**Exercise 1**

a) Explain the following terms in the context of the relational data model:

* + Relation: table
  + Attribute: column
  + Domain: set of allowable values for one or more attributes
  + Tuple: row
  + Degree: number of columns
  + Cardinality: number of rows

b) Use the Suppliers-Parts database to provide examples of each:

* Relations: Suppliers, Parts, Shipments
* Attributes in Parts: PNo, PName, Colour, Weight
* Domains in Parts: Number of a part (P+number), Name of a part (String), Colour (String), Weight (number)
* Tuple: P1, Nut, Red, 12
* Degree of Parts: 4
* Cardinality of Parts: 6

2.

a) Explain the following terms in the context of the relational data model:

* Candidate Key: a key that can be a primary key (defines each tuple as unique, can be either one attribute or a set of them)
* Primary Key: one candidate key, usually the shortest one (as few attributes as possible)
* Foreign Key: a key that is in two or more relations that connects them

b) Use the Suppliers-Parts database to provide examples of each:

* Candidate Key in Parts: PNo, PName+Colour+Weight
* Primary Key in Parts: PNo
* Foreign Key in Shipments: PNo

3.

a) What is the purpose of nulls and what do they represent?

-> nulls state that there is no value or the value is invalid

b) Is a component of a primary key allowed to accept nulls, why?

->No, because it defines each tuple as unique; each primary key has a different value and it has to have a value

c) Use the Suppliers-Parts database to discuss why it is desirable to enforce this constraint:

->In the Parts relation there are two Screws, we could imagine they had the same colour and weight and then if there was a null in the PNo, the tuples wouldn’t be unique and would be indistinguishable

4.

a) Describe the constraint called referential integrity:

->If a relation has a foreign key, it’s values must be either equal to values of a candidate key in the other relation or must be null

b) What is the purpose of this constraint?

->The purpose of it is, that the two relations are connected by the foreign key. If the value would differ, no match would be found and the relations couldn’t be connected.

c) Use the Suppliers-Parts database to discuss why it is desirable to enforce referential integrity:

->The relations Parts and Shipments are connected. The Shipments relation has a foreign key, which is PNo. If in Shipments in PNo there was a value that was not in Parts in PNo, it could not find a match and that shipment wouldn’t have a part, so the relations wouldn’t be connected.

5.

a) What is a view?

->It’s the external level of architecture. It’s dedicated to specific users.

b) Discuss the difference between a view and a base relation:

->View is a “modified” base relation. It is a relation that has been created by performing operations on the base relation.

c) Explain what happens when a user accesses a database through a view:

->The user sees only information dedicated for him, not the whole database.