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Lab 1: PostgreSQL

One example of a database that is in use today is the database implemented in regards to debit cards and bank accounts. When an individual withdraws or deposits money into his or her account, the bank updates it's database with new information regarding that customer. Some elements of data that a bank would need to store and keep track of would be an individual's account or card number, current account balance, date/time/place of a transaction, and amongst many other things, frequency of transaction. In general, a successful database must provide a context for the data it is tracking in order to transform numbers, figures, and whatever else the database might be storing, into useful information that can be analyzed and processed. For example, if a database were to have only two values: 200 and 100, without providing and context for what those values actually represent, they are nothing more than useless figures. Without any context an individual looking through a database would not know if they represent account balance, withdrawal amount, deposit amounts etc. Without any explicit context, the data fails to provide and useful insight into the meaning of that data, and proves to be useless as an analysis tool.

Once an organization like a bank can provide context for the data it collects, that data can become useful information that can either save or make the bank money. For example, if the national headquarters for Citibank tracks the profits made from all its locations on a national scale, and for each individual location there is a section of the database that describes what

community a specific location is in, an analysis might be able to discover a trend between what locations make the most money and what locations have a deficit. That analyst can then present that information to whoever may be in charge of the placing of new Citibank locations so he or she can better plan the construction of new branches.

The hierarchical model is a data model in which data is organized into a tree structure, where each ‘node’ is connected to another node by ‘links’. The data itself is stored in a ‘record’ which is a field that contains only one value. This database structure mandates that each child node can only have one parent node, but a parent node can have multiple children. In order for any data to be retrieved from this model, the entire structure must be traversed. The network model organizes data in a graph rather than a tree, in which, data vertices are connected through edges. In the network model there exists a more natural modeling of relationships between different entities of data. Both the hierarchical and the network model lose out to the relational model which organizes data on first-order predicate logic. The relational model provides a declarative method for specifying different types of data, meaning that users can directly state the information that they want the database to retrieve for them. It is implemented with the SQL language in which a table in a database corresponds to a variable, and the content of that table contains data relations. Finally, the relational model was the first database model that could be mathematically proven to be true and due to its intuitive structure and mathematical backing, was quickly accepted amongst programmers and businesses.