

DATA MODEL CONCEPTS

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Design categorization

- + Data Base design is three phased
- + Requirements Determination
- + Conceptual Or Logical design
- + Physical design

DATA MODEL

- + A data model is a model describing the data in an organization
- + Abstraction tool
 - Abstracts essential qualities of a dataset
- + Data modeling is the process of abstraction and documentation using a data model

Requirement Specification

- ✚ Determination of the data requirements (views) of individual users & applications

For e.g.

- 😊 Project building process /customer
- 😊 requirements specs

Conceptual (Logical) Design

- + Integration of the individual user (customer) & application (s/w) views into an overall conceptual views.
- + Customer reviews – Conflict resolution.
 - 2 types:
 - ☺ Unconstrained/Natural Conceptual Design
 - ☺ Constrained/Conceptual Design

Physical Design

- + The internal structure of the database
- + Translating the Conceptual Design(previous steps) into physical structures; basically stacks, queues etc...

Abstraction Hierarchy

+ Data abstraction creates hierarchies of abstractions along 2 dimensions

☺ Aggregation

☺ Generalization

+ Aggregation

Identifies a data item as a part of a higher level, more aggregate descriptor
e.g. Project -> Project -> Assignment

Abstraction Hierarchy

+ Generalization

It creates categories into which a data item may be classified

e.g. Employee can be categorized into age

😊 Type of job

😊 Type of pay plan, etc...

Data Model Categorization

- + Conceptual Model:
 - designed to promote user understandable
 - + Specifications of data.
 - Physical Model
 - designed to aid in physical database design.
 - Info logical
 - for human understanding and requirements level.
 - + Data logical
 - deals with physical and database implementation.
- Some models can contain elements of both models.

Logical Data Structure Definition

+ Terms used in Data definition

Entity: Any type of "thing" about which info. Is being maintained.

Attribute: A characteristic of an entity.

Instance: instance of an entity or relationship.

Relationship: Association between entities.

Identifiers: Set of attributes which uniquely identify an instance of an entity or relationship.

An Example

+ EMPLOYEE is an entity

A person who works for the company is an instance of EMPLOYEE.

His/her age is an attribute of the entity type.

Employee OF company, here "of" is a relationship.

Employee Id is an identifier.

Relationships

- ✚ Three types amongst activities recorded during conceptual data modeling. has adverse effects on the physical database design

Basically



1:1



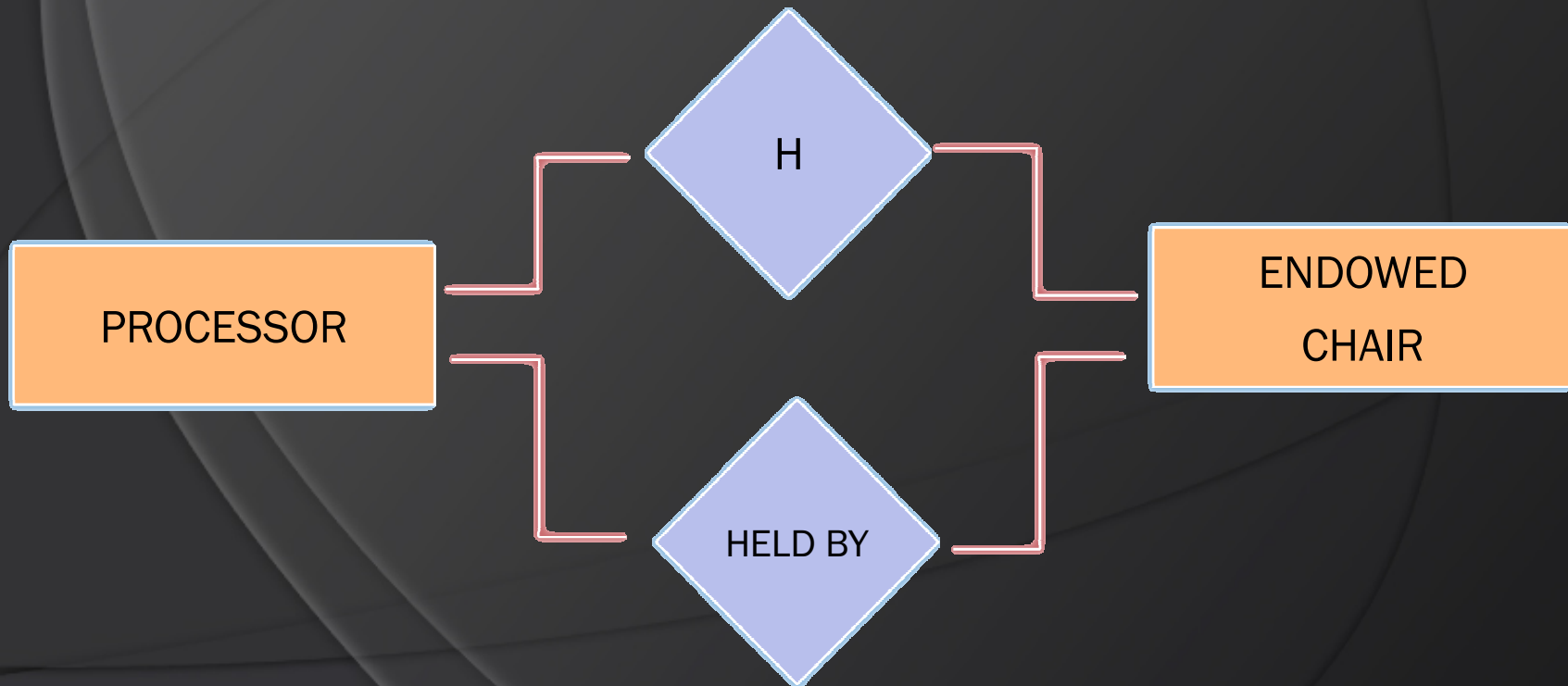
1:M



M:N

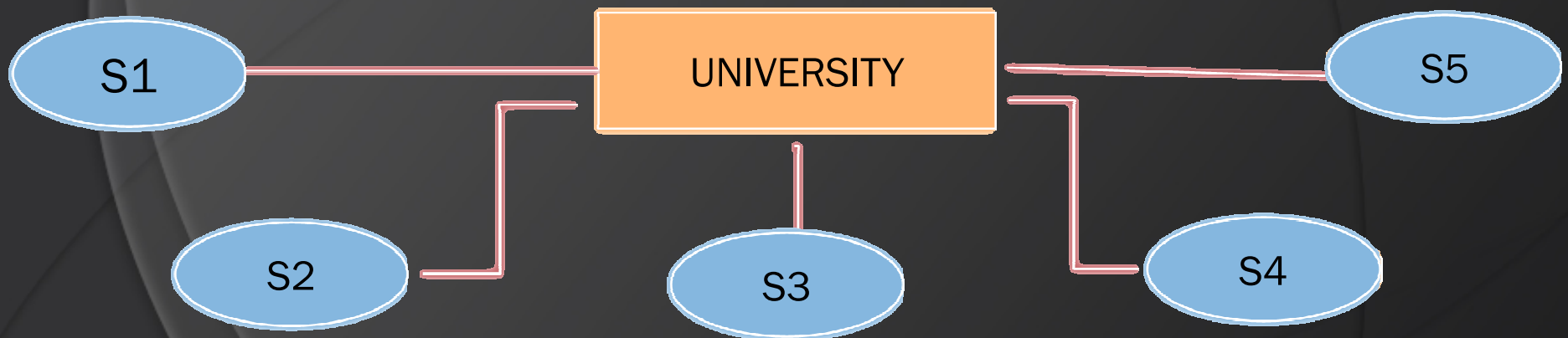
1:1

- + Instance of an entity has a given relationship with only one instance of a 2nd entity.



1:M

- + An entity has relationships with many instances of another entity.

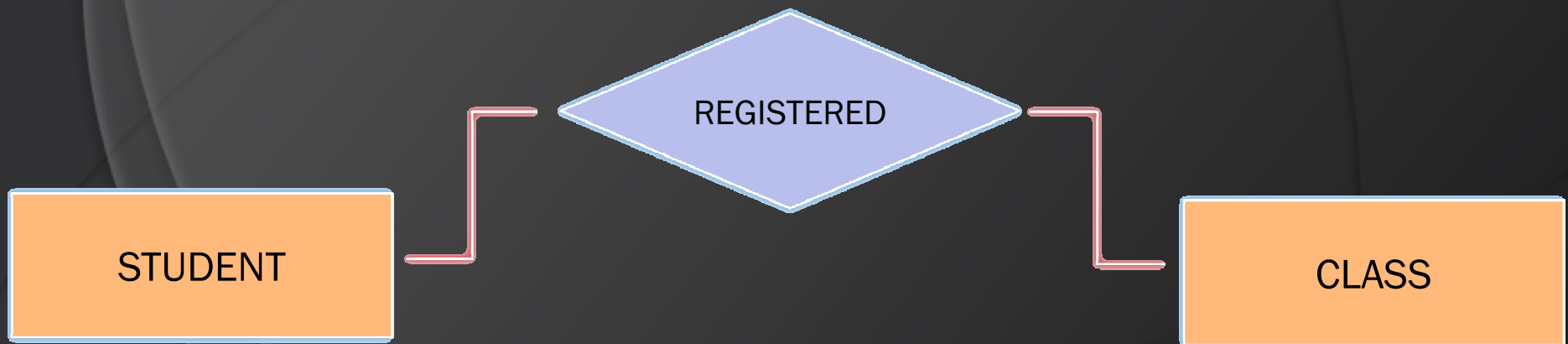


☺ University -> many students

☺ Students -> one university.

M:N

- ✚ An entity has relationships with many instances of another entity and vice-versa.



Constraints

- + Defines conditions that must be met for the data to be complete and correct.
- + Three types:
 - On values
 - On dependencies
 - On referential integrity
- +
 - Values: allowable, valid values for attribute
 - Dependencies: allowable values for attributes may depend on some other value.
 - E.g. allowable values for an employee skill classification are a part of allowable skills of the department he/she works in.

Referential integrity

- + Entities and relationships often have reference conditions that must be met.
- + A sales order; for an order to exist there must be a customer.

Schemas & Mappings

Schemas

- + Defines categories of data and their property.
- + A schema is an outline or representation of a plan, a theory, or an assignment.
- + Classification
 - External (User's view)
 - Conceptual (Overall logic)
 - Internal schema or Data storage Defn.
(Physical organization)

External Schema

- + Also known as user's schema(appl prg/ person formulating a query) is concerned with only a small portion of the database
- + It's the user view of data being used in the system.
- + Only a very few of the total entities or its attributes are taken into consideration.

Conceptual Schema

- + The logical view of the Database

The closest view of the real entities and their relationships.

- + Contains integrity rules & authorization rules.
But no data about how data is stored in the Database.

Internal Schema

- + Describes how the database is organized for physical storage and access.
- + Includes information on ordering of records, block sizes, storage indexes, use of pointers and access strategies being used.

Mapping

- + Translations from one schema to another.
For user access of data
- + the user view of the data as shown in the external schema must be translated into the overall conceptual schema. This is done by external\conceptual mapping.
- + In the same way conceptual\internal mapping translates logical descriptions of data in the conceptual schema to physical location and access paths in the internal schema.

Thank You!!!

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