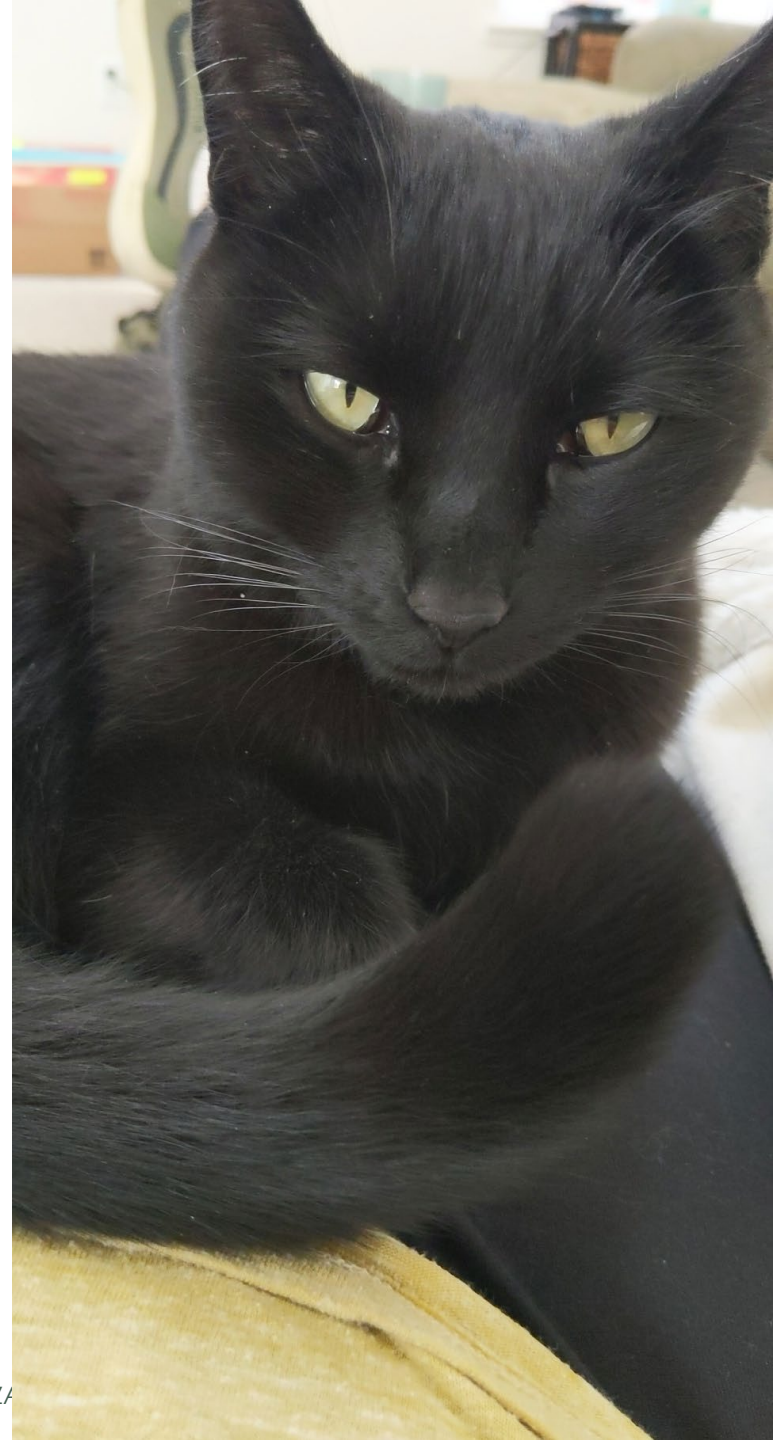

# Design

ERIN KEITH

# 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**

| Tournament | Year | 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**

| Tournament | Year | 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**

| Winner | Date of birth |
|---|---|
| Chip Masterson | 14 March 1977 |
| Al Fredrickson | 21 July 1975 |
| Bob Albertson | 28 September 1968 |

# UML

**U**nified **M**odeling **L**anguage

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**