1. What database models do you know?
   - Hierarchical (trees)
   - Network (graphs)
   - Relational (tables)
   - Object-oriented
2. Which are the main functions performed by a Relational Database Management System (RDBMS)?
   - Creating/altering/deleting tables.
   - Adding, changing, deleting, searching and retrieving of data stored in the tables.
   - Support for the SQL language.
   - Transaction support (optional).
3. Define what is "table" in database terms.
   - Database tables consists of data, arranged in rows and columns. All rows have the same structure. Columns have name and type.
4. Explain the difference between a primary and a foreign key.
   - The **Primary key** is a column of the table that uniquely identifies its rows. Two rows are different if and only if their primary keys are different.
   - The **Foreign key** is a identifier of a record located in another table (usually its primary key).
   - **Relationships** between tables are based on interconnections primary key/foreign key
5. Explain the different kinds of relationships between tables in relational databases.
   - Relationships have multiplicity – "One to many", "Many to many", "One to one".
   - **One-to-many** relationship is used very often. A single record in the first table has many corresponding records in the second table.
   - **Many-to-many** relationship – records in the first table have many corresponding records in the second one and vice versa. It's implemented through additional table.
   - **One-to-one** relationship – a single record in a table corresponds to a single record In the other table. Used to model **inheritance** between tables.
6. When is certain database schema normalized? What are the advantages of normalized databases?
   - **Database normalization** is the process of organizing the fields and tables of a relational database to minimize redundancy, dependency and repeating data.
   - **Normalization** usually involves dividing large tables into smaller (and less redundant) tables and defining relationships between them.
   - Normalization of the relational schema removes repeating data.
7. What are database integrity constraints and when are they used?
   - **Integrity constraints** ensure data integrity in the database tables.
   - Enforce data rules which cannot violated.
8. Point out the pros and cons of using indexes in a database.
   - **Indices** speed up searching of values in a certain column or group of columns (usually implemented as B-trees).
   - Adding and deleting records in indexed tables is slower.
   - Indices should be used for big tables only!

9. What is the main purpose of the SQL language?
   - Standardization for manipulation of relational databases.
   - Creating, altering and deleting tables and other objects in database.
   - Searching, retrieving, inserting, modifying and deleting table data (rows).
10. What are transactions used for? Give an example.
   - Transactions are a sequence of database operation which are executed as a single unit (either all of them execute successfully or none of them is executed at all).
   - Transactions are used to prevent errors in concurrent operations.
   - Example: Transfer money from one account into another concurrently by two bank managers.
11. What is a NoSQL database?
   - NoSQL databases data is stored as documents without fixed structure.
   - Single entity (document) is a single record.
   - Data is stored as key-value pairs in JSON format.
12. Explain the classical non-relational data models.
   - There are 5 types of non-relational data models:
     1. Document model – Set of documents e.g. JSON strings.
     2. Key-value model – Set of key-value pairs.
     3. Hierarchical key-value model – Hierarchy of key-value pairs.
     4. Wide-column model – Key-value model with schema.
     5. Object model – Set of OOP-style objects.
13. Give few examples of NoSQL databases and their pros and cons.
   - MongoDB – Very powerful JSON-document database
   - Redis – Very fast in-memory data structures server
   - CouchDB – JSON-based document database with REST API
   - Cassandra – Distributed wide-column database