

**ICS4U – Module 4 – Object Oriented Programming – Test Review**

- 1) What name must the constructor of a class have?
- 2) Consider the following code. Is the last statement valid or invalid? Explain.

```
Circle dot = new Circle(2);  
dot.radius = 5;
```

- 3) Use the following class to answer the questions below:

```
public class Roo {  
  
    private int x;  
  
    public Roo {  
        x = 1;  
    }  
  
    public void setX (int z) {  
        x = z;  
    }  
  
    public int getX() {  
        return(x);  
    }  
  
    public int calculate() {  
        x = x*factor();  
        return(x);  
    }  
  
    private int factor() {  
        return(0.12);  
    }  
}
```

- a. What is the name of the class?
- b. What is the name of the data member?
- c. List the accessor method.
- d. List the modifier method.
- e. List the helper method
- f. What is the name of the constructor?
- g. How many method members are there?

- 4) What is the difference between a class and an object?
- 5) Imagine a band festival where there are many bands playing – the TwoToos, the EggRolls, and Goop. Each band can TuneUp, PlayMusic, and TakeABow. A set list can be read or created. If this was simulated in an object-oriented program, what would appropriate names be for:
  - a. The class
  - b. The objects
  - c. A data member
  - d. The method members
- 6) Assume a class for a sports team named Team.
  - a. List three possible object names.
  - b. List three possible method members
  - c. List three possible data members
- 7) Use the following class data member definitions to answer the questions below:

```
public class Moo {  
    private double y;  
    private static int x;  
    private static final z;  
    ...
```

  - a. What data member is a constant?
  - b. Which data members are variables?
  - c. Which data member(s) are instance members?
  - d. Which data member(s) are class members?
- 8) Explain the difference between calling an instance method member and a class method member.
- 9) How can reusing code decrease the likelihood of bugs in an application?
- 10) Explain what is meant by passing a message.

## True/False

11) Determine if each of the following are true or false. If false, explain why.

- a. The state of an object is described by its methods.
- b. The behaviour of an object is described by its variables.
- c. An instance of a class is called an object
- d. Client code is an application that uses a class
- e. Encapsulation means that all the variables in a class are available to client code
- f. A constructor is a member of a class
- g. A variable that is visible to a class, but not to client code is declared with the keyword `private`.
- h. An accessor method is called to change the value of a data member
- i. A modifier method returns the value of a data member
- j. A constructor of a class is automatically called when an object of the class is instantiated
- k. A class can contain multiple constructors
- l. An instance variable is copied for each instance of a class
- m. A class variable is declared with the keyword `public`.
- n. A class method must be called from an object of the class
- o. A class constant is declared with only the keyword `final`.
- p. The `Object` class is a subclass of all other classes.
- q. The `toString()` method can be redefined in subclasses.
- r. Object-Oriented development requires that only one object be used in an application.

## Answers

1. The constructor of a class must have the same name as the class.
2. The last statement is invalid because the private data member radius cannot be directly accessed by client code.
3. a) Roo  
b) x  
c) getX()  
d) setX()  
e) factor()  
f) Roo  
g) four (4)
4. A class is a data type that defines variables for the state of an object and methods for an object's behavior. An object is an instance of a class. There can be many objects of the same class.
5. a) Band  
b) TwoToos, EggRolls, Goop  
c) setList  
b) tuneUp, playMusic, takeABow, getSetList, makeSetList
6. *Answers will vary. Possible answers include:*  
a) SwimTeam, FootballTeam, SoccerTeam  
b) playGames, reviewStats, practice  
c) roster, nextGame, highScore
7. a) z  
b) x and y  
c) y  
d) x and z
8. An instance method must be called from an instance of the class and a class method member can be called from the class itself.
9. Reusing code can decrease the likelihood of bugs because the code has been previously tested.
10. Passing a message occurs when information is passed from one object to another.
11. a) False. The state of an object refers to the data that it stores.  
b) False. The behavior of an object is described by its methods.  
c) True.  
d) True.  
e) False. Encapsulation means an object's data is protected from code outside the class.  
f) False. A constructor is part of a class that is used to initialize the variable members of a class.  
g) True.  
h) False. An accessor method is called to determine the value of a variable.  
i) False. A modifier method is called to change the value of a variable.  
j) True.  
k) True.  
l) True.  
m) False. A class variable is declared with the keyword static.  
n) False. A class method can be called from the class itself.  
o) False. The keyword static is also required.  
p) False. The Object class is the superclass of all other classes.  
q) True.  
r) False. Typically applications require more than one object.