Case study #1: The world database

We have been hired by an international non-profit organization, Ayuda, to design a database schema that stores current information about different countries in the world. For each country, Ayuda wants to store the name of the country in English, the standard, unique three-letter country code (e.g., 'USA' for United States of America), as well as what continent the country is in. In order to make decisions on which countries to dedicate aid, Ayuda wants to be able to know if the country is considered developed or undeveloped. Common indicators for how developed a country is are population, average income, and life expectancy. Ayuda is able to provide each country's gross national product and population and those two pieces of data together can be used to calculate average income. Ayuda is additionally interested in storing information about each country's government such as the type of government and the leader of the country.

In order to train its volunteers appropriately, Ayuda needs to know the languages spoken in each country. Ayuda also needs to know whether or not the language is official and what percentage of the population is speaking the language.

Lastly, Ayuda wants to store information about major cities of each country. Specifically, they want be able to store the name of the city, if it is the capital of the country, in what region of the country it resides, and its population.

Case study #2: Conference Review System

Researchers submit their research papers for consideration. Reviews by reviewers are recorded for use in the paper selection process. The database system caters primarily to reviewers who record answers to evaluation questions for each paper they review and make recommendations regarding whether to accept or reject the paper.

Authors of papers are uniquely identified by email id. First and last names are also recorded.

Each paper is assigned a unique identifier by the system and is described by a title, abstract, and the name of the file containing it.

A paper may have multiple authors, but one of the authors is designated as the contact author.

Reviewers of papers are uniquely identified by email address. Each reviewer's first name, last name, phone number, affiliation, and topics of interest are also recorded.

Each paper is assigned between 2-4 reviewers. A reviewer rates each paper assigned to him or her on a scale of 1-10 in 4 categories: technical merit, readability, originality, and relevance to conference, and provides an overall recommendation (accept/reject).

Each review contains two types of written comments: one to be seen by the review committee only and the other as feedback to the author(s).

Case study #3: Mail Order System

The company has employees, each identified by a unique employee number, first and last name, job title, hourly pay, address, and email.

Each customer is identified by a unique customer number, first and last name, address and email.

Each part sold is identified by a unique part number, a part name, price, and quantity in stock.

Each order, placed by a customer, is taken by an employee, and is given a unique order number. Each order contains specified quantities of one or more parts. Each order has a date of receipt as well as an expected ship date. Actual ship date is also recorded.