Tutorial 1
CS4.301: Data and Applications

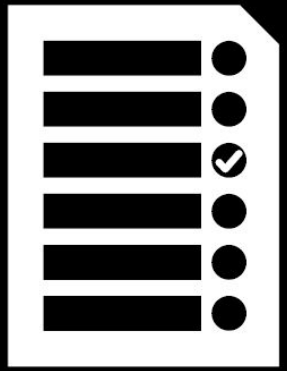
1st October, 2025

Agenda

- The Database Design Process
- Course Project
- Administrative Stuff

Database Design Process: First 3 steps

Miniworld / UoD



Data Requirements

Conceptual Design

Understanding the “mini-world”

- **What is a Mini-world / Universe of Discourse (UoD)?**
  - It's the specific part of the real world that your database will focus on.
  - The first and most important step is to define its **boundaries**: what is included and what is not.
- **Examples:**
  - **A University:** Includes students, professors, courses, and enrollments. It might exclude staff payroll or campus maintenance.
  - **A Clinic:** Includes patients, doctors, and appointments. It likely excludes the pharmaceutical supply chain.
  - **A Social Media App:** Includes users, posts, and comments. It might exclude the company's internal HR data.

Defining Data Requirements

Once your mini-world is defined, you must figure out what data you need to capture. This involves interviewing potential users and analyzing how they use information.

Key Questions to Ask:

- **What** are the main objects or concepts in this world? (e.g., "Students", "Courses")
- **What** do we need to know about these objects? (e.g., For a "Student", we need their name and student ID).
- **How** do these objects interact with each other? (e.g., A "Student" enrolls in a "Course").
- **What** tasks will the system perform? (e.g., "Find all students in a specific course").

Data Requirements for a University Mini-world

- **Main Objects (Entities)**
  - Students, Professors, Courses
- **Information about them (Attributes):**
  - **Student**: Student ID, Name, Major, Email.
  - **Professor**: Professor ID, Name, Department, Office.
  - **Course**: Course Code, Title, Credit Hours.
- **Interactions (Relationships):**
  - A Professor **teaches** a Course.
  - A Student **enrolls** in a Course.
  - A Professor **advises** a Student.

Course Project

(25% of the course total)

Project Overview

- **Objective:** To Design and Implement a complete Database System of a Mini-World taken from any fantasy world/media of your choice.
- **Phase Division:** The project is split into 4 phases:
  a. Requirements Specification (5%)
  b. ER Model (5%)
  c. Relational Database Design (5%)
  d. SQL Implementation (10%)

Phase I: The Requirements Document

Objectives

- Define a Mini-world
- Define the entity types of the mini-world
- Understand how they interact with each other
- Translate these interactions into relationships
- Define boundaries
- Define basic system behavior

This document is the foundation of your entire project. A strong requirements document leads to a strong database design!

Phase I: The Requirements Document

Sections

- **Introduction**
  - Define your mini-world, set boundaries.
- **Purpose of the DB**
  - Why does the DB exist? What does it offer that non-DB solutions don't?
- **Users of the DB**
  - Who uses it? What do they do with it?

Phase I: The Requirements Document

Sections

- **Database Requirements:**
  - List the main entities and the attributes you plan to store for each one.
- **Functional Requirements:**
  - Describe the tasks the database system must perform.
  - This is often a list of **accessing**, **searching**, **reporting**, and **sorting** operations (which will later become queries).
  - **Example Functional Requirements:**
    - "The system must allow a user to search for a book by its title or author."
    - "The system must generate a monthly report of all sales, grouped by product category."

Administrative Stuff

- **Teams**
  - 3 people in a team. Team formation form already released on Moodle.
  - Will remain the same throughout the duration of the project.
- **Approaching TAs**
  - TA office hours shared on Moodle.
  - For all queries/doubts that might benefit others, please post on Moodle.
  - For anything specific to you/your team, please reach out by email.
  - Be formal. Do not expect answers to queries on WhatsApp.
- **Late Days**
  - 3 late days in total over the course of 4 submissions.

Any Questions?

We'd be happy to answer