# Databases homework

## Task 1

**Q:** What database models do you know?  
**src:** [Wiki](http://en.wikipedia.org/wiki/Database_model)   
**1.** **Hierarchical** - is a database model in which the data is organized into a tree-like structure  
**2.** **Network** - is a database model conceived as a flexible way of representing objects and their relationships.  
**3.** **Relational** - is a database model based on first-order predicate logic.  
**4.** **Entity** - relationship model (ER model) is a data model for describing the data or information aspects of a business domain or its process requirements.  
**5.** **Object database** - is a database management system in which information is represented in the form of objects as used in object-oriented programming.  
**6.** **Document-oriented** - is a computer program designed for storing, retrieving, and managing document-oriented information, also known as semi-structured data.  
**7.** **Entity–attribute–value** - is a database model to describe entities where the number of attributes (properties, parameters) that can be used to describe them is potentially vast, but the number that will actually apply to a given entity is relatively modest. In mathematics, this model is known as a sparse matrix.  
**8.** **Star schema** - one or more fact tables referencing any number of dimension tables. The star schema is an important special case of the snowflake schema, and is more effective for handling simpler queries.

## Task 2

**Q:** Which are the main functions performed by a Relational Database Management System (RDBMS)?  
**src:** [really good explanation.](http://rdbms.ca/database/introduction.html)   
**A:** A relational DBMS is special system software that is used to manage the organization, storage, access, security and integrity of data. This specialized software allows application systems to focus on the user interface, data validation and screen navigation. When there is a need to add, modify, delete or display data, the application system simply makes a "call" to the RDBMS.

## Task 3

**Q:** Define what is "table" in database terms  
**src:** [Great and simple on database terms](http://www.bin-co.com/database/sql_tutorial/db_terms_meanings.php).   
**A:** A database can have multiple tables in it. All the data is stored in the tables. A table has a set of fields in it. These fields makes the design or the structure of the database.

## Task 4

**Q:** Explain the difference between a primary and a foreign key.  
**src:** no source here, this expanation is kind a from here and there.   
**A:** **Primary key** is a field or combination of fields that uniquely identify a record in a table, so that an individual record can be located without confusion. **Foreign key** (sometimes called a referencing key) is a key used to link two tables together. Typically you take the primary key field from one table and insert it into the other table where it becomes a foreign key (it remains a primary key in the original table.

## Task 5

**Q:** Explain the different kinds of relationships between tables in relational databases.  
**src:** [Technet](http://www.techrepublic.com/article/relational-databases-defining-relationships-between-database-tables/)  
**1.** **One-to-one:** Both tables can have only one record on either side of the relationship.  
**2.** **One-to-many:** The primary key table contains only one record that relates to none, one, or many records in the related table.  
**3.** **Many-to-many:** Each record in both tables can relate to any number of records (or no records) in the other table.

## Task 6

**Q:** When is a certain database schema normalized? What are the advantages of normalized databases?  
**src:** [E-Computer Notes](http://ecomputernotes.com/fundamental/what-is-a-database/what-is-a-database-normalization). /\* Yes I know he is indian, but the post is really great\*/  
**A:** Normalization is the process of removing redundant data from your tables in order to improve storage efficiency, data integrity and scalability. This improvement is balanced against an increase in complexity and potential performance losses from the joining of the normalized tables at query-time. There are two goals of the normalization process: eliminating redundant data (for example, storing the same data in more than one table) and ensuring data dependencies make sense (only storing related data in a table). Both of these are worthy goals as they reduce the amount of space a database consumes and ensure that data is logically stored.

## Task 7

**Q:** What are database integrity constraints and when are they used?  
**src:** [From Oracle documentation.](http://docs.oracle.com/cd/B10501_01/appdev.920/a96590/adg05itg.htm) /\* It’s nice read, if you have time, check it out.\*/  
**A:** You can define integrity constraints to enforce business rules on data in your tables. Business rules specify conditions and relationships that must always be true, or must always be false. Because each company defines its own policies about things like salaries, employee numbers, inventory tracking, and so on, you can specify a different set of rules for each database table.

## Task 8

**Q:** Point out the pros and cons of using indexes in a database.  
**src:** [Database Skill](http://www.databaseskill.com/3082411/)  
**Advantages**: use an index for quick access to a database table specific information. The index is a structure of the database table the value of one or more columns to sort.  
**Disadvantages**: too index will affect the speed of update and insert, because it requires the same update each index file. For a frequently updated and inserted into the table, there is no need for a rarely used where the words indexed separately, small table, the cost of sorting will not be great, there is no need to create additional indexes.

## Task 9

**Q:** What's the main purpose of the SQL language?  
**src:** [Wiki](http://en.wikipedia.org/wiki/SQL)  
**A:** SQL is a special-purpose programming language designed for managing data held in a relational database management system (RDBMS).

## Task 10

**Q:** What are transactions used for? Give an example.  
**src:** [It’s explained great](http://www.tutorialspoint.com/sql/sql-transactions.htm)   
**A:** A transaction is the propagation of one or more changes to the database. For example, if you are creating a record or updating a record or deleting a record from the table, then you are performing transaction on the table. It is important to control transactions to ensure data integrity and to handle database errors.

## Task 11

**Q:** What is a NoSQL database?  
**src:** [you can download a manual, it’s really usefull](http://www.mongodb.com/nosql-explained)  
bonus src: [Check this blog out, it’s really funny, but you can learn something from it](http://www.ignoredbydinosaurs.com/2013/05/explaining-non-relational-databases-my-mom)   
**A:** NoSQL, or 'Not Only SQL', represents the new class of data management technologies designed to meet the increasing volume, velocity, and variety of data that organizations are storing, processing, and analyzing.

## Task 12

**Q:** Explain the classical non-relational data models.  
**src:** [wikipage On NOSQL](http://en.wikipedia.org/wiki/NoSQL)  
**1.** Key-Value Store  
**2.** Column-oriented Store  
**3.** Document-oriented Store  
**4.** Graph Database  
**5.** Relational Database

## Task 13

**Q:** Give few examples of NoSQL databases and their pros and cons.  
**A:** No time for this one, if you want you can check it in the previous src, or in the mongodb site.

### **Disclaimer:** Yes I know it is the same as in wikipedia, that’s why I uploaded the links also, maybe some day this .docx will be usefull.