

# Assignment 3: Command

**Time Estimate:** 8 Hours

**Due:** End of Week 15

**Course:** Design Patterns

**Chapters Covered:**

- 16.6, 16.7, 17.1, 17.2, and 17.3

## INSTRUCTION

This assignment focuses on applying Model-View-Controller (MVC) principles and improving an existing design through structured refactoring. You will analyze system components, separate concerns, and propose practical changes to increase maintainability.

## TASK

### a. MVC Design (3 hours)

- Choose a simple system (e.g., to-do app, calculator, game menu).
- Define the **Model**, **View**, and **Controller** components.
- Create:
  - A **UML Class Diagram** with MVC components labeled.
  - A **Sequence Diagram** showing a complete user interaction.

**b. Refactoring Plan (3 hours)**

- Assume that the system is currently **tightly coupled**.
- Identify **3 areas** for refactoring:
  - One for **flexibility** (e.g., use interfaces).
  - One for **reuse** (e.g. extract method / class).
  - One for **testability** (e.g., decoupling logic from UI).
- For each:
  - Describe the **problem**.
  - State the **refactoring** (name it).
  - Provide updated **UML snippet** (if applicable).

**c. Tool Use + Reflection (2 hours)**

- Research and explain how one tool (e.g. IntelliJ, Eclipse) helps with refactoring.
- Reflect:
  - Which refactor would have the **biggest impact**?
  - How would these changes affect **future development**?

## SUBMISSION DETAILS

- **Submit via:** Canvas LMS
- **File Naming Convention:**

`StudentID_Assignment3_CS4213Fall112025`

- Submit a PDF or ZIP file that includes:
  - UML Class and Sequence Diagrams
  - Refactoring Plan
  - Tool description + Reflection

**Late work subject to the standard course penalty. Peer review is not required for this assignment.**