

Exposure Java	Multiple Choice Test
Chapter 9	Introduction to Inheritance
<p>This Test Is a KEY</p> <p>DO NOT WRITE ON THIS TEST</p> <p>This test includes program segments, which are not complete programs. Answer such questions with the assumption that the program segment is part of a correct program.</p>	

Objective 1 - "Is-A" and Has-A" Class Interaction

01.	Inheritance is the process of	<p>(A) using classes in the established standard Java Language library.</p> <p>### (B) using features from an existing class.</p> <p>(C) combining data and the methods, which process the data, inside the same module.</p> <p>(D) dividing a program into multiple related files for each class in the program.</p>
02.	The concept of inheritance is illustrated well with	<p>### (A) geometry.</p> <p>(B) history.</p> <p>(C) literature.</p> <p>(D) economics.</p>
03.	The <i>has-a</i> relationship describes	<p>(A) inheritance.</p> <p>(B) encapsulation.</p> <p>(C) polymorphism.</p> <p>### (D) composition.</p>
04.	The <i>is-a</i> relationship describes	<p>### (A) inheritance.</p> <p>(B) encapsulation.</p> <p>(C) polymorphism.</p> <p>(D) composition.</p>

05. A class, which can use all the features of an established superclass, is

- (A) a static class.
- (B) a superclass.
- #### (C) a subclass.
- (D) overloaded.

06. An established class, whose members can all be used by a newly declared class, is

- (A) a static class.
- #### (B) a superclass.
- (C) a subclass.
- (D) overloaded.

07. The *engine*, *transmission*, *seats* and other components required to make a *car* is an example of

- (A) a superclass.
- (B) inheritance.
- (C) instantiation.
- #### (D) composition.

08. A *truck*, which is a special *car* converted for off-roading with special shocks, mud tires and four-wheel drive is an example of

- (A) a superclass.
- #### (B) inheritance.
- (C) instantiation.
- (D) composition.

Objective 2 - GridWorld Inheritance Observations

09. Consider the following code segment and class declaration.

```
import info.gridworld.actor.ActorWorld;
import info.gridworld.actor.Actor;
import info.gridworld.grid.Location;

public class Question09
{
    public static void main(String[] args)
    {
        ActorWorld world = new ActorWorld();
        Actor actor1 = new Actor();
        Actor actor2 = new Actor();
        world.add(new Location(0,0),actor1);
        world.add(new Location(0,9),actor2);
        world.show();
    }
}

public class Spider
{
}
}
```

How will the **Spider** class object appear after the program segment above executes?

- (A) Exactly the same as an **Actor** object at a random location
- (B) Exactly the same as an **Actor** object at a specified location
- ### (C) There will not be any visible evidence of a **Spider** object on the GridWorld
- (D) There will be one **Spider** object at a random location

10. Consider the following code segment and class declaration.

```
import info.gridworld.actor.ActorWorld;
import info.gridworld.actor.Actor;
import info.gridworld.grid.Location;

public class Question10
{
    public static void main(String[] args)
    {
        ActorWorld world = new ActorWorld();
        Actor actor1 = new Actor();
        Actor actor2 = new Actor();
        world.add(new Location(0,0),actor1);
        world.add(new Location(0,9),actor2);
        world.add(new Location(4,4),new Spider());
        world.add(new Location(5,5),new Spider());
        world.show();
    }
}

public class Spider extends Actor
{
}
```

How will the **Spider** class objects appear after the program segment above executes?

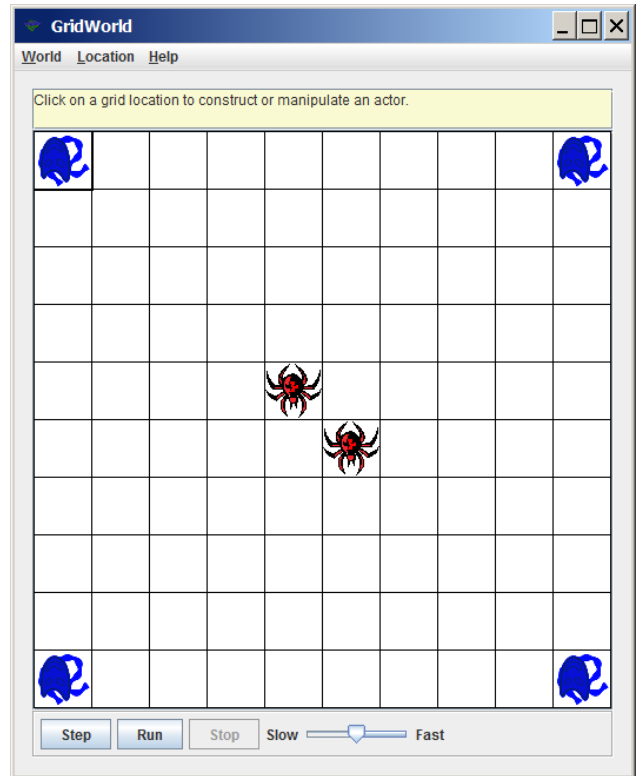
- (A) Exactly the same as an **Actor** object at random locations
- ### (B) Exactly the same as an **Actor** object at specified locations
- (C) There will not be any visible evidence of a **Spider** object on the GridWorld
- (D) There will be two **Spider** objects at a random location

11. Consider the following class declarations and the GridWorld output display in the next table cell.

```
public class Question11
{
    public static void main(String[] args)
    {
        ActorWorld world = new ActorWorld();
        Actor actor1 = new Actor();
        Actor actor2 = new Actor();
        world.add(new Location(0,0),actor1);
        world.add(new Location(0,9),actor2);
        world.add(new Location(4,4),new Spider());
        world.add(new Location(5,5),new Spider());
        world.show();
    }
}

public class Spider extends Actor
{
    public Spider()
    {
        setColor(Color.red);
    }
}
```

11.



The two **Spider** objects now look like spiders.

What must have been altered from the previous question to make the **Spider** objects appear like this?

- (A) The **Spider** class declaration includes **extends Actor**.
- (B) A **Spider.java** file is added to the GridWorld project folder.
- ### (C) A **Spider.gif** file is added to the GridWorld project folder.
- (D) An updated **gridworld.jar** file is attached to the GridWorld project.

12. Consider the following class declaration.
Assume that a GridWorld program has executed that includes a **Spider** object.

```
public class Spider extends Actor  
{  
    public void act()  
    {  
  
    }  
}
```

How will a **Spider** class object behave when the **step** method is called?

- (A) Like an **Actor** object
- (B) Like a **Bug** object
- (C) Like a **Flower** object
- ### (D) Like a **Rock** object

Objective 3 - Accessing Inheritance Members

13. Consider the following class heading.

```
public class Person extends Student
```

What is not true about the class interaction of that class heading?

- (A) It indicates an "is-a" class interaction between the two classes.
- (B) It indicates an inheritance relationship between **Person** and **Student**
- ### (C) It indicates that **Person** is the superclass and **Student** is the subclass.
- (D) It indicates that **Student** is the superclass and **Person** is the subclass.

14. Consider the following program for questions 14 and 15.

```
public class Question1415
{
    public static void main(String args[])
    {
        Student tom = new Student();
        System.out.println("tom's age is " + tom.getAge());
        System.out.println("tom's grade is " + tom.getGrade());
    }
}

class Person
{
    private int age;

    public int getAge()
    {
        return age;
    }
}

class Student extends Person
{
    private int grade;

    public int getGrade()
    {
        return grade;
    }
}
```

This program compiles and executes without error or logic problems.

What evidence exists that proves that inheritance is functional in this program?

- (A) The **Student** class extends the **Person** class.
- (B) The **tom** object has access to the **getGrade** method.
- ### (C) The **tom** object has access to the **getAge** method.
- (D) There is evidence of class interaction with composition, but not with inheritance.

15. What is the consequence of removing **extends Person** from the program above?
- (A) The class interaction will change from inheritance to composition.
 - (B) The class interaction will change from composition to inheritance.
 - (C) The program will compile, but it will not execute correctly.
 - ### (D) There will no longer be any interaction between the **Person** class and the **Student** class.

16. Which of the following is not possible between classes that have an inheritance relationship?

- ### (A) Access from superclass to any subclass members
- (B) Access from subclass to superclass members
- (C) Access from subclass methods to subclass data attributes
- (D) Access from superclass methods to superclass data attributes

Use this program segment for questions 17 & 18.

```
public class Demo
{
    public static void main(String args[])
    {
        Student tom = new Student(12);
        tom.showData();
    }
}

class Person
{
    public int age;

    public Person()
    {
        System.out.println("Person Parameter Constructor");
        age = 17;
    }

    public int getAge()    { return age; }
}

class Student extends Person
{
    private int grade;

    public Student(int g)
    {
        grade = g;
        System.out.println("Student Parameter Constructor");
    }

    public int getGrade()    { return grade; }

    public void showData()
    {
        System.out.println("Student's Grade is " + grade);
        System.out.println("Student's Age is " + age);
    }
}
```

17. What are the first 2 lines of output?

- ### (A) Person Parameter Constructor
Student Parameter Constructor
- (B) Student Parameter Constructor
Person Parameter Constructor
- (C) Person Parameter Constructor
Person Parameter Constructor
- (D) Student Parameter Constructor
Student Parameter Constructor
- (E) No Output.
This program does not compile.

18. What are the last 2 lines of output?

- ### (A) Student's Grade is 12
Student's Age is 17
- (B) Student's Grade is 12
Student's Age is 17
- (C) Student's Grade is 12
Student's Age is 17
- (D) Student's Grade is 12
Student's Age is 17
- (E) No Output.
This program does not compile.

Use this program segment for questions 19 & 20.

```
public class Demo
{
    public static void main(String args[])
    {
        Student tom = new Student(12);
        tom.showData();
    }
}

class Person
{
    private int age;

    public Person()
    {
        System.out.println("Person Parameter Constructor");
        age = 17;
    }

    public int getAge()    { return age; }
}

class Student extends Person
{
    private int grade;

    public Student(int g)
    {
        grade = g;
        System.out.println("Student Parameter Constructor");
    }

    public int getGrade()    { return grade; }

    public void showData()
    {
        System.out.println("Student's Grade is " + grade);
        System.out.println("Student's Age is " + age);
    }
}
```

19. What are the first 2 lines of output?

- (A) Person Parameter Constructor
Student Parameter Constructor
- (B) Student Parameter Constructor
Person Parameter Constructor
- (C) Person Parameter Constructor
Person Parameter Constructor
- (D) Student Parameter Constructor
Student Parameter Constructor

(E) No Output.
This program does not compile.

20. What are the last 2 lines of output?

- (A) Student's Grade is 12
Student's Age is 17
- (B) Student's Grade is 17
Student's Age is 12
- (C) Student's Grade is 17
Student's Age is 17
- (D) Student's Grade is 12
Student's Age is 12

(E) No Output.
This program does not compile.

Use this program segment for questions 21 & 22.

```
public class Demo
{
    public static void main(String args[])
    {
        Student tom = new Student(12);
        tom.showData();
    }
}

class Person
{
    protected int age;

    public Person()
    {
        System.out.println("Person Parameter Constructor");
        age = 17;
    }

    public int getAge()    { return age; }
}

class Student extends Person
{
    protected int grade;

    public Student(int g)
    {
        grade = g;
        System.out.println("Student Parameter Constructor");
    }

    public int getGrade()    { return grade; }

    public void showData()
    {
        System.out.println("Student's Grade is " + grade);
        System.out.println("Student's Age is " + age);
    }
}
```

21. What are the first 2 lines of output?

- ### (A) Person Parameter Constructor
Student Parameter Constructor
- (B) Student Parameter Constructor
Person Parameter Constructor
- (C) Person Parameter Constructor
Person Parameter Constructor
- (D) Student Parameter Constructor
Student Parameter Constructor
- (E) No Output.
This program does not compile.

22. What are the last 2 lines of output?

- ### (A) Student's Grade is 12
Student's Age is 17
- (B) Student's Grade is 17
Student's Age is 12
- (C) Student's Grade is 17
Student's Age is 17
- (D) Student's Grade is 12
Student's Age is 12
- (E) No Output.
This program does not compile.

Use this program segment for questions 23 & 24.

```
public class Demo
{
    public static void main(String args[])
    {
        Student tom = new Student(12,17);
        tom.showData();
    }
}

class Person
{
    private int age;

    public Person(int a)
    {
        System.out.println("Person Parameter Constructor");
        age = a;
    }

    public int getAge()    { return age; }
}

class Student extends Person
{
    private int grade;

    public Student(int a, int g)
    {
        super(a);
        grade = g;
        System.out.println("Student Parameter Constructor");
    }

    public int getGrade()    { return grade; }

    public void showData()
    {
        System.out.println("Student's Grade is " + getGrade());
        System.out.println("Student's Age is  " + getAge());
    }
}
```

23. What are the first 2 lines of output?

- ### (A) Person Parameter Constructor
Student Parameter Constructor
- (B) Student Parameter Constructor
Person Parameter Constructor
- (C) Person Parameter Constructor
Person Parameter Constructor
- (D) Student Parameter Constructor
Student Parameter Constructor
- (E) No Output.
This program does not compile.

24. What are the last 2 lines of output?

- (A) Student's Grade is 12
Student's Age is 17
- ### (B) Student's Grade is 17
Student's Age is 12
- (C) Student's Grade is 17
Student's Age is 17
- (D) Student's Grade is 12
Student's Age is 12
- (E) No Output.
This program does not compile.

Objective 4 - Inheritance Constructor Issues

Didn't like wording of this question

25. When an object of a subclass is instantiated, the constructor of the

- (A) primary class, containing the **main** method, is called first.
- (B) subclass is called first, followed by the constructor of the superclass.
- ### (C) superclass is called first, followed by the constructor of the subclass.
- (D) subclass is called first, followed by the constructor of the primary class, containing **main**.

26. If the **super** keyword is used, in a constructor, to send information, where must it be placed?

- (A) Anywhere in the program
- (B) Anywhere in the subclass
- (C) Anywhere in the superclass
- (D) Anywhere in the superclass constructor
- ### (E) At the very beginning of the subclass constructor

27. How is information passed from the subclass constructor to the superclass constructor?

- (A) The superclass constructor is automatically called before the subclass constructor.
- ### (B) Use the **super** keyword followed by a parameter list for the superclass constructor.
- (C) Use the **super** keyword followed by the superclass identifier.
- (D) Use the **new** operator inside the subclass constructor to instantiate the superclass.

28. Consider the following class declaration.

```
public class Qwerty extends Widget
{
    private int count;

    public Qwerty(int c)
    {
        count = c;
    }
}
```

Which of the following **Qwerty** methods is identical to the one above?

(A)

```
public Qwerty(int c)
{
    super(c);
    count = c;
}
```

(B)

```
### public Qwerty(int c)
{
    super();
    count = c;
}
```

(C)

```
public Qwerty(int c)
{
    super(Widget);
    count = c;
}
```

(D)

```
public Qwerty(int c)
{
    count = c;
    super();
}
```

29. Consider the program segment and class declarations.

```
int widgetCount = 10;
int pidgetCount = 20;
Widget widget = new Pidget(widgetCount,pidgetCount);
```

```
public Widget
{
    private int numWidgets;

    public Widget(int nW)
    {
        numWidgets = nW;
    }
}

public class Pidget extends Widget
{
    private int numPidgets;
}
```

Which of the following **Pidget** constructors correctly initializes the instances variables?

(A)

```
public Pidget(int nW, int nP)
{
    numWidgets = nW
    numPidgets = nP;
}
```

(B)

```
public Pidget(int nW, int nP)
{
    super(nw,nP);
}
```

(C)

```
### public Pidget(int nW, int nP)
{
    super(nW);
    numPidgets = nP;
}
```

(D)

```
public Pidget(int nW, int nP)
{
    numPidgets = nP;
    super(nw);
}
```

30. Consider the program segment and class declarations.

```
int pidgetCount = 20;  
Widget widget = new Widget(pidgetCount);
```

```
public Widget  
{  
    private int numWidgets;  
  
    public Widget()  
    {  
        numWidgets = 0;  
    }  
}
```

```
public class Pidget extends Widget  
{  
    private int numPidgets;  
}
```

Which of the following **Pidget** constructors correctly initializes the instances variables?

(A)

```
public Pidget(int nP)  
{  
    numWidgets = 0  
    numPidgets = nP;  
}
```

(B)

```
### public Pidget(int nP)  
{  
    super();  
    numPidgets = nP;  
}
```

(C)

```
public Pidget(int nP)  
{  
    super(nP);  
}
```

(D)

```
public Pidget(int nP)  
{  
    numPidgets = nP;  
    super();  
}
```


31. Consider the program segment and class declarations.

```
int widgetCount = 10;
double widgetCost = 3.75;
int pidgetCount = 20;
int pidgetCost = 6.25;
Widget widget = new Pidget(widgetCount,widgetCost,pidgetCount,pidgetCost);
```

```
public Widget
{
    private int widgetCount;
    private double widgetCost;

    public Widget(int count, double cost)
    {
        widgetCount = count;
        widgetCost = cost;
    }
}
```

```
public class Pidget extends Widget
{
    private int pidgetCount;
    private double pidgetCost;
}
```

Which of the following **Pidget** constructors correctly initializes the instances variables?

(A) ###
public Pidget(int w1, double w2, int p1, double p2)
{
 super(w1,w2);
 pidgetCount = p1;
 pidgetCost = p2;
}

(B)
public Pidget(int w1, double w2, int p1, double p2)
{
 super(p1,p2);
 widgetCount = w1;
 widgetCost = w2;
}

(C)
public Pidget(int w1, double w2, int p1, double p2)
{
 pidgetCount = p1;
 pidgetCost = p2;
 super(w1,w2);
}

(D)
public Pidget(int w1, double w2, int p1, double p2)
{
 widgetCount = w1;
 widgetCost = w2;
 super(p1,p2);
}

32. Consider the program segment and class declarations.

```
Widget widget = new Pidget(100,200,300);
```

```
public Kidget
{
    private int kidgetCount;
    public Kidget(int kC)
    {
        kidgetCount = kC;
    }
}

public Widget
{
    private int widgetCount;
    public Widget(int kC, int wC)
    {
        super(kC);
        widgetCount = wC;
    }
}

public class Pidget extends Widget
{
    private int pidgetCount;
}
```

Which of the following **Pidget** constructors correctly initializes the instances variables?

(A) `### public Pidget(int kC, int wC, int pC)`
`{`
 `super(kC,wC);`
 `pidgetCount = pC;`
`}`

(B) `public Pidget(int kC, int wC, int pC)`
`{`
 `pidgetCount = pC;`
 `super(kC,wC);`
`}`

(C) `public Pidget(int kC, int wC, int pC)`
`{`
 `kidgetCount = kC;`
 `widgetCount = wC`
 `pidgetCount = pC;`
`}`

(D) `public Pidget(int kC, int wC, int pC)`
`{`
 `super(pC);`
 `kidgetCount = kC;`
 `widgetCount = wC`
`}`

Objective 5 - super Calling a Superclass Method

33. What happens to a superclass method when it is re-defined in a subclass?

- (A) The superclass method is no longer available.
- (B) The superclass method must be removed to avoid a compile error.
- ### (C) Both methods in the superclass and subclass are available.
- (D) The superclass method is only available with a superclass object.

34. Method **boo** is defined in super class **Alpha** and **boo** is re-defined in subclass **Beta**. Consider the following program segment.

```
Beta beta = new Beta();  
beta.boo();
```

Which method(s) get called as a result of executing the code segment?

- (A) **boo** defined in **Alpha**, followed by **boo** defined in **Beta**
- (B) **boo** defined in **Beta**, followed by **boo** defined in **Alpha**
- (C) **boo** defined in **Alpha** only
- ### (D) **boo** defined in **Beta** only

35. Consider the following method, which is defined in the **Student** class and the **Person** class. Assume that the **Student** class is a subclass of the **Person** class.

```
public void showData()  
{  
    System.out.println(getData());  
    System.out.println( super.getData());  
}
```

What is printed when method **showData** is called?

- (A) Two identical values
- (B) A compile error message
- ### (C) The value of the subclass **getData** followed by the value of the superclass **getData**
- (D) The value of the superclass **getData** followed by the value of the subclass **getData**

Objective 6 - Umbrella Classes

37. For the coded segment that follows assume the following class relationships.

Actor is the highest superclass.
Classes **Rock**, **Flower** and **Bug** are subclasses of **Actor**.
Class **Spider** is a subclass of **Bug**.

```
Actor actor = new Actor();  
Rock rock = new Rock();  
Flower flower = new Flower();  
Bug bug = new Bug();  
Spider spider = new Spider();
```

Which class is the *umbrella class* in the code segment?

- (A) **Actor**
- (B) **Rock**
- (C) **Flower**
- (D) **Bug**
- ### (E) This code segment does not use an *umbrella class*.

38. For the coded segment that follows assume the following class relationships.

Actor is the highest superclass.
Classes **Rock**, **Flower** and **Bug** are subclasses of **Actor**.
Class **Spider** is a subclass of **Bug**.

```
Actor actor = new Actor();  
Actor rock = new Rock();  
Actor flower = new Flower();  
Actor bug = new Bug();  
Actor spider = new Spider();
```

Which class is the *umbrella class* in the code segment?

- ### (A) **Actor**
- (B) **Rock**
- (C) **Flower**
- (D) **Bug**
- (E) This code segment does not use an *umbrella class*.

39. What computer science concept benefits from using *umbrella classes*?

- (A) Inheritance
- (B) Composition
- (C) Encapsulation
- ### (D) Polymorphism
- (E) Concatenation

40. For the coded segment that follows assume the following class relationships.

Actor is the highest superclass.

Classes **Rock**, **Flower** and **Bug** are subclasses of **Actor**.

Class **Spider** is a subclass of **Bug**.

```
Actor actor = new Actor();
Actor rock = new Rock();
Actor flower = new Flower();
Actor bug = new Bug();
Actor spider = new Spider();
```

In the code segment which constructor is used to instantiate a new object?

- (A) The constructor of the *umbrella class*.
- (B) The constructor of the lowest subclass, which is **Spider**
- ### (C) The constructor method that is used for each individual object.
- (D) The constructor of the highest superclass.

41. _____ is the process of using features (both attributes and actions) from an established higher class.

- (A) Encapsulation
- (B) Instantiation
- (C) Polymorphism
- (D) Composition
- ### (E) Inheritance

42. What is the output of this program?

```
public class Java0909
{
    public static void main(String args[])
    {
        Student tom = new Student();
        tom.showData();
    }
}

class Person
{
    protected int age;
    public Person() { age = 18; }
    public getData() { return age; }
}

class Student extends Person
{
    private int grade;
    public Student() { grade = 12; }
    public getData() { return grade; }
    public void showData()
    {
        System.out.println("Grade "+getData());
        System.out.println("Age   "+getData());
    }
}
```

- (A) Grade 12
Age 18
- (B) Grade 18
Age 12
- #### (C) Grade 12
Age 12
- (D) Age 18
Grade 18
- (E) Error

43. What is the output of this program?

```
public class Java0910
{
    public static void main(String args[])
    {
        Student tom = new Student();
        tom.showData();
    }
}

class Person
{
    protected int age;
    public Person() { age = 18; }
    public getData() { return age; }
}

class Student extends Person
{
    private int grade;
    public Student() { grade = 12; }
    public getData() { return grade; }
    public void showData()
    {
        System.out.println("Grade "+getData());
        System.out.println("Age   "+super.getData());
    }
}
```

- ### (A) Grade 12
Age 18
- (B) Grade 18
Age 12
- (C) Grade 12
Age 12
- (D) Age 18
Grade 18
- (E) Error

44. Look at the program below.
What commands should be used in place of the *missing commands* to allow the program to work properly?

```
public class Java0911
{
    public static void main(String args[])
    {
        Student tom = new Student(12,18);
        tom.showData();
    }
}

class Person
{
    private int age;
    public Person(int a) { age = a; }
    public getAge() { return age; }
}

class Student extends Person
{
    private int grade;
    public Student(int a, int g) { missing commands }
    public getGrade() { return grade; }
    public void showData()
    {
        System.out.println("Grade "+getGrade());
        System.out.println("Age  "+getAge());
    }
}
```

Desired Output
Grade 12
Age 18

- ### (A) super(a);
grade = g;
- (B) super(g);
age = a;
- (C) grade = g;
super(a);
- (D) age = a;
super(g);

45. Look at the program below.
What commands should be used in place of the *missing commands* to allow the program to work properly?

```
public class Java0912
{
    public static void main(String args[])
    {
        Car car = new Car("Ford",350);
    }
}

class Engine
{
    private int horsepower;
    public Engine(int hp) { horsepower = hp; }
}

class Car
{
    String type;
    Engine engine;
    public Car(String t, int hp)
    {
        missing
        commands
    }
}
```

- (A) type = t;
horsePower = hp;
- (B) type = t;
super(hp);
- (C) super(hp);
super(t);
- (D) super(t);
horsePower = hp;
- ### (E) type = t;
engine = new Engine(hp);

46. Assume these 2 classes are in the same program.

```
class Tomato
{
}

class Microwave extends Tomato
{
}
```

Which of these statements does NOT construct an object properly?

- (A) Microwave bob = new Microwave();
- (B) Tomato bob = new Tomato();
- ### (C) Microwave bob = new Tomato();
- (D) Tomato bob = new Microwave();

47. What is the name of the class that ALL classes inherit from automatically?

- ### (A) Object
- (B) Class
- (C) extends
- (D) Inheritance
- (E) Composition

48. When a subclass has a method with the same signature as the superclass, what is that called?

- (A) instantiation
- (B) composition
- ### (C) overriding
- (D) unnecessary

49. What is the keyword **super** used for in Java?

- I. It calls a superclass constructor.
- II. It allows you to call a superclass method when the subclass has a method with the same identifier.
- III. It allows you to format your output to display "superscript" for things like exponents.

- (A) I only
- (B) II only
- (C) III only
- ### (D) I and II only
- (E) I, II and III

50. Inheritance is one part of *Class Interaction*. What is the other?

- (A) Encapsulation
 - (B) Instantiation
 - (C) Polymorphism
 - ### (D) Composition
-