

Red ID _____

Answer all 13 questions. Answer essay questions as briefly as possible.

The following might be names of patterns: Abstract Class, Abstract Factory, Active Object Model, Adapter, Application Controller, Bridge, Builder, Chain of Responsibility, Collaborator, Command, Composite, Decorator, Dependency Injection, Dynamic Factory, Extension Object, Façade, Factory Method, Flyweight, Interpreter, Iterator, Master-Slave, Mediator, Memento, MVC, Null Object, Observer, Property, Prototype, Proxy, Singleton, Schema, Smart Variables, Specification, State, Strategy, Template Method, Type Object, Value Object, Visitor.

In problems 1-4 provide only one pattern.

1. (2 points) What design pattern would you use to change the algorithm that an object uses?
2. (2 points) What design pattern would you use to add operations to classes without changing the class?
3. (2 points) What design pattern would you use to change how methods in a class behave?
4. (2 points) What design pattern might you use when you wish to reduce tight coupling between classes?
5. (12 points) What is a code smell? List three code smells.

6. (12 points) Circle the correct answer for each of the following.

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|------|-------|--|
| True | False | Mementos can be used in commands. |
| True | False | In the State pattern the Context should define the state transitions. |
| True | False | In the Visitor pattern adding new ConcreteElement classes is easy. |
| True | False | Command objects can perform the operation itself without delegating to a receiver. |
| True | False | Internal iterators are easier to implement then external iterators. |
| True | False | The Memento pattern allows the Originator to store a history of mementos. |
| True | False | The Composite pattern is often used in the interpreter pattern. |
| True | False | Mementos might be expensive. |
| True | False | In the interpreter pattern is it easy to extend grammar. |
| True | False | The interpreter pattern is not efficient. |
| True | False | Internal iterators are easier to implement then external iterators. |
| True | False | The composite pattern can make your design overly general. |
| True | False | The memento simplifies the originator |

7. (12 points) What can we learn from Dilbert about object-oriented programming? Select one pattern that supports this and explain how it supports this.

8. (10 points) Sometimes it can be difficult to tell if one should use the State or the Strategy pattern. Give some guidelines to tell when to use the State and when to use the Strategy pattern.

9. (10 points) Both the Memento and Command patterns can be used to implement undo. What are the disadvantages and advantages of each pattern for implementing undo.

10. (10 points) The Ball of Mud paper included seven patterns. List three of the patterns. Explain one of the patterns. Include in your explanation the forces leading to the pattern and consequences of the pattern.

11. (10 points) Explain one of the following types of coupling: Data Coupling, Control Coupling, Inside Internal Object Coupling.

12. (10 points) Explain one of the following types of cohesion: Logical, Temporal, Procedural, Communication, Sequential. Give an example.

13. (12 points) Explain.

A. Information Hiding

B. Encapsulation

C. Abstraction.

D. Coupling