

# Database Design

CmpE 226

Practice Problems

## Practice Problem (11)

1. Design a database with at least 10-12 of tables or ((**constraint tables. The constraint tables should use the full power of linear constraints. (For example, the equality constraint  $x = 1$  does not use the full power of linear constraints. So don't use only equality constraints in your database.**)) The tables should contain a reasonable number of tuples or (**constraint tuples**), not too few and not too many.
2. Prepare traditional class diagram for the following problems showing at least 10 relationships among the following object classes, including associations, aggregations, and generalizations. Show multiplicities in your diagrams.  
Your model should have 3-5 attributes and 3-5 operations per class. Use association and role names when needed. As you prepare the diagrams, you may add additional object classes.
3. **If you use MLPQ**, find at least 4 iconic queries or sequence of iconic queries. Explain what they mean and write them down in the style of the examples in the MLPQ system manual. (**Iconic queries are shown in Figure 1 MLPQ Graphical Interface in the MLPQ Specifications, such as Intersection, Union, Difference, Max, Min, etc.**)
4. Find at least 4 SQL queries of each of the following kind: **Basic, Aggregation, Sets, and Nested.** (That is, a total of 16 queries.)

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## Health and Nutrition Management System (HNMS)

MC Square

### Abstract

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Health & Nutrition Management System (HNMS) is a global system for increasing awareness on the health conditions prevalent in the underdeveloped parts of the world. It analyses the health conditions in Somalia and conducts a campaign to raise funds, handle the stocks and money received from across the world. The crux of the system is in delivering the goods and the importance of health and nutrition to the people of Somalia. It helps people to take steps in fulfilling the most important of the three basic needs of mankind – food

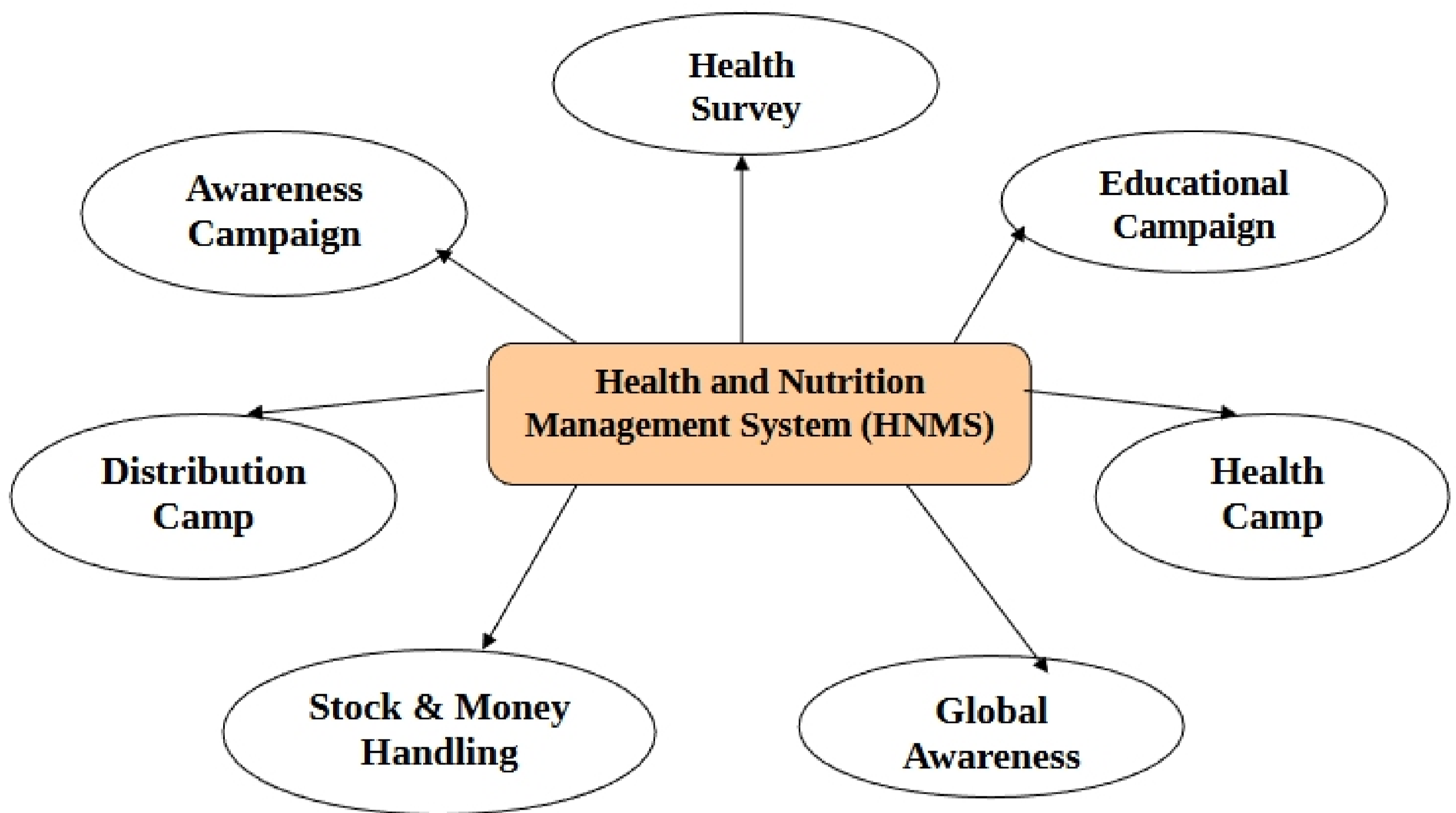
### Domain Description

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Somalia is characterized by a chronic vulnerability to environmental and health conditions. The Sub-Saharan people are faced with a multitude of problems: poverty, ever increasing number of diseases, malnutrition and lack of basic education. They lack resources to develop the land and at the current pace, they are a long way off from taking even the faintest steps towards progression. What the Somalis need is a helping hand to face life.

### Block Diagram

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## **Goals of HNMS**

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Somalis are plagued by a plethora of air-borne, water-borne and sexually transmitted diseases like malaria, typhoid, Hepatitis-A, Hepatitis-B and AIDS. The first step is to vaccinate the people thus stop the spread of these fatal diseases. The next step is to educate them about the diseases and help them understand the “do’s and don’ts” in order to help prevent the start and spread of these killers.

Somalis suffer from malnutrition and one of the main factors contributing to this is a high birth rate. An average Somali woman gives birth to 7-8 children, out of which 4-6 see daylight. The growth of these children is stunted due to lack of nutritional food. The mother will have to be taught that giving birth to so many children will drain her body of nutrients and the children can never sustain a good life. The masses will have to be educated on birth control and the importance of breast feeding.

The increase in birth-rate outpaces the natural recovery system of the soil. The need for food is placing an impossible demand on the nutrient-depleted soil. The Somalis have no idea of the advanced agricultural methods and no funds to implement them. HNMS will have to help the people restore the harmony of soil and educate them on efficient usage of land for agriculture.

The underlying feature of all goals is educating the people. Lost in their hardships, the Somalis are ignorant of the basic things a human being should be aware of. The most important task is to educate the people, and hence increase the literacy rate and eradicate superstitious beliefs.

All of these are not achievable in a day or month. It requires a lot of patience, effort and most important – funds. Global awareness should be created regarding the conditions prevalent in Somalia and the need to contribute generously. Awareness campaigns have to be conducted on the need for money, medicines, doctors, volunteers and so much more.

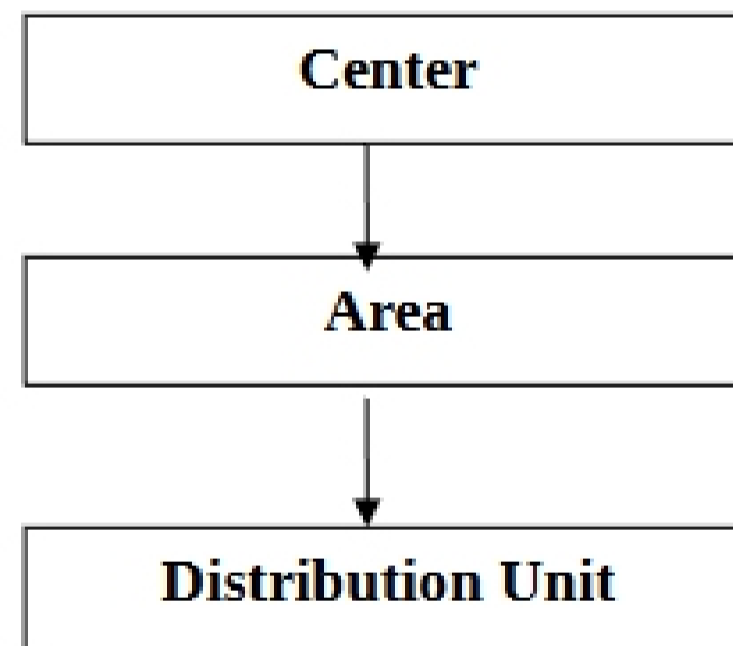
## Detailed Requirements

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Healthy life is the major concern of every individual on the earth. Ensuring healthy life is the ultimate goal of our system. First a health survey is conducted for the mass and their conditions are recorded in our system. These conditions may include the deficiencies and the diseases prevalent among them. Next HNMS aims at creating awareness among the people through educational campaigns. The campaigns help the people to get awareness about the air-borne, water-borne and sexually transmitted diseases that are prevalent in the society and the ways to prevent them. It also teaches about the importance of vaccination, breastfeeding and the healthy nutrients that are necessary for the healthy life.

The details regarding the campaigns like the place where the campaign is held and the purpose are recorded in our system. The system also aims at raising funds and getting medicine stocks, so it conducts global awareness through advertisements in the mass media to get donations from the people all over the world. The system keeps track of all the donations they get and it also efficiently distributes them according to the needs. Thus the HNMS tries to achieve the goal of healthier life.

The HNMS divides its operations into three levels - Center, Area and Distribution Unit represented as follows:



### **Center Level:**

The center maintains the stock that is sent to each area code. It also checks if it has enough medicines or if it needs to buy more medicines

### **Area Level:**

Area codes maintain the amount of stock they would need from the center and also the amount of stock that is sent to each Distribution unit

**Distribution Unit Level:** Distribution units maintain the amount of units they receive from the area codes and the amount they exhaust in each campaign

## Entities & Attributes

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### ***(1) Center Level***

#### **Person**

(name, dob, sex, area code, HNMS id)

Key: name, dob