like an IoT device, and your system, or the system you build rather, comprises both the event router and consumer. Or it could be that your upstream source system is made up of multiple producers, routers, and consumers and the systems you build are effectively just another downstream consumer of events.
    - Both architectures are based on asynchronous communication between an event producer and an event consumer.

      Correct: Nice job! Both architectures rely on the presence of an event router or message broker that acts as a buffer between the event producer and the event consumer. The router helps decouple the producer from the consumer, which enables asynchronous communication between them, meaning that the producer can send messages to the router or broker at any time and doesn't have to wait for the consumers to consumer the messages.
    - They both provide persistent storage for the streamed events.
    - They both use a log-based router that relay messages from an event producer to an event consumer.

11. Which of the following statements is true about IAM users and IAM roles?
    - An IAM user has temporary security credentials, whereas an IAM role is assigned long-term credentials.
    - An IAM role can be assumed by any resource, user, or application.
    - An IAM user is someone who assumed an IAM role
    - Policies are only attached to IAM users.

12. Which of the following statements is true about how traffic is managed within a Virtual Private Cloud (VPC)? Resources from two different VPCs can communicate with each other by default.
    - Within the same VPC, resources created in a public subnet cannot automatically communicate with resources created in a private subnet.
    - Resources created in a public subnet can automatically interact with the public internet.
    - Resources created in a private subnet can send requests to outside resources through a NAT gateway.