Database Systems

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Lab 1: PostgreSQL

I. Data vs. Information

One example of a database in use today that can be used as a guide for successful data storage and information output is *The Wayback Machine*, and archive of the internet as a whole beginning from around 15 years ago. The purpose of this database is to take data such as a string of letters (a web address), a snapshot of a webpage, and a meaningless series of numbers (a date in time) and put them together in order to give them context and provide information to the user. Individually, these pieces of data give very little to no information to the user. When put together, however, this data can aid in research of the history or evolution of the web, or even something as small as satisfying some nostalgia.

II. Data Models

Both the hierarchical and network data models are types of data storage and retrieval methodologies that predate the relational data model. The hierarchical data model derives its name from its child-parent structure, where there is a “parent” table that has multiple “children”, but “children” cannot have more than one “parent”. This gives us a tree-like visualization. The problem with this model was that while it could handle one-to-many relationships, it could not handle many-to-many as well due to duplication issues. The network data model, designed to improve on the hierarchical model, was made to handle many-to-many relationships better than the aforementioned hierarchical model. This model allows “child” tables to have multiple “parents”, therefore preventing duplication issues. Consistency issues eventually led to the

creation of the relational data model. Created by Dr. E. F. Codd, the relational data model proved superior to previous models because of the precision and flexibility of such a system, consisting of simple tables (relations) that hold similar information that contain no duplicate entities (rows). Because the data in an XML file is organized hierarchically so that relationships are readily obvious, it is clear that XML as a model for data storage only works in cases where a relational data model is not better than a hierarchical one. However, it would appear that in a majority of situations the relational data model comes out on top.

III. pgAdmin Tool