

## PROJECT PART 1.2: DATABASE DESIGN

In order for S.O.S. to efficiently manage and coordinate its operations, the I.S. design team decides on an I.S. design composed of six modules.

- Request Management: This module enables disaster victims to log in to the system and submit requests.
- Donation Management: This module enables donators to log in to the system and submit their donations.
- Inventory Management: This module tracks the stock of relief supplies. Relief supplies will be identified by unique numbers. Using these unique numbers, the inventory system can keep track of items. The inventory module can also view requests and match them with items on hand.
- Logistics Management: This module manages the flow of relief supplies from S.O.S. to disaster victims.
- Procurement Management: This module takes care of all the processes that are part of procuring relief supplies that disaster victims require but cannot be fulfilled through donations.
- Performance Management: This module collects information from each of the other modules. It generates performance reports so that S.O.S. can assess its performance.

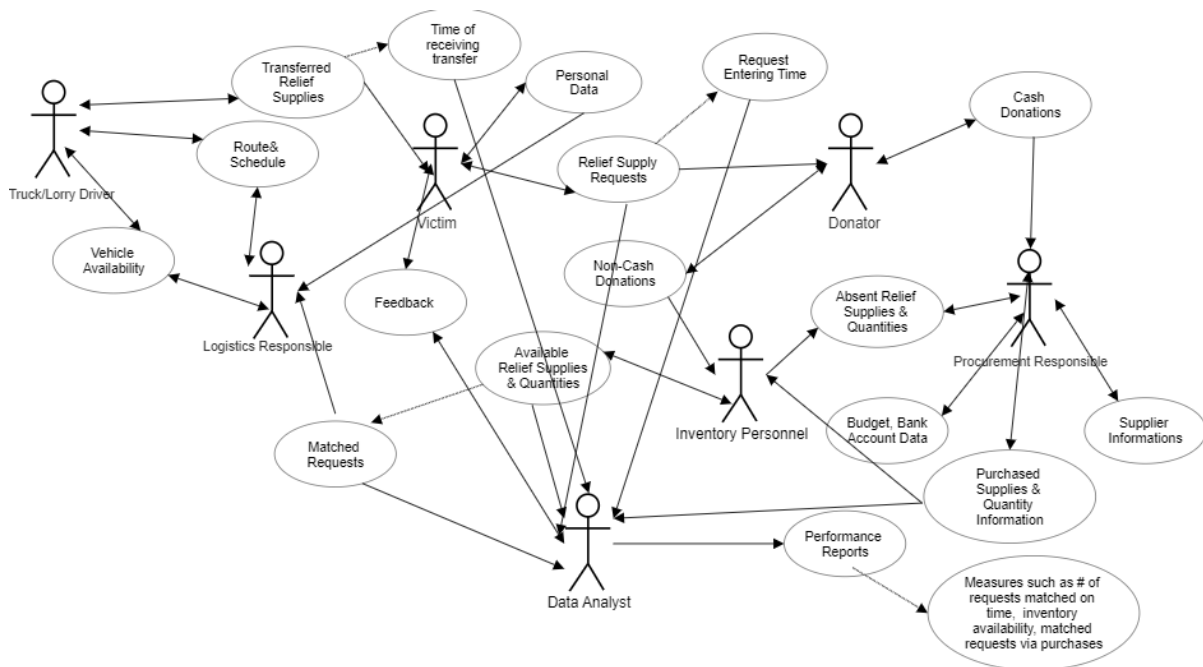


Figure 1. Use Case Diagram For the Overall System

In Figure 1, one can see the actors and their relationship within the information system. In addition to the relationship between the actors one can see the interdependencies between the modules in the following figure below.

Specifically, the information flow between and within the modules is depicted in the following figures. Figure 2 shows the information flow for the request management module. Once a disaster victim joins the system, s/he is given a unique RequesterID, with which their personal information can be known. A disaster victim can also submit their request composed of a list of requested items and their amount. The system also keeps track of request time, current status, and delivery time for each request.

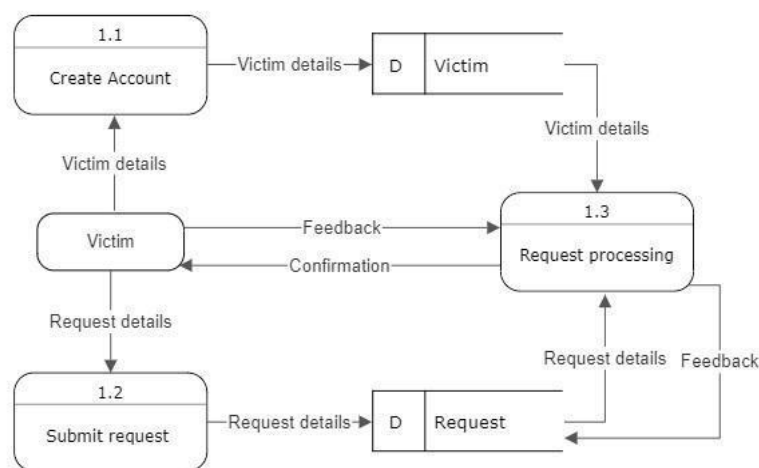


Figure 2. Data flow diagram for request management

S.O.S. will have a two-sided platform so that the donators also can join. Each donator is assigned a DonatorID associated with their personal information. For each committed donation, it is desirable to know its details. Specifically, each donation is given a specific DonationID. S.O.S. is determined to keep track of the donator, donation time, and delivery time for each donation. Furthermore, in some cases, the donator may directly fulfill an exact request, so such donations should also be associated with a RequestID. On the other hand, for remaining donations, the RequestID should be kept null. Note that each donation might include more than one item and the amount of an item in the donation could be more than one. Therefore, donation details are kept separately, including donated items and their amounts. If the donation is in the form of cash, its currency should also be specified.

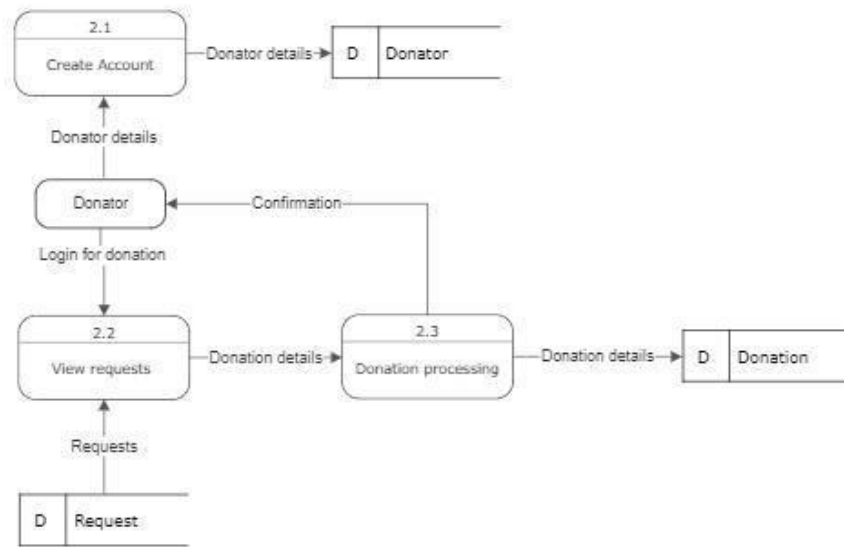


Figure 3. Data flow diagram for donation management

In S.O.S' inventory, different types of items collected for disaster victims are identified by unique ItemIDs indicating their name, item category, and amount. Items are characterized by six categories: (i) cash, (ii) shelter, (iii) hygiene, (iv) food, (v) clothing, and (vi) medical supplies. Note that all item categories are countable; in other words, their amount implies their quantity. For the cash category, the amount kept by S.O.S. is in T.L.s, but donations can be in different currencies. Hence, S.O.S. keeps track of currency exchange rates. The inventory is responsible for the processing of both donations and requests. This module also works with procurement by creating relief supply purchase requests and receiving orders from suppliers, as depicted in *Figure 5*. Relief supply purchases are driven by cash donations. The procurement module keeps the information about purchase transactions. S.O.S. might purchase more than one item at a time, and the amount of a purchased item could be more than one.

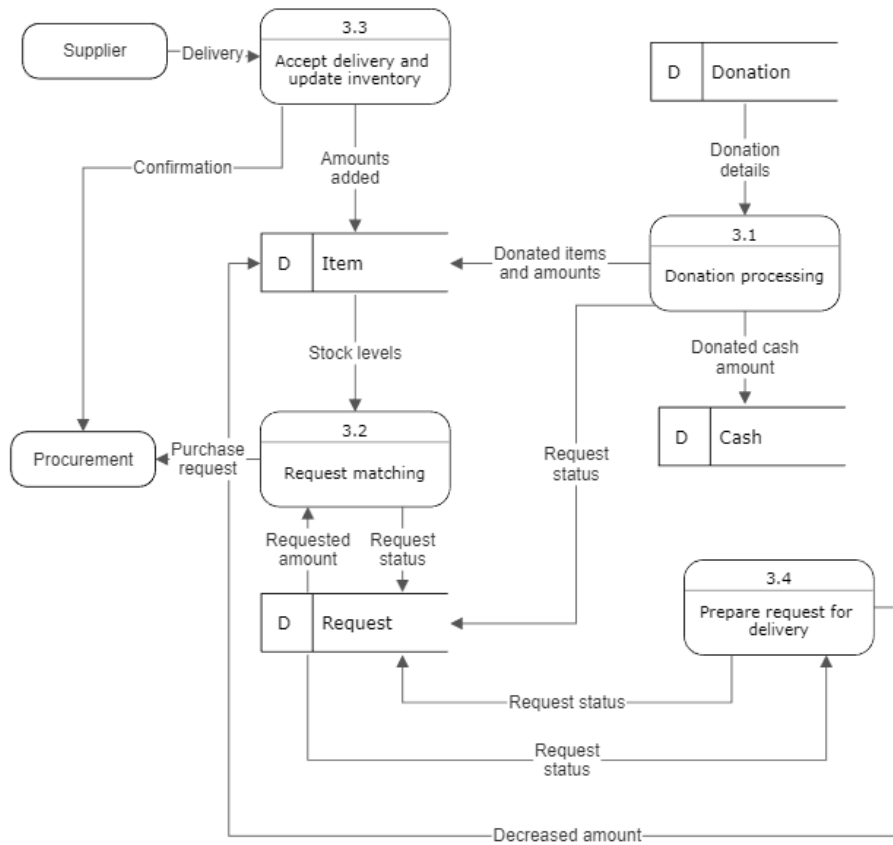


Figure 4. Data flow diagram for inventory management

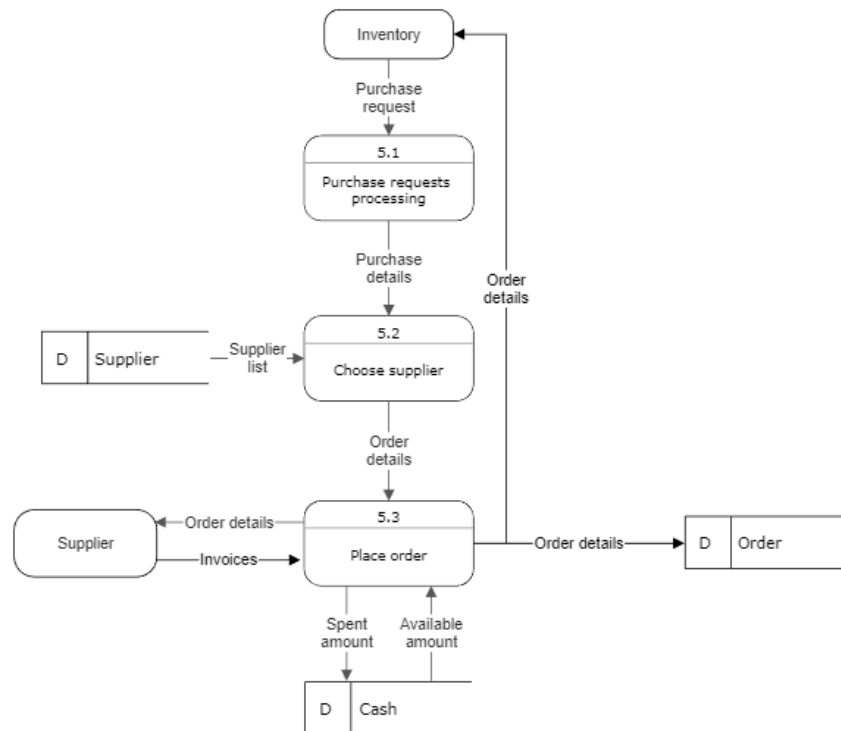


Figure 5. Data flow diagram for procurement management

S.O.S. is also responsible for the delivery of the items donated or purchased to requesters. S.O.S. is in charge of a wide geographic region. This region is divided into districts to facilitate logistics management. Each district is defined by a unique DistrictID designating its name, coordination, and population. S.O.S. is in collaboration with many logistics companies. Each company is responsible for preassigned districts. This information can be easily reached through CompanyID.

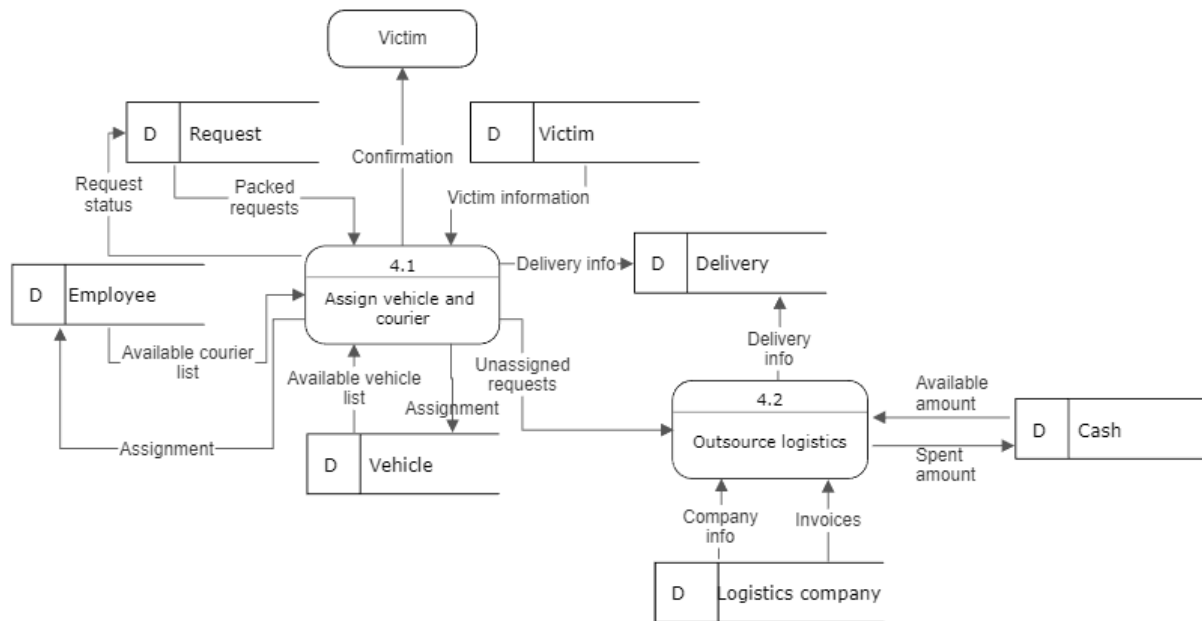


Figure 6. Data flow diagram for logistics management

Lastly, S.O.S. wants to monitor the performance of its operations. This is done through the performance management module. This module gathers data from each of the remaining modules and processes them to create reports. These reports are used to determine the most requested items in order to promote their donations, determine the response time to requests, determine the source of expenditure, etc..

For S.O.S.' I.S. to function, a massive amount of various types of data needs to be stored. You are given logical data flow diagrams related to each module and processes within them in the above. You are now expected to develop an appropriate data model and create a relational database for S.O.S.' I.S.

## 1. PROJECT PART 1.2

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You are required to develop an appropriate data model and create a relational database that meets the specified requirements of S.O.S..

- Determine the required entities. Construct an E.E.R. diagram showing the relations between them.
- Determine the required tables in the relational database. Specify the relations between them. While designing the relational database, please consider normalization rules.
- Design the SQL query that creates the relational database that you will propose.

## 2. SUBMISSION

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This is a **group** project of **six**. The deadline is Monday, **08-05-2023, 23:59**.

Upload (1) **your database model** in a .pdf file named as

**“Group\_Letter\_RDB.pdf”**

and (2) **your sql script** in a .sql file named as

**“Group\_Letter.sql”** on ODTÜClass.