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Question 1

a) **Assume that we are defining a Book class, and one of the instance variables is title. In order to support having a different title for different book objects, the variable title has to be declared as:**

2) Static

b) **To prevent the possibility that the title of a book object is changed from outside the Book class unless it is done via the setter method setTitle(), the variable title has to be declared as:**

3) Private

c) **To allow the title of a book object to be changed from outside the Book class via the setter method setTitle(), the method setTitle() has to be declared as:**

4) Public

d) **When passing parameters to a Java method that are primitive data types, the corresponding actual and formal parameters (respectively, the corresponding parameters when calling the method and those declared in the caller method):**

2)become aliases

e) **When passing parameters that are OBJECTS to a java method, the corresponding actual and formal parameters:**

2)become aliases

f) **In order to preserve encapsulation of an object, we would do the following in the class defining the object:**

1) declare the instance variables as private in the class

g) **Assume that a method receives an array of String as a parameter and the method modifies some elements of the array. To be able to see the changes in the array outside the method:**

2) The method may be defined to return any type. The changes in the array can be seen outside the method regardless.

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h) A constructor is used in a Class definition to:

4) Accept parameters used to instantiated the object

i) Method Overloading occurs when:

3) a method is implemented multiple times in the same class with different signatures

j) Method overriding occurs when:

2) a child class provides a method with the same signature as its parent class
3) a child class provides a method with the same signature as an ancestor class in the class hierarchy

Question 2

a) What is an Array?
An array is an ordered list of values.

b) What is an array's element type?
The values held in an array are called array elements. Element type can be primitive or an object reference.

c) How is each element in an array referenced?
A particular value in an array is referenced using the array name followed by the index in brackets.

d) How is an entire array passed as a parameter?
Like any other object, reference to the array is passed, making the formal and actual parameters aliases. An individual array element can be passed as well.

e) What is a command-line argument and how are they accessed?
The signature of the main method indicates that it takes an array of string objects as a parameter. These values come from command-line arguments that are provided when the interpreter is invoked.

Question 3

a) Describe the relationship between a parent class and a child class.
An existing class is called the parent class.; the derived class is called the child class. The child class inherits methods and data defined by parent class.

b) How does inheritance support software reuse?
Programmer can tailor a derived class as needed by adding new variables, methods, or by modifying the inherited ones. By using existing software components to create new ones, we capitalize on all the effort that went into the design, implementation, and testing of the existing

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software. In other words, the result of software reuse would be an improved version of the existing one.

c) **What does the protected modifier accomplish?**
The protected modifier allows a child class to reference a variable or method directly in the child class. It gives more encapsulation than public visibility, but is not as tightly encapsulated as private visibility.

d) **Why is the super reference important to a child task?**
The super reference can be used to refer to the parent class, and often used to invoke the parent's constructor.

e) **What is the role of an abstract class?**
It is a placeholder in a class hierarchy that represents a generic concept. It cannot be instantiated.

Question 4

a) **Describe the difference between Black Box and White Box testing.**
Black box Testing is a testing method in which the design implementation of the item being tested is not known to the tester. White box testing is a testing method in which the design implementation of the item being tested is known to the tester.

b) **Describe the goals and scope of the three types of testing called unit testing, integration testing, and system testing.**

Unit testing is where individual components of a software are tested. The goal is to validate each unit in the software.

Integration testing is where individual components of a software are combined and tested as a group.

System testing evaluates the system's compliance with specified requirements. It tests the complete software.