Design Pattern Intro & MidTerm Review
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Why design patterns?

- Ease communication by using a shared **vocabulary**
- Leverage existing design knowledge
- Enhance **flexibility** for future change
- Increase **reusability** of developed code
Motivational example
MidTerm Review

Intended Learning Outcomes:

“Critique an existing architecture or design.”

“Differentiate how various architectural styles and design patterns enhance and degrade functional- and non-functional properties.”

“Generate and justify and architecture and/or design given a collection of requirements.”

“Produce and present concise and unambiguous architecture and design descriptions.”

“Create and implement an architecture and design, refining it into a complete system.”
ILO 1: Critique

“Critique an existing architecture or design.”

So what is architecture?

“The set of principal design decisions”

- Focuses on those decisions that are hard to change once the system is built.

- Components, connectors, topology.
ILO 1: Critique

“Critique an existing architecture or design.”

Why is architecting software hard?

What has improved complexity?
ILO 1: Critique

“Critique an existing architecture or design.”

Example:

Given GWTs architecture, what is one benefit of 2nd generation web apps compared to GWT-based web-apps?
ILO 2: Differentiate

“Differentiate how various architectural styles and design patterns enhance and degrade functional- and non-functional properties.”

What is an architectural style?

What is a design pattern?
ILO 2: Differentiate

“Differentiate how various architectural styles and design patterns enhance and degrade functional- and non-functional properties.”

Abstraction:

Separation of concerns:
ILO 2: Differentiate

“Differentiate how various architectural styles and design patterns enhance and degrade functional- and non-functional properties.”

FPs:

NFPs:

Covered Styles:
ILO 2: Differentiate

“Differentiate how various architectural styles and design patterns enhance and degrade functional- and non-functional properties.”

Security:

Security Arch Principles:
ILO 3: Generate and Justify

“Generate and justify and architecture and/or design given a collection of requirements.”

Analysis vs design:

Example: Apply your knowledge of architectural styles to architect a system that allows the application to dynamically shift computation resources as the system executes. Provide a component diagram. Justify your selection of architectural style.
ILO 3: Generate and Justify

“Generate and justify and architecture and/or design given a collection of requirements.”

Example:

The OSI network model has been successfully leveraged for many years; how has its architecture influenced the success of the standard network stack?
ILO 4: Produce and Present

“Produce and present concise and unambiguous architecture and design descriptions.”

Alternative views:

Statechart diagram
Component diagram
Sequence diagram
Deployment diagram
ILO 4: Produce and Present

“Produce and present concise and unambiguous architecture and design descriptions.”

Example:

- Create a component diagram for an event-based system that has a Producer component and a Consumer component connected to an event bus.
ILO 5: Create and Implement

“Create and implement an architecture and design, refining it into a complete system.”

This is really about the project.