BEFORE: Monolithic Design

Main

students: Map<String, Student>
courses: Map<String, Course>
auditLog: List<String>

+main(String[])
+ menuLoop()
+ addStudentUI(Scanner)
+ addCourseUI(Scanner)
+ enrollUI(Scanner)
+ dropUI(Scanner)
+ listStudents()
+ listCourses()
+ loadAll()
+ saveAll()
+ loadStudents() ← Mixed concerns
+ saveStudents()
+ loadCourses()
+ saveCourses()
+ loadEnrollments()
+ saveEnrollments()

contains   contains

Student

ID
NAME
EMAIL

Course

code
title
capacity
roster: List
waitlist: List
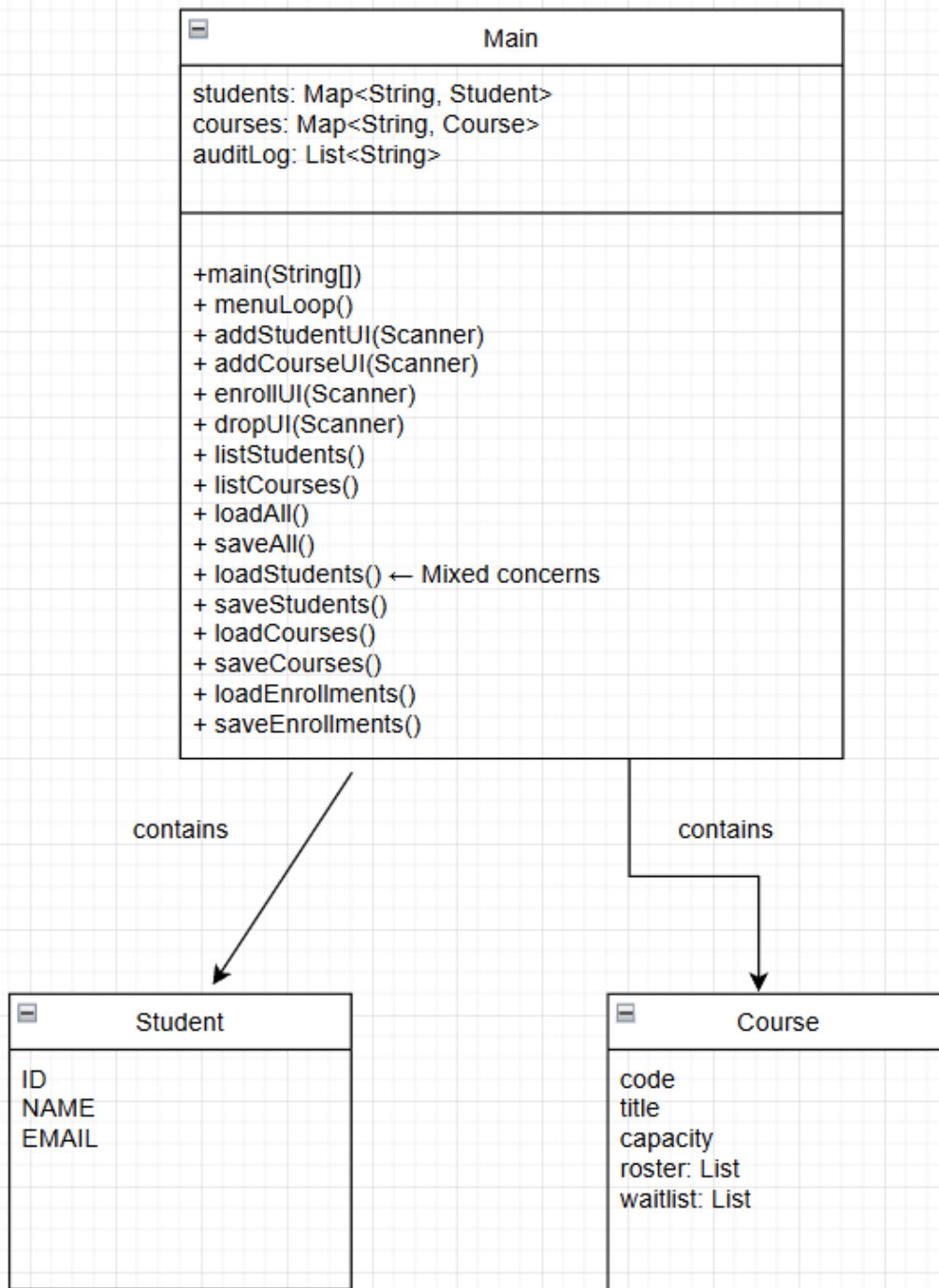
Problems:
Everything in one class
UI + Business Logic + Data Access all mixed
Global static state
Impossible to test

Violates all SOLID principles

Now : Layered Architecture

```
┌─────────────────────────────────┐
│              Main               │
│     (Dependency Injection Only) │
└─────────────────────────────────┘
                │
             creates
                ▼
┌─────────────────────────────┐
│         CliApplication      │         UI Layer
├─────────────────────────────┤
│ - service                   │
├─────────────────────────────┤
│ + run()                     │
│ + addStudentUI()            │
│ + enrollUI()                │
└─────────────────────────────┘
                │
              uses
                ▼
┌─────────────────────────────┐
│      RegistrationService    │         Business Layer
├─────────────────────────────┤
│ - studentRepo               │
│ - courseRepo                │
│ - enrollmentRepo            │
├─────────────────────────────┤
│ -+ addStudent()             │
│ + enrollStudent()           │
│ + dropStudent()             │
└─────────────────────────────┘
                │
              uses
                ▼
┌─────────────────────────────┐
│     Repository Interfaces   │
├─────────────────────────────┤
│ StudentRepository           │
│ CourseRepository            │
│ EnrollmentRepository        │
└─────────────────────────────┘
                │
         implemented by
                ▼
┌─────────────────────────────┐
│   CsvStudentRepository      │
│   CsvCourseRepository       │
│   CsvEnrollmentRepository   │
└─────────────────────────────┘
                │
            manages
                ▼
┌─────────────────────────────┐
│  ▤   Domain Models          │         Model Layer
├─────────────────────────────┤
│ Student                     │
│   Course                    │
│   Enrollment                │
└─────────────────────────────┘
```