



Design

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Goals

1. Review Normalization
2. Introduce UML
3. Practice!

Dependencies

Functional Dependency

- A functional dependency is a relationship between two sets of attributes in a database, where one set (the determinant) determines the values of the other set (the dependent).
- Example: primary key

Dependencies

Full Functional Dependency

- dependent attributes are determined by the determinant attributes
- Example:
employee ID determines employee Name and Address

Dependencies

Partial Functional Dependency

- dependent attributes are partially determined by the determinant attributes
- Example:
 - employee ID determines employee Name but not necessarily Address

Dependencies

Transitive Functional Dependency

- dependent attributes are determined by a set of attributes that are not included in the determinant attributes
- Example:
 - employee ID determines employee Department
 - which determines employee Salary

Normalization

First Normal Form

- 1NF
- every table has a primary key
- all data is atomic
- Atomic Example:
address with city and state or address, city, state

Normalization

Second Normal Form

- 2NF
- table is in 1NF
- all non-primary key attributes are functionally dependent on the primary key

- Example:

Employee ID -> Employee Name, Address, etc.

Normalization

Third Normal Form

- 3NF
- the table is in 2NF
- all non-primary key attributes are not functionally dependent on any non-primary key attributes

- Example:

Tournament winners			
<u>Tournament</u>	<u>Year</u>	Winner	Winner's date of birth
Indiana Invitational	1998	Al Fredrickson	21 July 1975
Cleveland Open	1999	Bob Albertson	28 September 1968
Des Moines Masters	1999	Al Fredrickson	21 July 1975
Indiana Invitational	1999	Chip Masterson	14 March 1977

Normalization

Third Normal Form

- 3NF
- the table is in 2NF
- all non-primary key attributes are not functionally dependent on any non-primary key attributes

- Example:

Tournament winners

<u>Tournament</u>	<u>Year</u>	Winner
Indiana Invitational	1998	Al Fredrickson
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Des Moines Masters	1999	Al Fredrickson
Indiana Invitational	1999	Chip Masterson

Winner's dates of birth

<u>Winner</u>	Date of birth
Chip Masterson	14 March 1977
Al Fredrickson	21 July 1975
Bob Albertson	28 September 1968

UML

Unified Modeling Language

It is a general-purpose modeling language that is intended to provide a standard way to **visualize** the design of a system. UML provides a **standard notation** for many types of diagrams.

Another tool for programmers to communicate with each other.



UML Activity

UML Activity

What are the compartments of a Class Diagram?

UML Activity

What are the compartments of a Interface Diagram?

UML Activity

What are the compartments of an Interface Diagram?

UML Activity

What are the marks for “visibility”?

UML Activity

How do you indicate Inheritance?

UML Activity

How do you indicate Aggregation?

UML Activity

Draw a UML diagram representing a simple system for People and their Pets.

Next Class

Module:

Week 5: Background, Ch 4

Topic:

Relational Algebra

