MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Suppose you create a class Cylinder to be a subclass of Circle. Analyze the following code:

```java
class Cylinder extends Circle {
    double length;

    Cylinder(double radius) {
        Circle(radius);
    }
}
```

A) The program compiles fine, but it has a runtime error because of invoking the Circle class's constructor illegally.
B) The program compiles fine, but you cannot create an instance of Cylinder because the constructor does not specify the length of the cylinder.
C) The program has a compile error because you attempted to invoke the Circle class's constructor illegally.

2) The equals method is defined in the Object class. Which of the following is correct to override it in the String class?

A) public static boolean equals(String other)  
B) public boolean equals(String other)  
C) public static boolean equals(Object other)  
D) public boolean equals(Object other)
3) Analyze the following code: (Choose all that apply.)

```java
public class Test extends A {
    public static void main(String[] args) {
        Test t = new Test();
        t.print();
    }
}

class A {
    String s;
    A(String s) {
        this.s = s;
    }

    public void print() {
        System.out.println(s);
    }
}
```

A) The program has an implicit default constructor Test(), but it cannot be compiled, because its super class does not have a default constructor. The program would compile if the constructor in the class A were removed.
B) The program compiles, but it has a runtime error due to the conflict on the method name print.
C) The program would compile if a default constructor A() {} is added to class A explicitly.
D) The program does not compile because Test does not have a default constructor Test().

4) Suppose ArrayList x contains two strings [Beijing, Singapore]. Which of the following methods will cause the list to become [Beijing, Chicago, Singapore]?
   A) x.add("Chicago")          B) x.add(0, "Chicago")
   C) x.add(2, "Chicago")       D) x.add(1, "Chicago")

5) The getValue() method is overridden in two ways. Which one is correct?
   I:
   ```java
   public class Test {
       public static void main(String[] args) {
           A a = new A();
           System.out.println(a.getValue());
       }
   }
   
class B {
       public String getValue() {
           return "Any object";
       }
   }
   ```
   class A extends B {
       public Object getValue() {
           return "A string";
       }
   }

```
II:
public class Test {
    public static void main(String[] args) {
        A a = new A();
        System.out.println(a.getValue());
    }
}

class B {
    public Object getValue() {
        return "Any object";
    }
}

class A extends B {
    public String getValue() {
        return "A string";
    }
}

A) I                        B) II                        C) Both I and II                  D) Neither

6) You can assign __________ to a variable of Object[] type. (Choose all that apply.)
   A) new int[100]
   B) new String[100]
   C) new double[100]
   D) new char[100]
   E) new java.util.Date[100]
7) Given the following code, find the compile error. (Choose all that apply.)

```java
public class Test {
    public static void main(String[] args) {
        m(new GraduateStudent());
        m(new Student());
        m(new Person());
        m(new Object());
    }

    public static void m(Student x) {
        System.out.println(x.toString());
    }
}

class GraduateStudent extends Student {
}
class Student extends Person {
    public String toString() {
        return "Student";
    }
}
class Person extends Object {
    public String toString() {
        return "Person";
    }
}

A) m(new Person()) causes an error
B) m(new GraduateStudent()) causes an error
C) m(new Object()) causes an error
D) m(new Student()) causes an error

8) Analyze the following code.

// Program 1
public class Test {
    public static void main(String[] args) {
        Object a1 = new A();
        Object a2 = new A();
        System.out.println(((A)a1).equals((A)a2));
    }
}

class A {
    int x;

    public boolean equals(A a) {
        return this.x == a.x;
    }
}
```
public class Test {
    public static void main(String[] args) {
        A a1 = new A();
        A a2 = new A();
        System.out.println(a1.equals(a2));
    }
}

class A {
    int x;
    public boolean equals(A a) {
        return this.x == a.x;
    }
}

A) Program 1 displays true and Program 2 displays true
B) Program 1 displays false and Program 2 displays false
C) Program 1 displays true and Program 2 displays false
D) Program 1 displays false and Program 2 displays true

9) Inheritance means __________.
   A) that a variable of supertype can refer to a subtype object
   B) that data fields should be declared private
   C) that a class can extend another class
   D) that a class can contain another class

10) The visibility of these modifiers increases in this order:
    A) private, none (if no modifier is used), protected, and public.
    B) private, protected, none (if no modifier is used), and public.
    C) none (if no modifier is used), private, protected, and public.
    D) none (if no modifier is used), protected, private, and public.

11) What is the output of the following code:

```
    public class Test {
        public static void main(String[] args) {
            String s1 = new String("Java");
            String s2 = new String("Java");
            System.out.println((s1 == s2) + " " + (s1.equals(s2)));
        }
    }
```
    A) false true     B) true true     C) true false     D) false false

12) What modifier should you use on a class so that a class in the same package can access it but a
class in a different package cannot access it?
    A) protected     B) private
    C) public        D) Use the default modifier.
13) Which of the following statements is false?
   A) A protected method can be accessed by a subclass in a different package.
   B) A private method cannot be accessed by a class in a different package.
   C) A method with no visibility modifier can be accessed by a class in a different package.
   D) A public class can be accessed by a class from a different package.

14) Suppose ArrayList x contains two strings [Beijing, Singapore]. Which of the following method will cause runtime errors? (Choose all that apply.)
   A) x.remove(2)
   B) x.get(1)
   C) x.get(2)
   D) x.size()
   E) x.set(2, "New York");

15) How many frames are displayed?
    import javax.swing.*;
    public class Test {
        public static void main(String[] args) {
            JFrame f1 = new JFrame("My Frame");
            JFrame f2 = f1;
            JFrame f3 = f2;
            f1.setVisible(true);
            f2.setVisible(true);
            f3.setVisible(true);
        }
    }
    A) 3.  B) 2.  C) 1.  D) 0.

16) The method _______ sets the font (Helvetica, 20-point bold) in component C.
    A) c.setFont(Font("Helvetica", Font.BOLD, 20))
    B) c.setFont(new Font("Helvetica", Font.bold, 20))
    C) c.setFont(new Font("Helvetica", Font.BOLD, 20))
    D) c.setFont(new Font("helvetica", BOLD, 20))

17) Which component cannot be added to a container?
    A) JComponent  B) JFrame  C) JButton  D) JPanel

18) Suppose a JFrame uses the GridLayout(0, 2). If you add six buttons to the frame, how many columns are displayed?
    A) 4  B) 1  C) 3  D) 2

19) What is best to describe the relationship between Component and Color?
    A) Composition  B) Association  C) Aggregation  D) Inheritance

20) _______ creates a color object. (Choose all that apply.)
    A) new Color(255, 255, 255)  B) new Color(1, 2, 3)
    C) new Color(0, 0, 0)  D) new Color(0, 266, 0)
21) Which of the following classes is a heavyweight component?
   A) JButton  B) JPanel  C) JFrame  D) JTextField

22) What is best to describe the relationship between Component and Font?
   A) Inheritance  B) Composition  C) Aggregation  D) Association

23) Swing components that don’t rely on native GUI are referred to as ________.
   A) heavyweight components  B) GUI components  C) lightweight components  D) non-GUI components

24) Can you use the setToolTip method to set a tooltip for ________? (Choose all that apply.)
   A) Container  B) JLabel  C) JButton  D) JComponent  E) Component

25) To add a component c to a JPanel p, use ________.
   A) p.insert(c)  B) p.add(c)  C) p.append(c)  D) p.getContentPane(c)

26) Analyze the following code:

```java
import javax.swing.*;

public class Test extends JFrame {
    private JButton jbtOK = new JButton("OK");

    public static void main(String[] args) {
        // Create a frame and set its properties
        JFrame frame = new Test();
        frame.setTitle("Logic Error");
        frame.setSize(200, 100);
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setVisible(true);
    }

    public Test() {
        jbtOK.setToolTipText("This is a button");
        add(new JButton("OK"));
    }
}
```

A) The tooltip text is displayed when you move the mouse on the button.
B) The tooltip text will be displayed if you replace `add(new JButton("OK"))` with `add(jbtOK = new JButton("OK"));`
C) The tooltip text will be displayed if you swap the two lines in the Test constructor.
D) The tooltip text will be displayed if you replace `add(new JButton("OK"))` with `add(jbtOK).`
27) What exception type does the following program throw?

```java
public class Test {
    public static void main(String[] args) {
        int[] list = new int[5];
        System.out.println(list[5]);
    }
}
```

A) ClassCastException  
B) ArrayIndexOutOfBoundsException  
C) No exception  
D) StringIndexOutOfBoundsException  
E) ArithmeticException

28) What is displayed on the console when running the following program?

```java
class Test {
    public static void main(String[] args) {
        try {
            System.out.println("Welcome to Java");
            int i = 0;
            int y = 2/i;
            System.out.println("Welcome to Java");
        }
        catch (RuntimeException ex) {
            System.out.println("Welcome to Java");
        }
        finally {
            System.out.println("End of the block");
        }
    }
}
```

A) The program displays Welcome to Java two times.  
B) The program displays Welcome to Java two times followed by End of the block.  
C) The program displays Welcome to Java three times followed by End of the block.  
D) The program displays Welcome to Java three times.
29) What is displayed on the console when running the following program?

```java
class Test {
    public static void main(String[] args) {
        try {
            System.out.println("Welcome to Java");
            int i = 0;
            int y = 2/i;
            System.out.println("Welcome to Java");
        } finally {
            System.out.println("End of the block");
        }
        System.out.println("End of the block");
    }
}
```

A) The program displays Welcome to Java two times followed by End of the block two times.
B) The program displays Welcome to Java two times followed by End of the block.
C) The program displays Welcome to Java three times followed by End of the block.
D) The program displays Welcome to Java and End of the block, and then terminates because of an unhandled exception.
30) What is displayed on the console when running the following program?

class Test {
    public static void main(String[ ] args) {
        try {
            method();
            System.out.println("After the method call");
        } catch (NumberFormatException ex) {
            System.out.println("NumberFormatException");
        } catch (RuntimeException ex) {
            System.out.println("RuntimeException");
        }
    }
    static void method() {
        String s = "5.6";
        Integer.parseInt(s); // Cause a NumberFormatException
        int i = 0;
        int y = 2 / i;
        System.out.println("Welcome to Java");
    }
}

A) The program displays NumberFormatException.
B) The program displays NumberFormatException followed by After the method call.
C) The program has a compilation error.
D) The program displays NumberFormatException followed by RuntimeException.
E) The program displays RuntimeException.

31) What exception type does the following program throw?

class Test {
    public static void main(String[ ] args) {
        Object o = new Object();
        String d = (String)o;
    }
}

A) StringIndexOutOfBoundsException
B) ClassCastException
C) ArrayIndexOutOfBoundsException
D) ArithmeticException
E) No exception
32) What is displayed on the console when running the following program?

```java
class Test {
    public static void main(String[ ] args) {
        try {
            method();
            System.out.println("After the method call");
        } catch (RuntimeException ex) {
            System.out.println("RuntimeException");
        } catch (Exception ex) {
            System.out.println("Exception");
        }
    }

    static void method() throws Exception {
        try {
            String s = "5.6";
            Integer.parseInt(s); // Cause a NumberFormatException
            int i = 0;
            int y = 2 / i;
            System.out.println("Welcome to Java");
        } catch (RuntimeException ex) {
            System.out.println("RuntimeException");
        } catch (Exception ex) {
            System.out.println("Exception");
        }
    }
}
```

A) The program has a compilation error.
B) The program displays Exception followed by RuntimeException.
C) The program displays RuntimeException followed by After the method call.
D) The program displays RuntimeException twice.
E) The program displays Exception twice.

33) A method must declare to throw ________.

A) Error  B) RuntimeException  C) checked exceptions  D) unchecked exceptions

34) Which of the following is not an advantage of Java exception handling?

A) Java separates exception handling from normal processing tasks.
B) Exception handling simplifies programming because the error-reporting and error-handling code can be placed at the catch block.
C) Exception handling makes it possible for the caller's caller to handle the exception.
D) Exception handling improves performance.
35) Analyze the following code:

```java
class Test {
    public static void main(String[] args)
        throws MyException {
        System.out.println("Welcome to Java");
    }
}

class MyException extends Error {
}
```

A) You cannot declare an exception in the main method.
B) You should not declare a class that extends Error, because Error raises a fatal error that
    terminates the program.
C) You declared an exception in the main method, but you did not throw it.
D) The program has a compilation error.

36) Analyze the following code:

```java
class Test {
    public static void main(String[] args) {
        try {
            String s = "5.6";
            Integer.parseInt(s); // Cause a NumberFormatException
            int i = 0;
            int y = 2 / i;
        }
        catch (Exception ex) {
            System.out.println("NumberFormatException");
        }
        catch (RuntimeException ex) {
            System.out.println("RuntimeException");
        }
    }
}
```

A) The program displays NumberFormatException followed by RuntimeException.
B) The program has a compilation error.
C) The program displays RuntimeException.
D) The program displays NumberFormatException.

37) Assume Calendar calendar = new GregorianCalendar(). ________ returns the week of the year.

A) calendar.get(Calendar.MONTH_OF_YEAR)
B) calendar.get(Calendar.MONTH)
C) calendar.get(Calendar.WEEK_OF_YEAR)
D) calendar.get(Calendar.WEEK_OF_MONTH)
38) The `java.lang.Number` and its subclasses are introduced in Chapter 11. Analyze the following code.

```java
Number numberRef = new Integer(0);
Double doubleRef = (Double)numberRef;
```

A) You can convert an int to double, so you can cast an Integer instance to a Double instance.
B) A runtime class casting exception occurs, since `numberRef` is not an instance of `Double`.
C) The program runs fine, since `Integer` is a subclass of `Double`.
D) The compiler detects that `numberRef` is not an instance of `Double`.
E) There is no such class named `Integer`. You should use the class `Int`.

39) The `java.lang.Comparable` interface is introduced in Chapter 11. Analyze the following code:
(Choose all that apply.)

```java
public class Test1 {
    public Object max(Object o1, Object o2) {
        if (((Comparable)o1).compareTo(o2) >= 0) {
            return o1;
        } else {
            return o2;
        }
    }
}
```

A) The program has a compile error because `Test1` does not have a main method.
B) The program would compile if `((Comparable)o1).compareTo(o2) >= 0` is replaced by `((Comparable)o1).compareTo(o2) >= 0`.
C) The program has a compile error because you cannot cast an Object instance `o1` into `Comparable`.
D) The program has a compile error because `o1` is an `Object` instance and it does not have the `compareTo` method.

40) ________ is a reference type. (Choose all that apply.)

A) A class type 
B) An interface type
C) A primitive type 
D) An array type
41) Which statements are most accurate regarding the following classes?

```java
class A {
    private int i;
    protected int j;
}

class B extends A {
    private int k;
    protected int m;
    // some methods omitted
}
```

A) In the class B, an instance method can only access k, m.
B) In the class B, an instance method can only access i, j, k, m.
C) In the class B, an instance method can only access j, m.
D) In the class B, an instance method can only access j, k, m.

42) Analyze the following code.

```java
1. public class Test {
2.   public static void main(String[] args) {
3.     Fruit[] fruits = {new Fruit(2), new Fruit(3), new Fruit(1)};
4.     java.util.Arrays.sort(fruits);
5.   }
6. }

class Fruit {
    private double weight;
    public Fruit(double weight) {
        this.weight = weight;
    }
}
```

A) The program has a compile error because the Fruit class does not have a default constructor.
B) The program has a runtime error on Line 3 because the Fruit class does not have a default constructor.
C) The program has a runtime error on Line 4 because the Fruit class does not implement the java.lang.Comparable interface and the Fruit objects are not comparable.
D) The program has a compile error on Line 4 because the Fruit class does not implement the java.lang.Comparable interface and the Fruit objects are not comparable.

43) Which of the following class definitions defines a legal abstract class?

A) abstract class A { abstract void unfinished(); }
B) class A { abstract void unfinished() {} }
C) class A { abstract void unfinished(); }
D) public class abstract A { abstract void unfinished(); }

44) BigInteger and BigDecimal are immutable

A) true  B) false
45) The printout from the following code is _______.

```java
java.util.ArrayList list = new java.util.ArrayList();
list.add("New York");
java.util.ArrayList list1 = list;
list.add("Atlanta");
list1.add("Dallas");
System.out.println(list1);
```

A) [New York] B) [New York, Atlanta, Dallas] C) [New York, Atlanta] D) [New York, Dallas]

46) To create an Image object from an ImageIcon object imageIcon, use the _______ method.

A) imageIcon.setImage() B) imageIcon.image() C) imageIcon.returnImage() D) imageIcon.getImage()

47) Given a Graphics object g, to draw an circle with radius 20 centered at (50, 50), you use _______.

A) g.drawOval(30, 30, 40, 40) B) g.drawOval(30, 30, 20, 20) C) g.drawOval(50, 50, 20, 20) D) g.drawOval(50, 50, 40, 40)

48) The header for the paintComponent method is _______.

A) protected void paintComponent(Graphics g) B) protected void paintComponent() C) public void paintComponent(Graphics g) D) private void paintComponent(Graphics g)

49) The coordinate of the upper-left corner of a frame is _______.

A) (10, 10) B) (25, 25) C) (100, 100) D) (0, 0)

50) Which of the following statements are true? (Choose all that apply.)

A) The Graphics object is automatically created for each visible GUI component.
B) Each GUI component contains a Graphics object that can be obtained using getGraphics() method.
C) If a GUI component is not visible, getGraphics() returns null.
D) Once a GUI component is visible, getGraphics() returns the object.

51) To draw graphics, it is better to declare a class that extends _______ and override the paintComponent method.

A) JLabel B) JButton C) JComponent D) JPanel

52) Given a Graphics object g, to draw a polyline to connect points (3, 3), (4, 10), (10, 20), (2, 100), you use _______.

A) g.drawPolyline(new int[] {3, 4, 10, 2}, new int[] {3, 10, 20, 100}, 4) B) g.drawPolygon(new int[] {3, 4, 10, 2, 3, 10, 20, 100}, 4) C) g.drawPolyline(new int[] {3, 4, 10, 2, 3, 10, 20, 100}, 4) D) g.drawPolygon(new int[] {3, 4, 10, 2}, new int[] {3, 10, 20, 100}, 4)
53) Analyze the following code.

```
1. import java.awt.*;
2. import java.awt.event.*;
3. import javax.swing.*;
4. 
5. public class Test extends JFrame {
6.   public Test() {
7.       JButton jbtOK = new JButton("OK");
8.       JButton jbtCancel = new JButton("Cancel");
9.       getContentPane().add(jbtOK);
10.      getContentPane().add(jbtCancel);
11.      jbtOK.addActionListener(this);
12.      jbtCancel.addActionListener(this);
13.   }
14. 
15.   public void actionPerformed(ActionEvent e) {
16.      System.out.println("A button is clicked");
17.   }
18. 
19.   public static void main(String[] args) {
20.      JFrame frame = new Test();
21.      frame.setSize(300, 300);
22.      frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
23.      frame.setVisible(true);
24.   }
25. }
```

A) The program has runtime errors on Lines 9 and 10 because jbtOK and jbtCancel are added to the same location in the container.
B) The program has compile errors on Line 15 because the signature of actionPerformed is wrong.
C) The program has compile errors on Line 20 because new Test() is assigned to frame (a variable of JFrame).
D) The program has compile errors on Lines 11 and 12 because Test does not implement ActionListener.
E) None of the above.

54) To listen to keyboard actions, the listener must implement the _______ interface or extend the _______ class.
A) ComponentListener/ComponentAdapter  
B) WindowListener/WindowAdapter
C) KeyListener/KeyAdapter  
D) MouseListener/MouseAdapter

55) The getKeyCode() method of the KeyEvent returns _______.
A) the ASCII code of the character  
B) the Unicode code of the character
C) a character  
D) None of the above.

56) What is the value of evt.getKeyCode() or evt.getChar() for the keyTyped() events?
A) A character  
B) VK_UNDEFINED
C) The ASCII code of the character  
D) The Unicode code of the character
57) The listener's ________ method is invoked after a mouse button is released? (Choose all that apply.)
   A) public void mouseExited(MouseEvent e)
   B) public void mouseEntered(MouseEvent e)
   C) public void mouseClicked(MouseEvent e)
   D) public void mousePressed(MouseEvent e)
   E) public void mouseReleased(MouseEvent e)

58) Suppose A is an anonymous inner class in Test. A is compiled into a file named ________.
   A) A$Test.class
   B) A.class
   C) Test$A.class
   D) Test&1.class
   E) Test$1.class

59) ________ returns the selected item on a JComboBox j cbo.
   A) j cbo.getSelectedItem()
   B) j cbo.getSelectedIndex()
   C) j cbo.getSelectedItems()
   D) j cbo.getSelectedIndices()

60) How many items can be added into a JComboBox object?
   A) 0
   B) 2
   C) 1
   D) Unlimited

61) The method ________ adds a text area jta to a scrollpane j ScrollPane.
   A) j ScrollPane.insert(jta)
   B) j ScrollPane.addItem(jta)
   C) j ScrollPane.add(jta)
   D) None of the above.

62) ________ allows selections of multiple contiguous items without restrictions. (Choose all that apply.)
   A) Multiple-interval selection
   B) Single selection
   C) Single-interval selection
   D) Default selection

63) Which of the following statements are true? (Choose all that apply.)
   A) You can specify a horizontal text alignment in a text field.
   B) You can create a text field with a specified text.
   C) You can specify the number of columns in a text field.
   D) You can disable editing on a text field.

64) How many items can be selected from a JComboBox object at a time?
   A) 1
   B) 2
   C) 0
   D) Unlimited

65) Analyze the following code.

   // Program 1:
   public class Test {
      public static void main(String[ ] args) {
         Object a1 = new A();
         Object a2 = new A();
         System.out.println(a1.equals(a2));
      }
   }

   class A {
int x;

public boolean equals(A a) {
    return this.x == a.x;
}
}

// Program 2:
public class Test {
    public static void main(String[] args) {
        A a1 = new A();
        A a2 = new A();
        System.out.println(a1.equals(a2));
    }
}

class A {
    int x;

    public boolean equals(A a) {
        return this.x == a.x;
    }
}

A) Program 1 displays false and Program 2 displays true  
B) Program 1 displays false and Program 2 displays false  
C) Program 1 displays true and Program 2 displays true  
D) Program 1 displays true and Program 2 displays false

66) What is the output of the following code:

public class Test {
    public static void main(String[] args) {
        Object o1 = new Object();
        Object o2 = new Object();
        System.out.println((o1 == o2) + " " + (o1.equals(o2)));
    }
}

A) true false    B) false false    C) false true    D) true true

67) Which of the following classes cannot be extended?

A) final class A {  }  
B) class A { private A();}  
C) class A { protected A();}  
D) class A { }

68) Which of the following statements are true? (Choose all that apply.)

A) A method can be overridden in the same class.
B) A method can be overloaded in the same class.
C) If a method overrides another method, these two methods must have the same signature.
D) If a method overloads another method, these two methods must have the same signature.
69) Analyze the following code: (Choose all that apply.)

import java.util.StringTokenizer;

public class A extends StringTokenizer {
}

A) The program would compile fine if you add the following constructor into A: A(String s) {} 
B) The program would compile fine if you add the following constructor into A: A(String s) { super(s); }
C) The program has a compilation error because A does not have a default constructor.
D) The program has a compilation error because the default constructor of A invokes the default constructor of StringTokenizer, but StringTokenizer does not have a default constructor.

70) Can you use the getWidth method to get a width for _______? (Choose all that apply.)

A) JComponent 
B) JLabel 
C) Component 
D) Container 
E) JButton

71) Can you use the setBackground method to set a back ground color for _______? (Choose all that apply.)

A) JButton 
B) Container 
C) Component 
D) JComponent 
E) JLabel

72) Analyze the following code.

import java.awt.*; 
import javax.swing.*;

public class Test {
  public static void main(String[ ] args) {
    Component c = new JButton("OK");
    JFrame frame = new JFrame("My Frame");
    frame.add(c);
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    frame.setVisible(true);
  }
}

A) You cannot assign a JButton to a variable of java.awt.Component. 
B) You cannot create a JFrame using new JFrame("My Frame").
C) You can only add c to a container because c’s type is Component.
D) You cannot add a Swing component directly to a JFrame using add(c) prior to JDK 1.4, but it is OK in JDK 1.5.
73) Suppose a JFrame uses the GridLayout(2, 2). If you add six buttons to the frame, how many columns are displayed?
A) 1  B) 3  C) 4  D) 2

74) What is displayed on the console when running the following program?

```java
class Test {
    public static void main(String[] args) {
        try {
            System.out.println("Welcome to Java");
            int i = 0;
            int y = 2/i;
            System.out.println("Welcome to HTML");
        }
        finally {
            System.out.println("The finally clause is executed");
        }
    }
}
```

A) The program displays three lines: Welcome to Java, Welcome to HTML, The finally clause is executed.
B) Welcome to Java.
C) Welcome to Java followed by The finally clause is executed in the next line.
D) None of the above.

75) Which of the following statements are true? (Choose all that apply.)
A) A method may declare to throw multiple exceptions.
B) You use the keyword throws to declare exceptions in the method heading.
C) If a checked exception occurs in a method, it must be either caught or declared to be thrown from the method.
D) To throw an exception, use the keyword throw.
76) What is displayed on the console when running the following program?

```java
class Test {
    public static void main(String[] args) {
        try {
            System.out.println("Welcome to Java");
            int i = 0;
            double y = 2.0 / i;
            System.out.println("Welcome to HTML");
        } finally {
            System.out.println("The finally clause is executed");
        }
    }
}
```

A) Welcome to Java.
B) The program displays three lines: Welcome to Java, Welcome to HTML, The finally clause is executed.
C) Welcome to Java followed by The finally clause is executed in the next line.
D) None of the above.

77) The java.util.Calendar and java.util.GregorianCalendar classes are introduced in Chapter 11.

Analyze the following code.

```java
1. import java.util.*;
2. public class Test {
3.    public static void main(String[] args) {
4.        Calendar[] calendars = new Calendar[10];
5.        calendars[0] = new Calendar();
6.        calendars[1] = new GregorianCalendar();
7.    }
8. }
```

A) The program has a compile error on Line 4 because java.util.Calendar is an abstract class.
B) The program has a compile error on Line 6 because Calendar[1] is not of a GregorianCalendar type.
C) The program has no compile errors.
D) The program has a compile error on Line 5 because java.util.Calendar is an abstract class.

78) Suppose A is an interface, B is a concrete class with a default constructor that implements A.

Which of the following is correct? (Choose all that apply.)

A) A a = new A();
B) A a = new B();
C) B b = new B();
D) B b = new A();

79) Which of the following statements are true? (Choose all that apply.)

A) If you compile an interface without errors, but with warnings, a .class file is created for the interface.
B) If you compile a class with errors, a .class file is created for the class.
C) If you compile an interface without errors, a .class file is created for the interface.
D) If you compile a class without errors but with warnings, a .class file is created.
80) Which of the following methods draws a filled 3D rectangle? (Choose all that apply.)
   A) g.fill3DRect(50, 50, 20, 30, 1)
   B) g.fill3DRect(50, 50, 20, 30)
   C) g.fill3DRect(50, 50, 20, 30, true)
   D) g.fill3DRect(50, 50, 20, 30, false)

81) You can draw graphics on any GUI components.
   A) true
   B) false

82) Invoking ________ returns the width of the string in a FontMetrics object fm.
   A) fm.getHeight(s)
   B) getLength(s)
   C) fm.getWidth(s)
   D) fm.stringWidth(s)

83) To detect whether the right button of the mouse is pressed, you use the method ________ in the
    MouseEvent object evt.
   A) evt.isAltDown()
   B) evt.isShiftDown()
   C) evt.isControlDown()
   D) evt.isMetaDown()

84) To listen to mouse clicked events, the listener must implement the ________ interface or extend the
    ________ adapter.
   A) MouseMotionListener/MouseMotionAdapter
   B) MouseListener/MouseAdapter
   C) WindowListener/WindowAdapter
   D) ComponentListener/ComponentAdapter

85) Which of the following statements are true? (Choose all that apply.)
   A) JSlider fires an AdjustmentEvent.
   B) A listener of a JSlider must implement ChangeEvent and the stateChanged method.
   C) JSlider fires an ActionEvent.
   D) You can create a JSlider bar by specifying its orientation.
   E) JSlider fires a javax.swing.event.ChangeEvent.

86) Clicking a JRadioButton generates ________ events. (Choose all that apply.)
   A) ItemEvent
   B) ComponentEvent
   C) ContainerEvent
   D) ActionEvent

87) Encapsulation means ________.
   A) that data fields should be declared private
   B) that a class can contain another class
   C) that a variable of supertype can refer to a subtype object
   D) that a class can extend another class

88) Invoking ________ removes all elements in an ArrayList x.
   A) x.empty()
   B) x.remove()
   C) x.clean()
   D) x.delete()
   E) x.clear()
89) You can use methods ______ on any instance of java.awt.Component. (Choose all that apply.)
A) setForeground
B) getFont
C) setFont
D) setBackground
E) setLayout

90) What is displayed on the console when running the following program?

class Test {
    public static void main (String[ ] args) {
        try {
            System.out.println("Welcome to Java");
            return;
        } finally {
            System.out.println("The finally clause is executed");
        }
    }
}

A) Welcome to Java followed by The finally clause is executed in the next line
B) Welcome to Java
C) The finally clause is executed
D) None of the above

91) Which of the following statements are correct? (Choose all that apply.)
A) Object i = 4.5;
B) Number i = 4.5;
C) Integer i = 4.5;
D) Double i = 4.5;

92) Which of the following statements are true? (Choose all that apply.)
A) Whenever a GUI component is displayed, its Graphics object is automatically created.
B) You may create a Graphics object using new Graphics().
C) Invoking repaint() causes paintComponent to be invoked by the JVM.
D) The paintComponent method is automatically invoked by the JVM. You should never invoke it directly.

93) Which of the following statements are true? (Choose all that apply.)
A) You can add a listener in the Timer constructor.
B) You can specify a delay using the setDelay method.
C) You can specify a delay in the Timer constructor.
D) You can use the addActionListener method in the Timer class to add a listener.

94) Clicking a JComboBox object generates an ItemEvent event,
A) if a new item is selected. 
B) if an item is selected.
95) Analyze the following code:

```java
public class Test {
    public static void main(String[ ] args) {
        B b = new B();
        b.m(5);
        System.out.println("i is " + b.i);
    }
}

class A {
    int i;
    public void m(int i) {
        this.i = i;
    }
}

class B extends A {
    public void m(String s) {
    }
}
```

A) The program has a compilation error, because b.m(5) cannot be invoked since the method m(int) is hidden in B.
B) The program has a runtime error on b.i, because i is not accessible from b.
C) The program has a compilation error, because m is overridden with a different signature in B.
D) The method m is not overridden in B. B inherits the method m from A and defines an overloaded method m in B.

96) Which of the following statements is for placing the frame's upper left corner to (200, 100)?

A) frame.setLocation(200, 200)  
B) frame.setLocation(100, 100)  
C) frame.setLocation(200, 100)  
D) frame.setLocation(100, 200)
97) What is displayed on the console when running the following program?

```java
class Test {
    public static void main(String[] args) {
        try {
            System.out.println("Welcome to Java");
            int i = 0;
            int y = 2/i;
            System.out.println("Welcome to Java");
        } catch (RuntimeException ex) {
            System.out.println("Welcome to Java");
        }
        finally {
            System.out.println("End of the block");
        }
        System.out.println("End of the block");
    }
}
```

A) You cannot catch RuntimeException errors.
B) The program displays Welcome to Java two times followed by End of the block.
C) The program displays Welcome to Java two times followed by End of the block two times.
D) The program displays Welcome to Java three times followed by End of the block.

98) What is the output of the following code?

```java
public class Test {
    public static void main(String[] args) {
        java.math.BigInteger x = new java.math.BigInteger("3");
        java.math.BigInteger y = new java.math.BigInteger("7");
        x.add(y);
        System.out.println(x);
    }
}
```

A) 10  B) 11  C) 3  D) 4

99) The following are the methods to obtain font properties in a FontMetrics object fm. (Choose all that apply.)

A) fm.getHeight()  B) fm.getLeading()
C) fm.getAscent()  D) fm.getDescent()

100) The component that processes the listener is called ________.

A) the listener object  B) the adapter object
C) the source object  D) the adaptee object