Exercise 1: Design a data warehouse with following tables:

- NATION (n_nationkey, n_name, n_regionkey, n_comment);
- CUSTOMER (c_custkey, c_name, c_address, c_nationkey, c_phone, c_acctbal, c_mktsegment, c_comment)
- ORDERS (o_orderkey, o_custkey, o_orderstatus, o_totalprice, o_orderdate, o_orderpriority, o_clerk, o_shippriority, o_comment);
- PART (p_partkey, p_name, p_mfgr, p_brand, p_type, p_size, p_container, p_retailprice, p_comment);
- PARTSUPP (ps_partkey, ps_suppkey, ps_availqty, ps_supplycost, ps_comment);
- REGION (r_regionkey, r_name, r_comment);
- SUPPLIER (s_suppkey, s_name, s_address, s_nationkey, s_phone, s_acctbal, s_comment);
- LINEITEM (l_orderkey, l_partkey, l_suppkey, l_linenumber, l_quantity, l_extendedprice, l_discount, l_tax, l_returnflag, l_linestatus, l_shipdate, l_commitdate, l_receiptdate, l_shipinstruct, l_shipmode, l_comment);

Consider the following constraints:

- All attributes must exist.
- Following primary keys should be defined:
  - PK_NATION = n_nationkey;
  - PK_CUSTOMER = c_custkey;
  - PK_ORDERS = o_orderkey;
  - PK_PART = p_partkey;
  - PK_PARTSUPP = ps_partkey, ps_suppkey;
  - PK_REGION = r_regionkey;
  - PK_SUPPLIER = s_suppkey;
  - PK_LINEITEM = l_orderkey, l_partkey, l_suppkey, l_linenumber;

Following foreign keys should be defined:

- ORDERS(o_custkey) → CUSTOMER(c_custkey)
- LINEITEM(l_orderkey) → ORDER(o_orderkey)
- LINEITEM(l_partkey) → PARTSUPP(ps_partkey)
- LINEITEM(l_suppkey) → PARTSUPP(ps_suppkey)
- PARTSUPP(ps_partkey) → PART(p_partkey)
- PARTSUPP(ps_suppkey) → SUPPLIER(s_suppkey)
- SUPPLIER(s_nationkey) → NATION(n_nationkey)
- CUSTOMER(c_nationkey) → NATION(n_nationkey)
- NATION(r_regionkey) → REGION(r_regionkey)

Exercise 2: Import the provided TPC-H Data into the data warehouse using the sqlldr.
http://wwwiti.cs.uni-magdeburg.de/iti_db/lehre/dw/ws1415/TPCH100m.zip
The following points must be considered:
• The data warehouse is accessed by network.
• Standard, the sqlldr writes different log files. Accordingly, the sqlldr must be configured, or executed in a directory with write-rights.
• The properties of the data (delimiter, null columns, format, line break, data type) must be defined in a control file.

**Exercise 3:** Find all customer names (C_NAME) in the created data warehouse with an edit-distance from 1 to customer ‘Customer#000000105’.

**Exercise 4:** Find all commentary in the created data warehouse (L_Comments) of orders (LINEITEM) with an soundex of ‘W153’.
How was the soundex created?

**Exercise 5:** Based on the created database, determine the number of ordered parts (L_Quantity) ordered in the years 1995 and 1996 from customers from Germany or France. Construct the aggregates for all combinations with the union operator.

**Exercise 6:** Solve exercise 5 using the CUBE and ROLLUP operator.
Explain the concept of both operators.

Exercise 7 2/2

Good Luck!