1. **What database models do you know?**
   1. Hierarchical (tree)
   2. Network / graph
   3. Relational (table)
   4. Object-oriented
2. **Which are the main functions performed by a Relational Database Management System (RDBMS)?**
   1. Creating / altering / deleting tables and relationships between them (database schema)
   2. Adding, changing, deleting, searching and retrieving of data stored in the tables
   3. Support for the SQL language
   4. Transaction management (optional)
3. **Define what is "table" in database terms.**
   1. A table is a collection of related data held in a structured format within a database.
4. **Explain the difference between a primary and a foreign key.**
   1. The foreign key is another table’s item’s primary key
   2. Foreign keys are not unique inside a table, whereas primary keys are
5. **Explain the different kinds of relationships between tables in relational databases.**
   1. One-to-one
      1. A single record in a table corresponds to a single record in the other table
   2. One-to-many
      1. A single record in the first table has many corresponding records in the second table
   3. Many-to-many
      1. Records in the first table have many corresponding records in the second one and vice versa
6. **When is a certain database schema normalized?**
   1. When a table contains less data repetitions ⬄ when it is in one of the following Normal Forms
   2. 1-st Normal Form
      1. Data is stored in tables
      2. Fields in the rows are atomic (inseparable) values
      3. There are no repetitions within a single row
      4. A primary key is defined for each table
   3. 2-nd Normal Form
      1. Retains all requirements of 1-st Normal Form
      2. There are no columns that do not depend on part of the primary key (if it consists of several columns)
   4. 3-rd Normal Form
      1. Retains all requirements of 2-nd Normal Form
      2. The only dependencies between columns are of type "a column depends on the PK"
   5. 4-th Normal Form
      1. Retains all requirements of 3-rd Normal Form
      2. There is one column at most in each table that can have many possible values for a single key (multi-valued attribute)
7. **What are the advantages of normalized databases?**
   1. Less data repetition
   2. Smaller in size
   3. Weaker data coupling
8. **What are database integrity constraints and when are they used?**
   1. What…?
      1. Integrity constraints ensure data integrity in the database tables
      2. Enforce data rules which cannot be violated
   2. When…?
      1. When the primary key of a table must have unique value for each table row
      2. When all values in a certain column (or a group of columns) must be unique
      3. When the value in given column must be a key from another table
      4. When values in a certain column must meet some predefined condition
9. Point out the pros and cons of using indexes in a database.
   1. Pros
      1. speed up searching of values in a certain column or group of columns
   2. Cons
      1. Adding and deleting records in indexed tables is slower
10. **What's the main purpose of the SQL language?**
    1. Manipulation of relational databases
11. **What are transactions used for? Give an example.**
    1. Transactions are a sequence of database operations which are executed as a single unit:
       1. Either all of them execute successfully
       2. Or none of them is executed at all
    2. Example:
       1. In a multiplayer game, where player trade items
          1. The item must be removed from one player’s inventory and added to the other player’s inventory or process must FAIL
12. **What is a NoSQL database?**
    1. A NoSQL database is a DB, which uses document-based model (non-relational) and   
       NO RELATIONS
13. **Explain the classical non-relational data models.**
    1. Document model
       1. Set of documents, e.g. JSON strings
    2. Key-value model
       1. Set of key-value pairs
    3. Hierarchical key-value
       1. Hierarchy of key-value pairs
    4. Wide-column model
       1. Key-value model with schema
    5. Object model
       1. Set of OOP-style objects
14. **Give few examples of NoSQL databases and their pros and cons.**
    1. Redis
       1. Pros
          1. Ultra-fast in-memory data structures server
          2. Stable
          3. Fast
       2. Cons
          1. Grouping works bad (I haven’t really used it, I don’t know)
    2. MongoDB
       1. Pros
          1. Speed
          2. Flexibility
          3. Mature and powerful JSON-document database
       2. Cons
          1. No Joins
          2. Concurrency issues
          3. Young software: Inexperienced User-Base; Still Under Construction; Little  
              Documentation
          4. Doesn’t automatically treat operations as transactions
          5. High Memory Usage
    3. CouchDB
       1. Pros
          1. JSON-based document database with REST API
          2. Simple
          3. Thanks to map/reduce, querying data is somewhat separated from the data itself.
       2. Cons
          1. High Memory Usage
          2. Arbitrary queries are hard to code
    4. Cassandra
       1. Pros
          1. Distributed wide-column database
          2. decentralized system
       2. Cons
          1. there is no referential integrity
          2. querying options for retrieving data are very limited