程序代写代做 CS编程辅导

Entity-Relationship Model – Part 1

Database Design Process

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IT Projects [1]

		2012	2013	2014	2015
SUCCESSFUL	25%	27%	31%	28%	29%
CHALLENGED	49%	56%	50%	55%	52%
FAILED	22%	17%	19%	17%	19%

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[1] CHAOS report by Standish Group, 2015

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- There can be many reasons, including:

  - Customers were not sure about what they wanted,
  - Requirements were not properly documented,
  - Improper development methodology was used,
  - Resources were not sufficient,
  - There were communication issues,
  - …

[1] CHAOS report by Standish Group, 2015

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The Tyre Swing Project

As proposed by
the project sponsor

...cified in the
... request

As designed by the
senior analyst

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What the user
wanted

Database Design – Four Phases

The database design process has **four phases**:

1. **Requirements Collection and Analysis**

2. **Conceptual Design**

3. **Logical Design**

4. **Physical Design**

Phase 1: Requirements Collection and Analysis

- **Requirements collection and analysis** is the process of collecting and analyzing data required by the organization so as to provide database solutions that fulfill business needs of the organization.

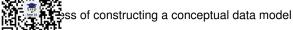- Compilation of data requirements includes:

    - a description of data used or generated;

    - details of how data is to be used/generated;

    - any additional requirements for new database system;

    - …

Phase 2: Conceptual Design

- **Conceptual design** is the process of constructing a conceptual data model that is

    - modeled at a high level of abstraction;
    - sufficiently simple and often graphical;
    - used to communicate the requirements of a database with nontechnical users.

- A conceptual data model is built using the information in users' requirements specification.

Note: The conceptual design is based on **the entity-relationship model** in this course.

Phase 3: Logical Design

- **Logical design** is the [process] of constructing a logical data model (e.g. relational or object-o[riented])

- A conceptual data model is translated onto a logical data model, which can be further refined (e.g., normalisation) to meet the data requirements. For example,

    - **From:** An ER model.

    - **To:** Relations with their primary and foreign keys, which facilitates SQL to deal with retrieving, updating and deletion.

Note: The logical design is based on **the relational data model** in this course.

Phase 4: Physical Design

- **Physical design** is the process of implementing the logical data model in a specific database management system (DBMS).

- Assume that the logical data model is the relational data model. Then the physical design is to translate relations to a DBMS that involves:

  - Selecting the files in which to store the relations.
  - Deciding which indexes should be used to achieve efficient access.
  - Describing the integrity constraints and security measures.
  - ...

- The decisions made during the physical design phrase affect the performance and accessibility of the database.

  Note: Details of this topic are out of the scope of our course.

Database Design Process