AP Computer Science
Chapter 4 Test

4.1 Multiple-Choice Questions

1) The behavior of an object is defined by the object's
A) instance data
B) constructor
C) visibility modifiers
D) methods
E) all of the above
Answer: D

2) To define a class that will represent a car, which of the following definitions is most appropriate?
A) `private class car`
B) `public class car`
C) `public class Car`
D) `public class CAR`
E) `private class Car`
Answer: C

3) Which of the following reserved words in Java is used to create an instance of a class?
A) `class`
B) `public`
C) `public` or `private`, either could be used
D) `import`
E) `new`
Answer: E

4) In order to preserve encapsulation of an object, we would do all of the following except for which one?
A) Make the instance data private
B) Define the methods in the class to access and manipulate the instance data
C) Make the methods of the class public
D) Make the class final
E) All of the above preserve encapsulation
Answer: D

5) If a method does not have a return statement, then
A) it will produce a syntax error when compiled
B) it must be a void method
C) it can not be called from outside the class that defined the method
D) it must be defined to be a public method
E) it must be an int, double, float or String method
Answer: B

6) Consider a sequence of method invocations as follows: main calls m1, m1 calls m2, m2 calls m3 and then m2 calls m4, m3 calls m5. If m4 has just terminated, what method will resume execution?
A) m1
B) m2
C) m3
D) m5
E) main
Answer: B
Explanation: B) Once a method terminates, control resumes with the method that called that method. In this case, m2

calls m4, so that when m4 terminates, m2 is resumed.

7) A variable whose scope is restricted to the method where it was declared is known as a(n)
A) parameter
B) global variable
C) local variable
D) public instance data
E) private instance data
Answer: C

8) Having multiple class methods of the same name where each method has a different number of or type of parameters is known as
A) encapsulation
B) information hiding
C) tokenizing
D) importing
E) method overloading
Answer: E
Explanation: E) When methods share the same name, they are said to be overloaded. The number and type of parameters passed in the message provides the information by which the proper method is called.

9) Instance data for a Java class
A) are limited to primitive types (e.g., `int`, `float`, `char`)
B) are limited to Strings
C) are limited to objects(e.g., Strings, classes defined by other programmers)
D) may be primitive types or objects, but objects must be defined to be private
E) may be primitive types or objects
Answer: E

For the questions #10 ~ 11 below, use the following class definition.

```
import java.text.DecimalFormat;
public class Student
{
      private String name;
      private String major;
      private double gpa;
      private int hours;

      public Student(String newName, String newMajor, double newGPA, int newHours)
      {
            name = newName;
            major = newMajor;
            gpa = newGPA;
            hours = newHours;
      }

      public String toString( )
      {
            DecimalFormat df = new DecimalFormat("0.000");
            return name + "\n" + major + "\n" + df.format(gpa) + "\n" + hours;
      }
}
```

10) Which of the following could be used to instantiate a new Student s1?
A) `Student s1 = new Student( );`
B) `s1 = new Student( );`
C) `Student s1 = new Student("Jane Doe", "Computer Science", 3.333, 33);`
D) `new Student s1 = ("Jane Doe", "Computer Science", 3.333, 33);`
E) `new Student(s1);`
Answer: C

11) Another method that might be desired is one that updates the Student's number of credit hours. This method will receive a number of credit hours and add these to the Student's current hours. Which of the following methods would accomplish this?
A)
```
public int updateHours( )
 {    return hours;    }
```
B)
```
public void updateHours( )
  {    hours++;    }
```
C)
```
public updateHours(int moreHours)
 {    hours += moreHours;  }
```
D)
```
public void updateHours(int moreHours)
 {    hours += moreHours;  }
```
E)
```
public int updateHours(int moreHours)
 {    return hours + moreHours;  }
```
Answer: D

12) Consider a method defined with the header: `public void doublefoo(double x).` Which of the following method calls is legal?
A) `doublefoo(0);`
B) `doublefoo(0.555);`
C) `doublefoo(0.1 + 0.2);`
D) `doublefoo(0.1, 0.2);`
E) all of the above are legal except for D
Answer: E

13) The expressions that are passed to a method in an invocation are called
A) actual parameters
B) formal parameters
C) formal arguments
D) formals
E) any of the above
Answer: A

14) What happens if you declare a class constructor to have a void return type?
A) You'll likely receive a syntax error
B) The program will compile with a warning, but you'll get a runtime error
C) There's nothing wrong with declaring a constructor to be void
D) The class' default constructor will be used instead of the one you're declaring
E) None of the above
Answer: A

15) What is the return type of a constructor?
A) `void`
B) A constructor does not have a return type.
C) `private`
D) `public`
E) `protected`

Answer: B

16) When a method exits, its ____ are removed.

A) local variables
B) classes
C) comments
D) instance variables
E) constructors

Answer: A

17) A method header consists of which of the following parts?

A) the return type, the name of the method, and a list of the parameters (if any)
B) an access specifier, the type of the instance variable, and the name of the instance variable
C) the type of the instance variable, an access specifier, and a list of the parameters (if any)
D) an access specifier, a return type, a method name, and a list of the parameters (if any)
E) choice C) and D)

Answer: D

18) Which of the following statements is true about constructors?

A) Providing a constructor for a class is optional.
B) You can only provide one constructor for a class.
C) The body of the constructor must initialize all instance variables or the constructor will not successfully compile.
D) A constructor has a `void` return type.
E) None of the above.
Answer: A

19) We want to create a class that represents a geometric sequence. A geometric sequence is a sequence of numbers that begin at some value and then multiplies each value by some constant to get the next value. For example, the geometric sequence 1, 2, 4, 8, 16 starts at 1 and multiplies each term by 2 to get the next. The geometric sequence 10.8, 5.4, 2.7, 1.35 starts at 10.8 and multiplies each term by 0.5 to get the next. The basic framework of a geometric sequence class is below:

```
public class GeometricSequence
{
   private double initialValue;
   private double multiplier;
}
```

What should the body of the parameter constructor be?

A)
```
initialValue = initial;
multiplier = mult;
```
B)
```
initial = initialValue;
mult = multiplier;
```
C)
```
double initialValue = initial;
double multiplier = mult;
```
D)
```
double initial = initialValue;
double mult = multiplier;
```
E)
```
double initialValue = 0;
Double multiple = 2;
```
Answer: A

20) Given this method comment, fill in the blank in the method implementation.

```
public BankAccount(double _________)
{
   balance = initialBalance;
}
```
A) `amount`
B) `parameter`
C) `initialBalance`
D) `balance`
E) `initial`
Answer: C

21) Given this method comment, fill in the blank in the method implementation.

```
public double getBalance()
{
   __________ balance;
}
```

A) `balance`
B) `return ;`
C) `double`
D) `return`
E) `private double`
Answer: D

4.2 True/False Questions

22) Java methods can return only primitive types (`int`, `double`, `float`, `char`, `boolean`, etc).
Answer: FALSE

23) Formal parameters are those that appear in the method call and actual parameters are those that appear in the method header.
Answer: FALSE

24) All Java classes must contain a main method which is the first method executed when the Java class is called upon.
Answer: FALSE
Explanation: Only the *driver program* requires a main method. The driver program is the one that is first executed in any

Java program (except for Applets), but it may call upon other classes as needed, and these other classes do not need main methods.

25) The following method header definition will result in a syntax error:

```
public void calcHourlyPay( );
```

Answer: TRUE

26) A method defined in a class can access the class' instance data without needing to pass them as parameters or declare them as local variables.
Answer: TRUE

27) Defining formal parameters requires including each parameters type.
Answer: TRUE

28) Every class definition must include a constructor.
Answer: FALSE

29) An object should be encapsulated in order to guard its data and methods from inappropriate access.
Answer: TRUE

30) Accessors and mutators provide mechanisms for controlled access to a well-encapsulated class.
Answer: TRUE

4.3 Free-Form Questions

31) When are local variables initialized?

Answer: You must initialize local variables in a method body.

For the questions below, write the requested portions of a class called BaseballPlayer. This class contains the following data instances:

```
private String name;
private String position;
private int numAtBats;
private int numSingles;
private int numDoubles;
private int numTriples;
private int numHomeRuns;
private double battingAverage;
```

32) Write the constructor, which is passed the player's name and position.
Answer:

```
public BaseballPlayer(String newName, String newPosition)
{
   name = newName;
   position = newPosition;
   numAtBats = 0;
   numSingles = 0;
   numDoubles = 0;
   numTriples = 0;
   numHomeRuns = 0;
   battingAverage = 0.0
}
```

Notice that we not only initialize the instance data that were passed as parameters, but also all other data instances.

~~33) A driver's license will have an ID number, a name, date of birth, address, gender, height (in feet and inch), and weight. Define the instance data for this `DriversLicense` class.~~
~~Answer: private String IDNum, name, DOB, address, gender, height;~~
~~private int weight;~~

33) Consider the following `Point2D` class.

```
public class Point2D {

      private double xCoord;
      private double yCoord;

      public Point2D(double x, double y) {
            xCoord = x;
            yCoord = y;
      }
}
```

Which of the following code segments, appearing in a class other than `Point2D`, will correctly create an instance of a `Point2D` object?

A) `Point2D p = (3.0, 4.0);`
B) `Point2D p = Point2D(3.0, 4.0);`
C) `new p = Point2D(3.0, 4.0);`
D) `new Point2D = p(3.0, 4.0);`
E) `Point2D p = new Point2D(3.0, 4.0);`
Answer: E

34) A driver's license will have an ID number, a name, date of birth, address, gender, height (in feet and inch), and weight. Define the instance data for this `DriversLicense` class.

Answer: private String IDNum;
private String name;
private String DOB;
private String address;
private String gender;
private String height;
private int weight;

or

Answer: private String IDNum, name, DOB, address, gender, height;
private int weight;