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Data Analysis and Design | 2014

Task 1 [A]

Introduction: Data Models

Data model describes the model of logical structure of database. According to Liberty University (n.d.) "A data model is a conceptual demonstration of the data structures that are required by a database." It describes collection of at least three database components, data structure, general integrity and rules of inference that to be applied to instance of database.

Data model represents how data are connected to each other and rules (constraints) applied. It also defines how data will be managed and stored in the system. In simple word it is planning structure of database system. This report will critically compare different data models such as hierarchical, network and relations data models.

Hierarchical Data Model

Hierarchical data model is oldest data model between three data models. In this data model data is organized in family tree or inverted tree model. This data model contains two segments, child and parent. It creates Parent Child Relationships between records. Hierarchical supports 1: N (one-to-many) relation meaning parent can have multiple (N) child but child can have only one parent. This model provides database security, data independence and integrity but tends to be complex as well as has limitation due to inability of one to many relationships.

Network Data Model

Like hierarchical model, network data model is also represented in family or inverted tree model. But the one of the key advantages of this type of data model is it is able to establish N: N (many to many) relationship. Network data model creates relationships called sets which consist of owner record type, member record type and set name. Member record type can have same role in different sets as well hence supports multi-parent concept which is its main advantage over first type of model. It is more flexible and supports more relations compared to hierarchical.

Relational Data Model

Relation data model is latest data model compared to other two. Unlike other two models, this data model is represented in two dimensional relations called tables. Column represents attributes or domain and Row represents record. This data model allows maintaining integrity constraints, data structure and storage-retrieval. Similar to network model, it allows relation between different tables but with more rules (integrity). Since it reduces data redundancy and supports normalization modern software are using this kind of model.

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