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# REVIEW

# Jeopardy Game

- Instructions:
  - clue is stated
  - raise your hand
  - you state the *question* (in that form)
  - not really final exam questions
  - but an interesting, "competitive" review of software engineering concepts and terms

# OOAD

- Clue:
  - An object-oriented programming language, invented by James Gosling.

- Question:
  - What is Java?

# OOAD

- Clue:
  - A visual design notation, that's "unified".

- Question:
  - What is UML?

# Process

- Clue:
  - Making sure you develop the system right.

- Question:
  - What is verification?

# Process

- Clue:
  - Making sure you develop the right system.

- Question:
  - What is validation?

# Process

- Clue:
  - Three approaches of software prototyping.

- Question:
  - What are throwaway, incremental, evolutionary?

# Process

- Clue:
  - The system is delivered in a series of releases or builds.

- Question:
  - What is staged delivery?

# Process

- Clue:
  - In Extreme Programming, code should conform to these rules.

- Question:
  - What are coding conventions?

# Process

- Clue:
  - A practice where production code is written with two programmers actively at one machine.

- Question:
  - What is pair programming?

# OOAD

- Clue:
  - Simplifying to its essentials the description of a real-world entity or concept.

- Question:
  - What is abstraction?

# OOAD

- Clue:
  - Bundling data with access functions, in a way that distinguishes "what" from "how".

- Question:
  - What is encapsulation?

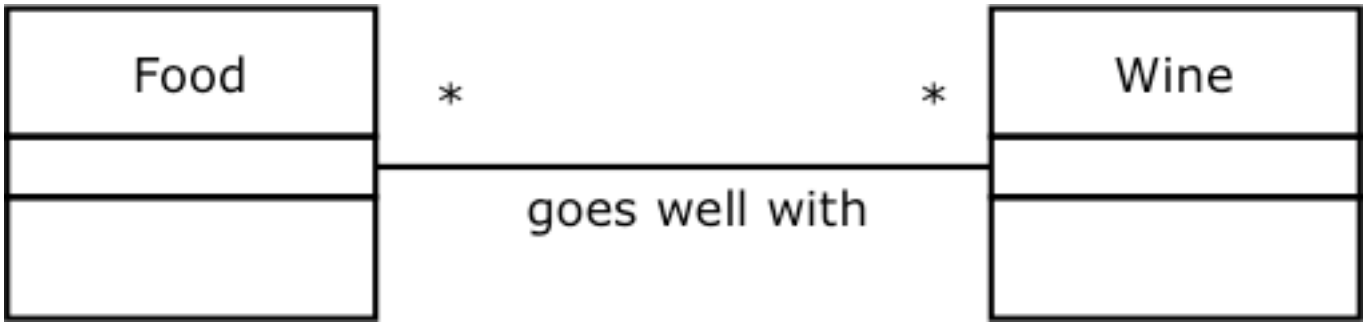
# OOAD

- Clue:
  - Revealing assumptions through interfaces and hiding changeable internal details.

- Question:
  - What is information hiding?

# OOAD

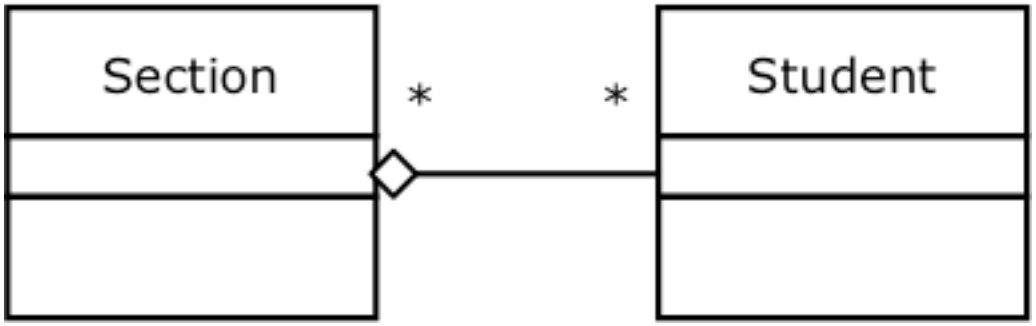
- Clue:
  - "Some" relationship between parts.




- Question:
  - What is an association?

# OOAD

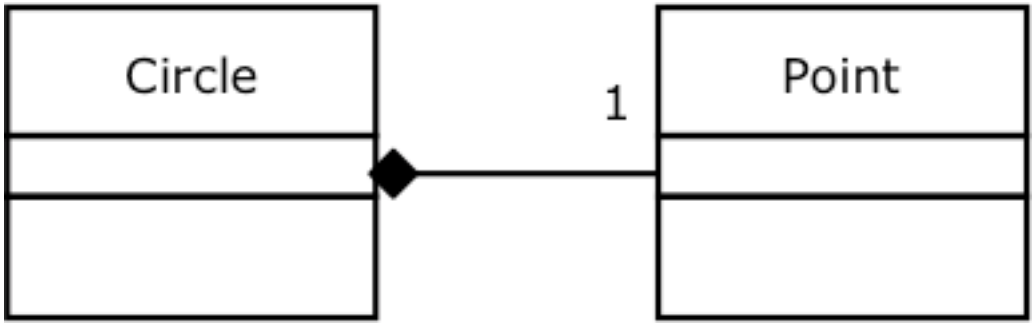
- Clue:
  - A weak "has-a" relationship.




- Question:
  - What is an aggregation?

# OOAD

- Clue:
  - Contained instances are exclusive to the container in this kind of UML relationship.




- Question:
  - What is a composition?

# OOAD

- Clue:
  - Looking for conceptual commonalities in abstractions.

- Question:
  - What is generalization?

# OOAD

- Clue:
  - In Java, this can be considered a "contract", specifying a capability that implementing classes must provide.

- Question:
  - What is an interface?

# OOAD

- Clue:
  - If this test fails, inheritance is likely not appropriate.

- Question:
  - What is the is-a test?

# OOAD

- Clue:
  - A candidate subclass should be substitutable anywhere a reference to a superclass object is used, according to this principle.

- Question:
  - What is the Liskov substitution principle?

# OOAD

- Clue:
  - Treating different objects in a uniform manner in a common algorithm.

- Question:
  - What is polymorphism?

# OOAD

- Clue:
  - This kind of class cannot be instantiated.

- Question:
  - What is an abstract class?

# OOAD

- Clue:
  - The method to run is selected at run time, depending on the type of the receiving object.

- Question:
  - What is dynamic binding?

# OOAD

- Clue:
  - This widening type of cast is safe due to the principle of substitutability.

- Question:
  - What is an upcast?

# OOAD

- Clue:
  - Using index cards to assist object-oriented analysis.

- Question:
  - What is CRC design?

# OOAD

- Clue:
  - One should reduce this between classes.

- Question:
  - What is coupling?

# OOAD

- Clue:
  - Time flows downward in this UML diagram to express behavior between objects.

- Question:
  - What is a UML sequence diagram?

# OOAD

- Clue:
  - Each object in a UML sequence diagram plays this in a group of collaborating objects.

- Question:
  - What is a role?

# Software Design

- Clue:
  - A design to maintain the consistency of the views of some data within an interactive application.

- Question:
  - What is MVC (model-view-controller)?

# Software Design

- Clue:
  - In Java, this interface is used with the Observable superclass.

- Question:
  - What is Observer?

# User Interface

- Clue:
  - According to Scott Adams, engineers, scientists, and programmers are not representative of these people.

- Question:
  - What are normal people?

# User Interface

- Clue:
  - Objects of interest in a graphical user interface should be visible, to exploit this cognitive ability.

- Question:
  - What is recognition?

# User Interface

- Clue:
  - This kind of design uses layout and color to help organize and communicate information economically to users.

- Question:
  - What is graphic design?

# User Interface

- Clue:
  - Because of this, color should not be the only way to distinguish visual elements.

- Question:
  - What is color blindness?

# Requirements

- Clue:
  - They may not know what is possible, or be able to express their needs.

- Question:
  - Who are users?

# Requirements

- Clue:
  - Required qualities, such as those -ibilities.

- Question:
  - What are non-functional requirements?

# Requirements

- Clue:
  - Requirements should be this, so tests can be designed to show the system fulfills them.

- Question:
  - What is verifiable?

# Requirements

- Clue:
  - This captures the goal, conditions, and steps of a coherent interaction between the users and the system.

- Question:
  - What is a use case?

# Requirements

- Clue:
  - Different types of users or roles in use cases.

- Question:
  - What are actors?

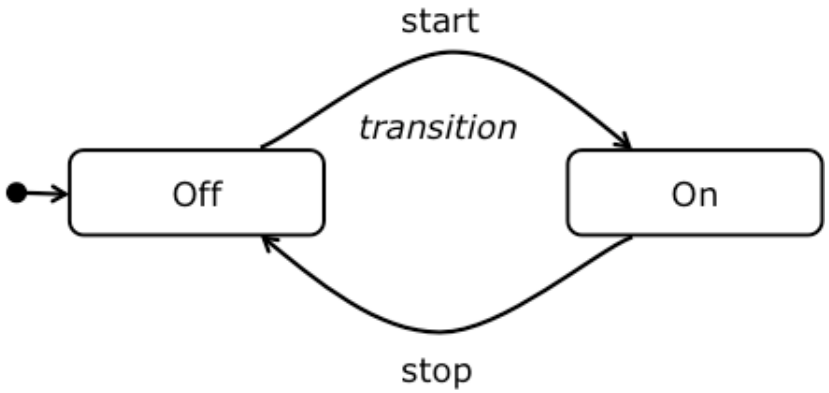
# Requirements

- Clue:
  - A way to specify a need often written in the form: as a «user role», I want «goal».

- Question:
  - What is a user story?

# Requirements

- Clue:
  - A UML diagram used to model the behavior of an object in response to external events.




- Question:
  - What is a UML state diagram?

# Testing

- Clue:
  - This leads to faults in work products, and may cause failures in running software.

- Question:
  - What is human error?

# Testing

- Clue:
  - This kind of testing is to prevent previous problems from reoccurring.

- Question:
  - What is regression testing?

# Testing

- Clue:
  - The correct way to test a theory is to seek this.

- Question:
  - What is to refute it?

# Testing

- Clue:
  - Use this technique to separate out dependency resolution from the constituent classes and enhance testability.

- Question:
  - What is dependency injection?

# Testing

- Clue:
  - A kind of testing object that mimics the real object but can be further instrumented.

- Question:
  - What is a mock object?

# Testing

- Clue:
  - A way of development where tests are generally written before the code.

- Question:
  - What is test-driven development?

# Testing

- Clue:
  - A commonly used Java framework for writing unit tests.

- Question:
  - What is JUnit?

- Clue:
  - A practical, proven solution to a recurring design problem.

- Question:
  - What is a design pattern?

# Design Patterns

- Clue:
  - This design pattern ensures a class only has one instance, and provides a global point of access to it.

- Question:
  - What is the singleton pattern?

# Design Patterns

- Clue:
  - This design pattern composes individual objects to form a tree structure, and treats individual and composed objects uniformly.

- Question:
  - What is the composite pattern?

# Design Patterns

- Clue:
  - This design pattern encapsulates a request as an object, so you can later undo/redo the request.

- Question:
  - What is the command pattern?

# Design Patterns

- Clue:
  - This design pattern defines the skeleton of an algorithm, deferring some steps to subclasses.

- Question:
  - What is the template method pattern?

# Design Patterns

- Clue:
  - An object whose main responsibility is to make other objects.

- Question:
  - What is a factory object?

# Design Patterns

- Clue:
  - This design pattern defines an interface for creating an object, but lets subclasses decide which class to instantiate.

- Question:
  - What is the factory method pattern?

# Design Patterns

- Clue:
  - This design pattern allows an object to alter its behavior when its internal state changes.

- Question:
  - What is the state pattern?

# Design Patterns

- Clue:
  - This design pattern adapts the interface of a class into another interface that clients expect.

- Question:
  - What is the adapter pattern?

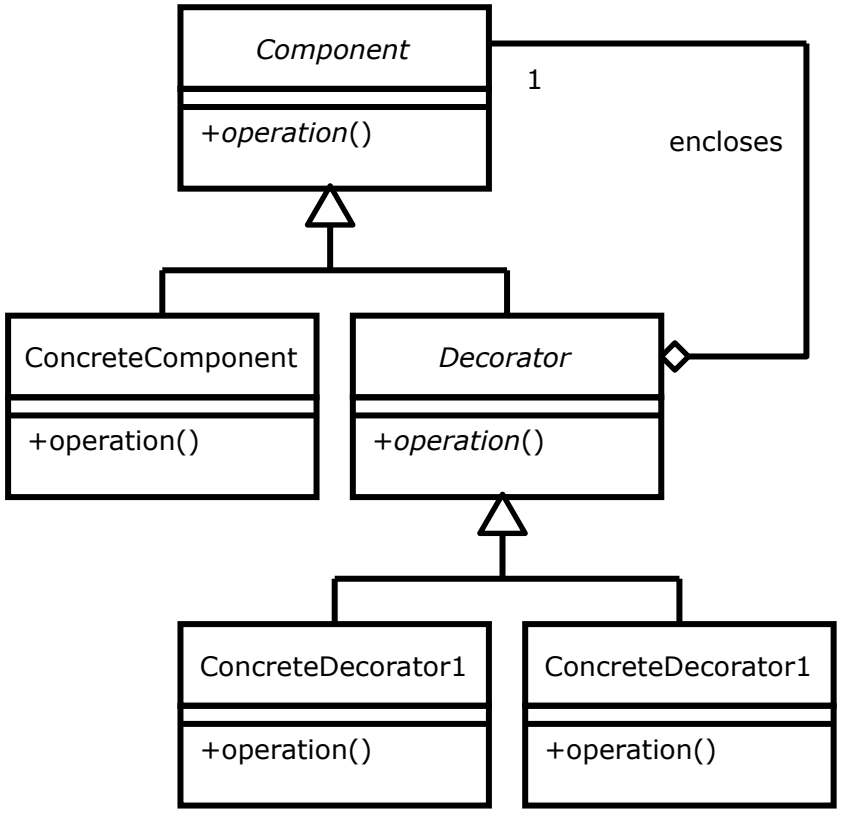
# Design Patterns

- Clue:
  - This design pattern provides a surrogate for another object, to control access to it.

- Question:
  - What is the proxy pattern?

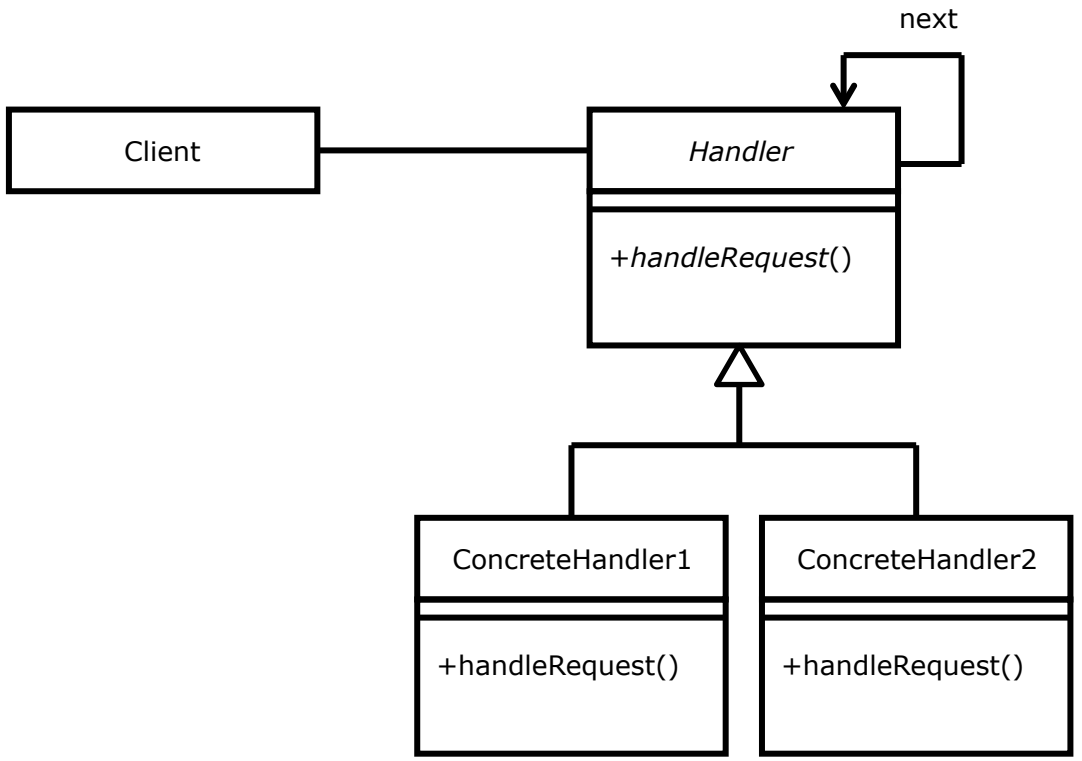
# Design Patterns

- Clue:
  -




- Question:
  - What is the decorator pattern?

# Design Patterns

- Clue:
  - 

- Question:
  - What is the chain of responsibility pattern?

# Design Patterns

- Clue:
  - In this design principle, classes should be open for extension but closed for modification.

- Question:
  - What is the open-closed principle?

# Design Patterns

- Clue:
  - In this design principle, depend on abstractions or generalizations, not on concrete classes.

- Question:
  - What is the dependency inversion principle?

# Design Patterns

- Clue:
  - In this design principle, for a class, reduce the number of classes it knows about and interacts with.

- Question:
  - What is the principle of least knowledge?

# Design Patterns

- Clue:
  - This law suggests the only methods that may be called, to conform with the principle of least knowledge.

- Question:
  - What is the Law of Demeter?

- Clue:
  - Change a software system so that the external behavior does not change but the internal structure is improved.

- Question:
  - What is refactoring?

# Refactoring

- Clue:
  - Risk is reduced in refactoring by proceeding in small steps and doing this after each step.

- Question:
  - What is testing?

# Refactoring

- Clue:
  - Indications that the code may need refactoring.

- Question:
  - What are code smells?

# Refactoring

- Clue:
  - Code with very complex, tangled control flow typified by lots of gotos.

- Question:
  - What is spaghetti code?

# Refactoring

- Clue:
  - A class that gets increasingly larger, which may indicate poor separate of concerns.

- Question:
  - What is a blob class?

# Refactoring

- Clue:
  - When a class is commonly changed in different ways for different reasons.

- Question:
  - What is "divergent change"?

# Refactoring

- Clue:
  - When making a change requires many little changes across many different classes or methods.

- Question:
  - What is "shotgun surgery"?

# Refactoring

- Clue:
  - When a method seems more interested in the details of a class other than the one it is in.

- Question:
  - What is "feature envy"?

# Refactoring

- Clue:
  - When using the built-in types too much rather than classes to represent concepts in the problem domain.

- Question:
  - What is "primitive obsession"?

# Refactoring

- Clue:
  - When code is created because "we might need it someday", which adds design complexity.

- Question:
  - What is "speculative generality"?

# Refactoring

- Clue:
  - When a subclass inherits something that is not needed.

- Question:
  - What is "refused bequest"?

# Refactoring

- Clue:
  - Potentially deodorant for bad smelling code.

- Question:
  - What are comments?

# Optimization

- Clue:
  - According to Donald Knuth, this is the root of all evil.

- Question:
  - What is premature optimization?

# Optimization

- Clue:
  - Do this first before tuning the code.

- Question:
  - What is profiling?

# Optimization

- Clue:
  - To reduce time, one uses more of this resource in caching or memoization.

- Question:
  - What is space?

# Optimization

- Clue:
  - An efficient method to evaluate a polynomial that reduces expensive multiplications.

- Question:
  - What is Horner's method?

# Optimization

- Clue:
  - Optimizing compilers fold and propagate these, because they do not change.

- Question:
  - What are constants?

# Optimization

- Clue:
  - A loop transformation to reduce the amount of loop housekeeping in each iteration.

- Question:
  - What is loop unrolling?

# Optimization

- Clue:
  - This converts interpreted bytecode to natively executed binary code at run time.

- Question:
  - What is a just-in-time compiler?

# Optimization

- Clue:
  - The 80/20 rule is also known as this principle.

- Question:
  - What is the Pareto principle?

# Optimization

- Clue:
  - In Java, use this class directly to append lots of strings more efficiently.

- Question:
  - What is StringBuilder?

# Optimization

- Clue:
  - An optimization where a method call is replaced with the actual body of the method.

- Question:
  - What is inlining?