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Started on Tuesday, 25 May 2021, 12:57 AM

State Finished

Completed on Tuesday, 25 May 2021, 1:58 AM

Time taken 1 hour

Grade 1.00 out of 20.00 (5%)

Question 1

Correct

Mark 1.00 out of 1.00

Which one of the following statements is generally correct about intellectual property?

Select one:

- ☒ a. You should not easily relinquish your copyright to let others to exploit your intellectual property commercially. ✓
- ☐ b. You should trust ANU to handle your intellectual property on your behalf.
- ☐ c. You should get a copyright lawyer to examine your intellectual property.
- ☐ d. You do not need to provide a license to your open source software on GitHub.

Your answer is correct.

The correct answer is:

You should not easily relinquish your copyright to let others to exploit your intellectual property commercially.

Question 2

Incorrect

Mark 0.00 out of 1.00

Which one of the following statements is INCORRECT about design by contract:

Select one:

Select one:

- ☐ a. An invariant specifies a condition that must hold anytime a client could invoke an object's method.
- ☐ b. Postconditions involve the old system state, the new system state, the method arguments, and the method's return value. It specifies conditions that must hold after a method completes.
- ☐ c. JML, iContract, C4J, and JUnit are examples of design by contract tools.
- ☒ d. JML annotations can be attached to Java programs by writing them directly into the Java source code files. ✗ JML, iContract, C4J, and JUnit are examples of design by contract tools.

Your answer is incorrect.

The correct answer is: JML, iContract, C4J, and JUnit are examples of design by contract tools.

Marked out of 1.00

Which one of the following statements is INCORRECT about intellectual property?

Select one:

- ☐ a. There are different categories of intellectual property, including copyright, trademarks, and patents.
- ☐ b. Intellectual property is intangible things such as ideas expressed in painting, books, songs, etc.
- ☐ c. Copyright is a form of patent that protects the original expression of ideas.
- ☐ d. Patents differ from Copyright because unlike copyright, which applies to any intellectual expression. Patents apply to functional inventions.

Your answer is incorrect.

The correct answer is:

Copyright is a form of patent that protects the original expression of ideas.

Marked out of 1.00

Considering the class below, which one of the following statements is INCORRECT:

```
public class Universe {  
  
    private static Universe INSTANCE;  
  
    private Universe() {  
  
    }  
  
    public static Universe getInstance() {  
        if(INSTANCE == null) {  
            INSTANCE = new Universe();  
        }  
        return INSTANCE;  
    }  
}
```

Select one:

Select one:

- ☐ a. The instruction `assertSame(Universe.getInstance(), Universe.getInstance())` will not fail if you write such a unit test for Universe class.
- ☐ b. You cannot remove the static modifier from the field `INSTANCE` and from the method `getInstance()` if you want to implement a Singleton.
- ☐ c. The instruction `assertEquals(Universe.getInstance(), Universe.getInstance())` will not fail if you write such a unit test for Universe class.
- ☐ d. You can call the instruction `new Universe()` outside the Universe class.

Your answer is incorrect.

The correct answer is: You can call the instruction `new Universe()` outside the Universe class.

Marked out of 1.00

Which of these cannot be done with JML?

Select one:

Select one:

- ☐ a. Java XML processing.
- ☐ b. Record detailed design decisions and document assumptions.
- ☐ c. Runtime assertion checking.
- ☐ d. Design by contract.

Your answer is incorrect.

The correct answer is: Java XML processing.

Question **6**

Not answered

Marked out of 1.00

Which one of the following is the best license for an open source data structure library to prevent commercial exploitation?

Select one:

- ☐ a. MIT
- ☐ b. No licence provided
- ☐ c. GPL (GNU General Public Licence)
- ☐ d. Apache 2.0

Your answer is incorrect.

The correct answer is:

GPL (GNU General Public Licence)

Marked out of 1.00

Which one of the following statements is INCORRECT about design patterns:

Select one:

Select one:

- ☐ a. The factory method pattern deals with the problem of creating objects without having to specify the class of the object that will be created. A factory method lets a class defer instantiation to subclasses.
- ☐ b. Singleton pattern ensures that you will have one instance of a class. Usually, the Singleton class has a private constructor and a static method called getInstance().
- ☐ c. According to Gang of Four (GoF), design patterns can be considered good solutions that have worked over time. The idea is to organize code solutions into patterns and reuse such solutions.
- ☐ d. The observer pattern defines a one-to-many dependency among objects. Whenever an object changes the state, the others are not notified.

Your answer is incorrect.

The correct answer is: The observer pattern defines a one-to-many dependency among objects. Whenever an object changes the state, the others are not notified.

Question 8

Not answered

Marked out of 1.00

Which one of the following alternatives is CORRECT about JML?

Select one:

Select one:

- ☐ a. Invariant property of a variable should not be violated during method execution.
- ☐ b. JML is a formal specification language for Java to specify behaviour of Java classes and to record design and implementation decisions.
- ☐ c. If a postcondition is violated, the software component has no bug.
- ☐ d. JML annotations can be compiled with the standard javac program.

Your answer is incorrect.

The correct answer is: JML is a formal specification language for Java to specify behaviour of Java classes and to record design and implementation decisions.

Considering the code below, which one of the following statements is INCORRECT:

```
public class NotificationFactory {  
  
    public Notification createNotification(String msg, String c)  
    {  
        String channel = c;  
  
        if (channel == null || channel.isEmpty()) {  
            List<String> l = Arrays.asList("SMS", "EMAIL", "PUSH");  
            Random rand = new Random();  
            channel = l.get(rand.nextInt(l.size()));  
        }  
        if ("SMS".equalsIgnoreCase(channel)) {  
            return new SMSNotification();  
        } else if ("EMAIL".equalsIgnoreCase(channel)) {  
            return new EmailNotification();  
        } else if ("PUSH".equalsIgnoreCase(channel)) {  
            return new PushNotification();  
        }  
        return null;  
    }  
}
```

Select one:

Select one:

- ☐ a. The class NotificationFactory is a typical example of Factory Method pattern.
- ☐ b. If the channel is not defined, the method randomly chooses one.
- ☐ c. Notification can be an interface that SMSNotification, EmailNotification, and PushNotification implements. Notification cannot be a superclass of SMSNotification, EmailNotification, and PushNotification.
- ☐ d. The method createNotification will return an instance of Notification or null.

Your answer is incorrect.

The correct answer is: Notification can be an interface that SMSNotification, EmailNotification, and PushNotification implements. Notification cannot be a superclass of SMSNotification, EmailNotification, and PushNotification.

Marked out of 1.00

Fill the blank in the statement below:

The factory method design pattern lets a class _____

Select one:

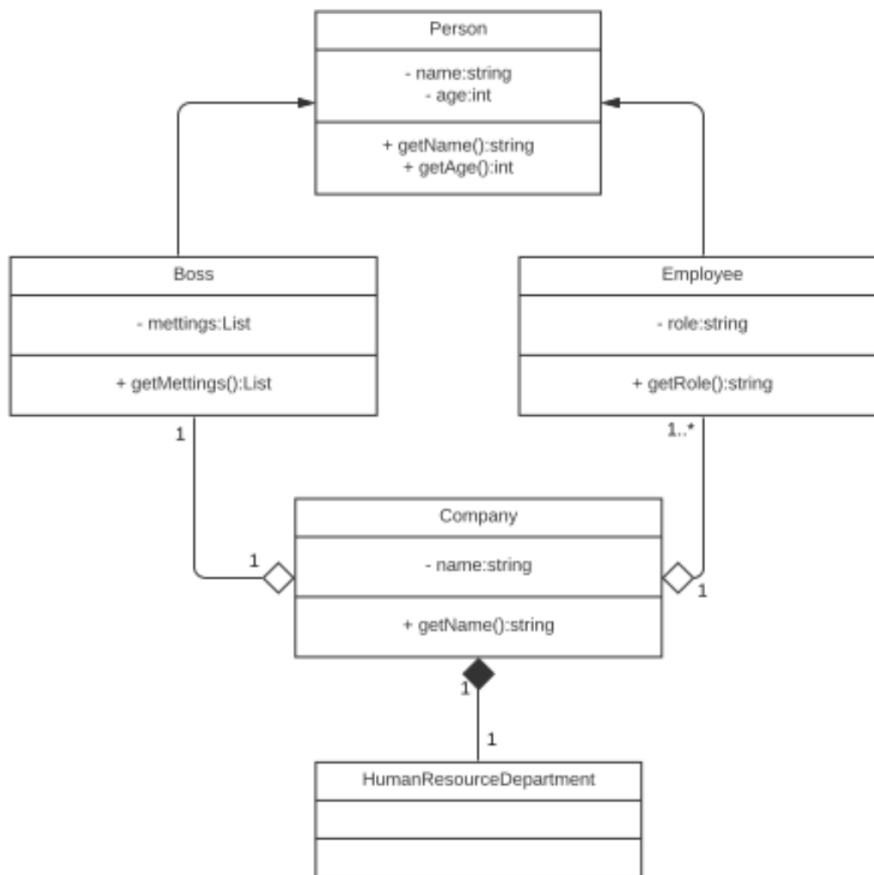
Select one:

- ☐ a. defer instantiation to subclasses
- ☐ b. be called only once
- ☐ c. be instantiated only at compile-time
- ☐ d. be instantiated only at runtime

Your answer is incorrect.

The correct answer is: defer instantiation to subclasses

Considering the class diagram below, which one of the following statements is INCORRECT?



Select one:

Select one:

- ☐ a. Boss is a Person and Employee is a Person. The type of this relationship is Inheritance.
- ☐ b. Person is the parent class of Boss and Employee. It means that Boss and Employee have the operation `getName`.
- ☐ c. One Company has at least one instance of Employee.
- ☐ d. The relationship between Company and HumanResourceDepartment is a composition. It means that an instance of HumanResourceDepartment can exist regardless of the existence of an instance of Company.

Your answer is incorrect.

The correct answer is: The relationship between Company and HumanResourceDepartment is a composition. It means that an instance of HumanResourceDepartment can exist regardless of the existence of an instance of Company.

Marked out of 1.00

Fill the blank in the statement below:

Generalization indicates a relationship between a more generalized class to more-specialized classes: This is a "_____" relationship.

Select one:

Select one:

- ☐ a. is-entirely-made-of
- ☐ b. has-a
- ☐ c. depends-on
- ☐ d. is-a or is-like-a

Your answer is incorrect.

The correct answer is: is-a or is-like-a

Question **13**

Not answered

Marked out of 1.00

Which of the following describes the Singleton pattern correctly?

Select one:

Select one:

- ☐ a. This pattern involves a single class which is responsible to create an object while making sure that only single object gets created.
- ☐ b. This pattern is used when we want to pass data with multiple attributes in one shot from client to server.
- ☐ c. This pattern creates object without exposing the creation logic to the client and refer to newly created object using a common interface.
- ☐ d. In this pattern an interface is responsible for creating a factory of related objects without explicitly specifying their classes.

Your answer is incorrect.

The correct answer is: This pattern involves a single class which is responsible to create an object while making sure that only single object gets created.

Marked out of 1.00

Which one of the following statements is INCORRECT about intellectual property?

Select one:

- ☐ a. GPL (GNU General Public Licence) and GLPv3 are examples of Copyright licenses.
- ☐ b. Copywrong is related to unethical or illegal use of material.
- ☐ c. Copyright is automatically assigned to you as the creator, you do not need to register it separately.
- ☐ d. Copyright protects people's ability to monetise on their intellectual or creative output.

Your answer is incorrect.

The correct answer is:

GPL (GNU General Public Licence) and GLPv3 are examples of Copyright licenses.

Question **15**

Not answered

Marked out of 1.00

Which one of the following statements is INCORRECT about design by contract:

Select one:

Select one:

- ☐ a. The basic premise of design by contract is to associate a specification with every software element.
- ☐ b. Design by contract can be an effective way for debugging, testing and, more generally, quality assurance.
- ☐ c. Interfaces form a contract between the class and the outside world. Implementing an interface allows a class to become more formal about the behaviour it promises to provide.
- ☐ d. Preconditions specify conditions that must hold after a method completes.

Your answer is incorrect.

The correct answer is: Preconditions specify conditions that must hold after a method completes.

Marked out of 1.00

Which one of the following statements is INCORRECT about JML?

Select one:

Select one:

- ☐ a. Postcondition for a method can be specified using the instruction "ensures".
- ☐ b. In the JML expression "`//@ requires amount <= getBalance();`", the method `getBalance()` is a pure method.
- ☐ c. `\old(balance)` is used to refer to the value of the variable `balance` at the time of entry into a method.
- ☐ d. Precondition for a method can be specified using the instruction "before".

Your answer is incorrect.

The correct answer is: Precondition for a method can be specified using the instruction "before".

Question **17**

Not answered

Marked out of 1.00

Which one of the following statements is INCORRECT about UML:

Select one:

Select one:

- ☐ a. Composition represents the relationship is-entirely-made-of. When you say that a class B is-entirely-made-of A then both should exist or be destroyed together.
- ☐ b. Inheritance indicates the relationship is-a. For instance, when you define a parent class A and a subclass B, it is correct to say that B is-a A.
- ☐ c. The class diagram represents a set of entities and their relationships. Usually, a class has a name, a set of attributes, and operations. Each operation has an access modifier, defining its visibility that can be only public or private.
- ☐ d. Aggregation represents the relationship is-part-of. When you say that a class B is-part-of A then if A is destroyed, B still exists.

Your answer is incorrect.

The correct answer is: The class diagram represents a set of entities and their relationships. Usually, a class has a name, a set of attributes, and operations. Each operation has an access modifier, defining its visibility that can be only public or private.

Marked out of 1.00

Which one of the following is the best way to protect the intellectual property of a machine learning algorithm in a published paper?

Select one:

- ☐ a. Copyright
- ☐ b. Trademark
- ☐ c. Patent
- ☐ d. Trade secret

Your answer is incorrect.

The correct answer is:

Patent

Question **19**

Not answered

Marked out of 1.00

Fill the blank in the statement below:

Aggregation (a class is made up of another class): This is a _____ relationship. That is when a line connects two class with an empty diamond then objects of one class are made up of objects of the other class.

Select one:

Select one:

- ☐ a. uses
- ☐ b. is-a
- ☐ c. does-a
- ☐ d. has-a

Your answer is incorrect.

The correct answer is: has-a

Marked out of 1.00

Which one of the following statements is INCORRECT about JML?

Select one:

Select one:

- ☐ a. The goal of JML is to be easy to use for any Java programmer. For example, properties can be specified as comments in a .java file or in a separate .jml file.
- ☐ b. /*@ invariant (\forall int i; 0 <= i && i < a.length-1; a[i] < a[i+1]) @*/ is a formal JML invariant that checks if the array is sorted.
- ☐ c. A precondition violation indicates a bug in the caller. In other words, the caller did not observe the conditions expected on correct calls.
- ☐ d. OpenJML is a tool to verify JML statements but the standard Java compiler is enough to compile JML annotations.

Your answer is incorrect.

The correct answer is: OpenJML is a tool to verify JML statements but the standard Java compiler is enough to compile JML annotations.

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