1.   Which of the following are Java integer data types?

    (A)   byte, short, integer and longInteger
    (B)   shortInt, int and longInt
    (C)   byteInt, shortInt, int and longInt
    (D)   byte, short, int and long

---

2.   Which real number data type is the most accurate?

    (A)   double
    (B)   float
    (C)   long
    (D)   real
    (E)   scientific

---

3.   Which of the following is not a common binary arithmetic operator for real numbers?

    (A)   +
    (B)   -
    (C)   *
    (D)   %
    (E)   /

---

4.   The expression **++q** will _____ execute the same as the expression **q++**.

    (A)   always
    (B)   never
    (C)   sometimes
    (D)   always (provided that q is an int data type)

---

5.   What is true about the following program segment?

    int x = 10;
    System.out.println(x);
    x += ++x + x++;
    System.out.println(x);

    (A)   The syntax is correct.
    (B)   The segment will display two values for variable x.
    (C)   This segment displays a program style, which should not be used.
    (D)   All of the above

---

6.   What is the output of the following program statement?

    int q = 10;
    System.out.print(q + " ");
    q += 20;
    System.out.println(q);
    q *= 5;

    (A)   30 150
    (B)   10 30 150
    (C)   10 30
    (D)   1020

7.   What is the output of the program segment below?

```
int age = 25;
String firstName = "John";
String lastName = "Doe";
System.out.println(firstName + "\n" + lastName + "\n" + age);
```

(A)   JohnDoe25

(B)   John Doe 25

(C)   John
        Doe
        25

(D) Error Message

---

8.   What is the output of the program segment below?

```
final int num1 = 100;
final double num2 = 123.321;
System.out.println(num1 + " " + num2);
num1 = 200;
num2 = 321.123;
System.out.println(num1 + " " + num2);
```

(A)   100 123.321
        200 321.123

(B)   200 321.123
        200 321.123

(C)   100 123.321
        100 123.321

(D)   Compile Error message

---

9.   What is the output of the program segment below?

```
int num1 = 500;
int num2 = 200;
int num3 = 300;
double average = (num1 + num2 + num3) / 3;
System.out.println(average);
```
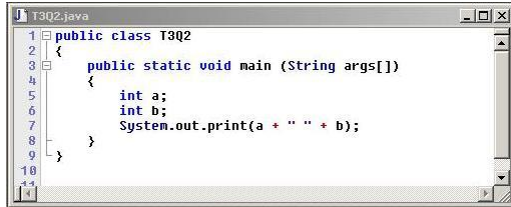
(A)   800
(B)   333
(C)   333.333333333333
(D)   Error message

---

10.   What is the output of the program segment below?

```
int var1 = 65;
char var2 = (char) var1;
double var3 = (double) var2;
System.out.println(var1 + " " + var2 + " " + var3);
```

(A)   65 65 65
(B)   A A A
(C)   65 A 65.0
(D)   Error message
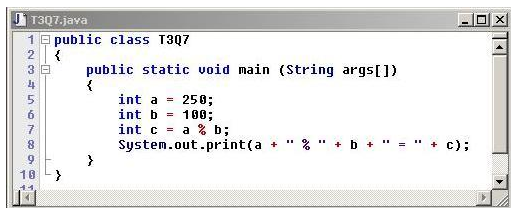
11. What is the output of this program?

```
T3Q2.java                                    _ □ ×
 1 ⊟ public class T3Q2
 2   {
 3 ⊟     public static void main (String args[])
 4       {
 5           int a;
 6           int b;
 7           System.out.print(a + " " + b);
 8       }
 9   }
10
```
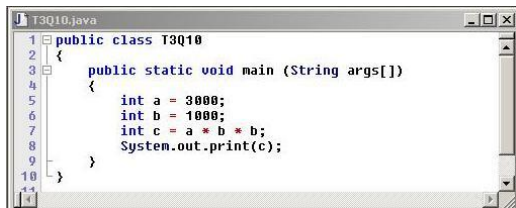
(A) 00
(B) 0 0
(C) 2 random integers
(D) Compile Error

12. What is the output of this program?

```
T3Q7.java                                    _ □ ×
 1 ⊟ public class T3Q7
 2   {
 3 ⊟     public static void main (String args[])
 4       {
 5           int a = 250;
 6           int b = 100;
 7           int c = a % b;
 8           System.out.print(a + " % " + b + " = " + c);
 9       }
10   }
```

(A) 250 % 100 = 2
(B) 250 % 100 = 2.5
(C) 250 % 100 = 50
(D) 100 % 250 = 0
(E) 100 % 250 = 0.4
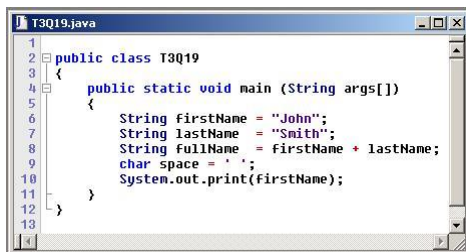

13. What is the output of this program?

```
T3Q10.java                                   _ □ ×
 1 ⊟ public class T3Q10
 2   {
 3 ⊟     public static void main (String args[])
 4       {
 5           int a = 3000;
 6           int b = 1000;
 7           int c = a * b * b;
 8           System.out.print(c);
 9       }
10   }
```

(A) 3000
(B) 3000000
(C) 3000000000
(D) Compile Error
(E) A negative number, caused by an overflow
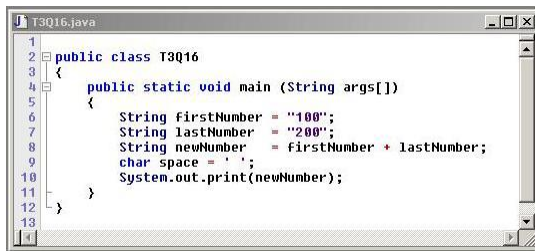

14. What is the output of this program?

```
T3Q19.java                                   _ □ ×
 1
 2 ⊟ public class T3Q19
 3   {
 4 ⊟     public static void main (String args[])
 5       {
 6           String firstName = "John";
 7           String lastName  = "Smith";
 8           String fullName  = firstName + lastName;
 9           char space = ' ';
10           System.out.print(firstName);
11       }
12   }
13
```

(A) John
(B) Smith
(C) John Smith
(D) JohnSmith
(E) Smith, John

15.   What is the output of this program?

```
T3Q16.java                                    _ | □ | ×
 1
 2  public class T3Q16
 3  {
 4      public static void main (String args[])
 5      {
 6          String firstNumber = "100";
 7          String lastNumber  = "200";
 8          String newNumber   = firstNumber + lastNumber;
 9          char space = ' ';
10          System.out.print(newNumber);
11      }
12  }
13
```

        (A)   100200
        (B)   100 200
        (C)   200100
        (D)   200 100
        (E)   300

---

16.   Which of the following programming features is/are part of Object Oriented Programming?

        (A)   Encapsulation
        (B)   Polymorphism
        (C)   Class interaction
        (D)   All of the above.

---

17.   Object Oriented Programming

        (A)   makes programs more reliable.
        (B)   simulates real life.
        (C)   uses a lot of intimidating vocabulary, which is not as bad as it sounds.
        (D)   does all of the above.

---

18.   What is the value of result in the following statement?

        int result = Math.pow(-2,2);

        (A)   -4.0
        (B)   -0.25
        (C)   0.25
        (D)   4.0
        (E)   NaN
19.   What is the value of result in the following statement?

        int result = Math.floor(9.999999);

        (A)   10
        (B)   9.999999
        (C)   9
        (D)   Error Message

---

20.   What is the value of result in the following statement?

        int result = Math.round(9.500001);

        (A)   10
        (B)   9.500001
        (C)   9
        (D)   Error Message

---

21.   What is the output of the following code segment?

        int a = 25;
        int b = 16;
        int result = Math.sqrt(Math.abs(b-a));
        System.out.println(result);

        (A)   5
        (B)   4
        (C)   3
        (D)   -3
        (E)   NaN

22.   Assume that **a** and **b** are non-equal integers.
        What is the value of **result** in the following statement?

        int result = Math.sqrt(Math.min(a,b)-Math.max(b,a));

        (A)   -25.0
        (B)   -5.0
        (C)   5.0
        (D)   25.0
        (E)   NaN

23.   Assume you have an 800 by 600 applet window and that **g** is an object of the **Graphics** class.
Which of the following commands will draw a diagonal line from the <u>top-left</u> corner to the <u>bottom-right</u> corner?

(A)   g.drawLine(0,0,799,599);
(B)   g.drawLine(0,0,599,799);
(C)   g.drawLine(0,799,0,599);
(D)   g.drawLine(799,599,0,0);
(E)   Both A and D

24.   Assume you have an 800 by 600 applet window and that **g** is an object of the **Graphics** class.
        Which of the following will draw one single pixel?

        (A)   g.drawPixel(100,200);
        (B)   g.drawLine(100,200,100,200);
        (C)   Both A and B
        (D)   Neither A, nor B

25.   Assume you have an 800 by 600 applet window and that **g** is an object of the **Graphics** class.
        Which of the following program segments will make the entire applet window *red*?

        (A)   g.setColor(Color.red);
               g.drawRect(0,0,800,600);   (D)   g.setColor(Color.red);
                                                            g.fillRect(800,600,0,0);

        (B)   g.setColor(Color.red);
               g.drawRect(0,0,600,800);   (E)   g.setColor(Color.red);
                                                            g.fillRect(0,0,600,800);

        (C)   g.setColor(Color.red);
               g.fillRect(0,0,800,600);

26.   The *drawOval* method uses the exact same parameters as what 3 other method(s)?

        (A)   fillOval
        (B)   drawRect
        (C)   fillRect
        (D)   All of the above

27.   If you are using the **drawArc** command, and the 3rd & 4th parameters are equal, and the last parameter is **360**, what will you draw?

        (A)   a circle
        (B)   an oval
        (C)   a semi-circle
        (D)   an incomplete oval (essentially an "arc")
        (E)   There is no way to tell without knowing information on the ther parameters.

28. Assume you have an 800 by 600 applet window and that **g** is an object of the **Graphics** class.
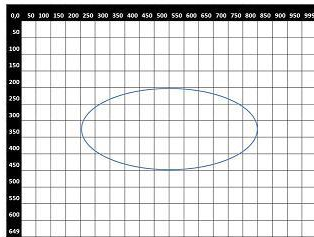Which of the following commands will display a message near the <u>bottom</u> of the screen?

    (A)   g.drawString("APCS is awesome!",200,550);
    (B)   g.drawString("APCS is awesome!",200,750);
    (C)   g.drawString(200,50,"APCS is awesome!");
    (D)   g.drawString(200,550,"APCS is awesome!");

29. Assume you have an 800 by 600 applet window and that **g** is an object of the **Graphics** class.
Also assume the "boxes" shown represent squares that are 100 pixels by 100 pixels.
What is the output of this program segment:

g.setColor(Color.yellow);
g.fillArc(200,100,400,400,45,270);

(A)	(B)
(C)	(D)
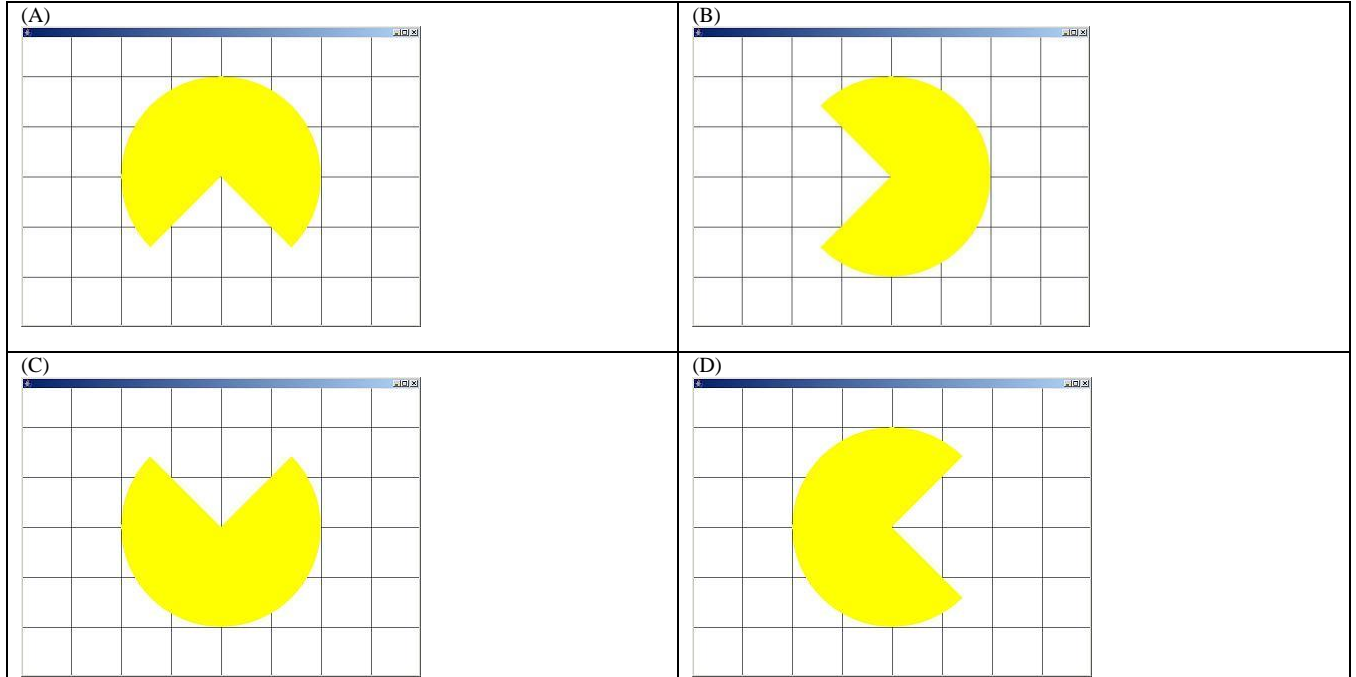
30. Consider this output.

Assume **g** is an object of the **Graphics** class and that the color has already been set.
Which of the following commands will generate this output?

    (A)   g.drawOval(200,200,600,250);
    (B)   g.fillOval(200,200,600,250);
    (C)   g.drawOval(500,325,300,125);
    (D)   g.fillOval(500,325,150,125);

31. Which of the following sentences can be translated into a conditional statement?

    (A)   Tomorrow is the start of the second semester.
    (B)   If you are a national merit finalist, you will receive a scholarship.
    (C)   Your SAT score should be 1250.
    (D)   Go straight to jail; do not pass go; do not collect any money.

32. What is the output of the following program segment?

```
double bonus = 500.0;
double sales = 300000.0;
if (sales >= 300000.0)
        bonus += 250.0;
System.out.println("Bonus: " + bonus);
System.out.println("The End");
```

(A)	(B)	(C)	(D)
Bonus: 50.0 The End	Bonus: 500.0 The End	Bonus: 750.0 The End	No output

33. What is the output of the following program segment?

```
int n1 = 100;
int n2 = 200;
int n3 = n1 / n2;
if (n3 > 0)
{
        n2 = n1;
        n1 = n2;
}
else
{
        n1 = n2;
        n2 = n1;
}
System.out.println(n1 + " " + n2);
```

(A)   100 200
(B)   200 100
(C)   200 200
(D)   100 100

34. What is the output of the following program segment?

```
int k = 100;
k /=3;
if (k < 30)
{
        k++;
        k = k % 5;
}
else
{
        k--;
        k = k % 5;
}
System.out.println("k = "+k);
```

(A)   k = 0
(B)   k = 1
(C)   k = 2
(D)   k = 30
(E)   k = 32

35. What is the value of **num** at the conclusion of the following program segment?

```
char qwerty = 'B';
int num = 100;
switch(qwerty)
{
        case 'A': num ++; break;
        case 'B': num += 2;
        case 'C': num += 3; break;
        case 'D': num += 4;
}
```

(A)   100
(B)   102
(C)   105
(D)   109
(E)   Error message

36. The **do..while** loop structure uses what kind of Repetition?

(A) pre-condition
(B) post-condition
(C) fixed
(D) multi-condition

---

37. What is the output of the following program segment?

```
int x,y;
y = 0;
for (x = 1; x <= 5; x++)
        y++;
        y++;
System.out.println("y = " + y);
```

(A) y = 5
(B) y = 6
(C) y = 10
(D) y = 11
(E) y = 12

---

38. What is the output of the following program segment?

```
for (int k = 0; k <= 10; k+=3)
        System.out.println("What is OOP?");
```

(A) What is OOP?
    What is OOP?
    What is OOP?
    What is OOP?
    What is OOP?
    What is OOP?

(B) What is OOP?
    What is OOP?
    What is OOP?
    What is OOP?
    What is OOP?

(C) What is OOP?
    What is OOP?
    What is OOP?
    What is OOP?

(D) What is OOP?

(E) No Output

---

39. What is the LAST number output from the following program segment?

```
int j,k;
for (j = 1; j < 30; j*=3)
{
        k = 2 * j;
        System.out.println(j);
}
```

(A) 27
(B) 29
(C) 30
(D) 54

---

40. What is the output of the following program segment?

```
int j;
j = 25;
while (j > 2)
{
        j/=2;
        System.out.print(j + " ");
}
```

(A) 25 12 6 3

(B) 25 13 7 4 2

(C) 25 12 6 3 1

(D) 12 6 3 1

(E) 12 6 3

41.   What are the <u>FIRST</u> and <u>LAST</u> numbers output from the following program segment?

```
int j = 10;
do
{
    j++;
    System.out.println(j);
}
while (j<=25);
```
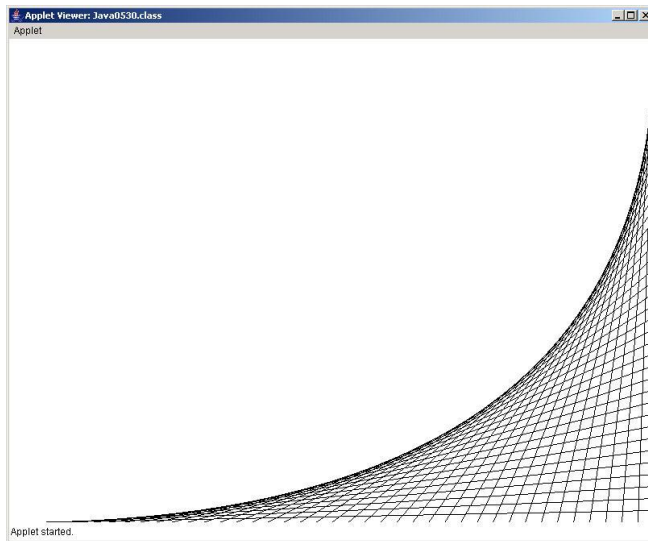
(A)   10 and 24
(B)   10 and 25

(C)   11 and 24
(D)   11 and 25
(E)   11 and 26

42.   What are the FIRST and LAST numbers output from the following program segment?

```
int j = 10;
do
{
    System.out.println(j);
    j++;
}
while (j<=25);
```

(A)   10 and 24
(B)   10 and 25
(C)   11 and 24

(D)   11 and 25
(E)   11 and 26

43.   Which of the following loop structures created this output?

(A)   for (int y = 0; y <= 600; y += 20)
          g.drawLine(0,300,400,y);

(B)   for (int x = 0; x <= 800; x += 20)
          g.drawLine(400,300,x,600);

(C)   g.drawRect(50,50,500,500);
      for (int x = 50; x <= 550; x += 10)
          g.drawLine(x,50,600-x,550);
      for (int y = 50; y <= 550; y += 10)
          g.drawLine(50,y,550,600-y);

(D)   int y = 600;
      for (int x = 0; x <= 800; x += 20)
      {
          g.drawLine(x,600,800,y);
          y-=15;
      }

(E)   for (int y = 0; y <= 600; y += 20)
          g.drawLine(0,300,400,y);
      for (int y = 0; y <= 600; y += 20)
          g.drawLine(800,300,400,y);

44.   Which of the following loop structures created this output?
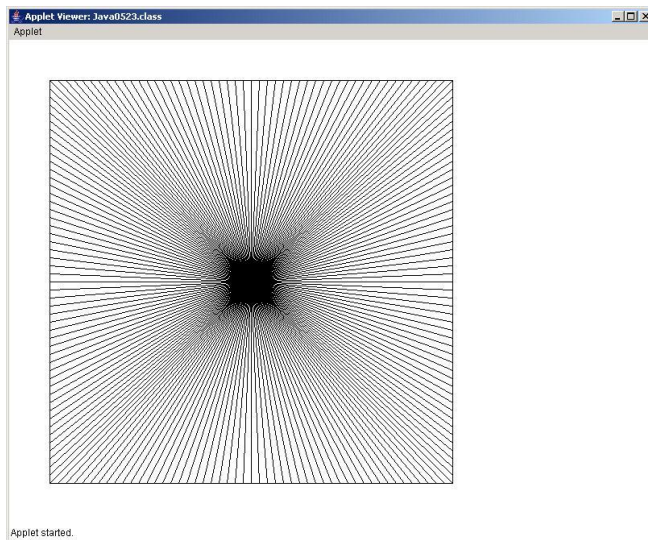
(A)   **for (int y = 0; y <= 600; y += 20)**
            g.drawLine(0,300,400,y);

(B)   **g.drawRect(50,50,500,500);**
            for (int x = 50; x <= 550; x += 10)
                g.drawLine(x,50,600-x,550);

(C)   **g.drawRect(50,50,500,500);**
            for (int x = 50; x <= 550; x += 10)
                g.drawLine(x,50,600-x,550);
            for (int y = 50; y <= 550; y += 10)
                g.drawLine(50,y,550,600-y);

(D)   **int y = 600;**
            for (int x = 0; x <= 800; x += 20)
            {
                g.drawLine(x,600,800,y);
                y-=15;
            }

(E)   **for (int y = 0; y <= 600; y += 20)**
                g.drawLine(0,300,400,y);
            for (int y = 0; y <= 600; y += 20)
                g.drawLine(800,300,400,y);

---

45.   **drawPolygon** & **fillPolygon** are both methods of the _____ class.

(A)   Math
(B)   Random
(C)   DecimalFormat
(D)   Polygon
(E)   Graphics

---

46.   **nextInt** & **nextDouble** are both methods of which classes?

(A)   Math and Random
(B)   Random and Scanner
(C)   DecimalFormat and Color
(D)   Polygon and Graphics
(E)   Graphics and Scanner

---

47.   What can you determine from the source code of a program that displays random numbers
        if this line is near the top of the file?

        Random rand = new Random(12345);

(A)   The output will be the same every time you execute the program.
(B)   The output will be different every time you execute the program.
(C)   You cannot determine anything without seeing the program.

48.   Look at this program segment:

Random rand = new Random();
System.out.println(rand.nextInt(901)+100);

What is the range of numbers that can be displayed by this program segment?

(A)   100..901
(B)   100..999
(C)   100..1000
(D)   100..1001

---

49.   Assume **rand** is an object of the **Random** class. Which of the following will generate a random integer in this range: 1..2013 ?

(A)   System.out.println(rand.nextInt(2012));
(B)   System.out.println(rand.nextInt(2013));
(C)   System.out.println(rand.nextInt(2013)+1);
(D)   System.out.println(rand.nextInt(2014)-1);

---

50.   Assume **g** is an object of the **Graphics** class.
        Which of the following is using an *anonymous object*?

(A)   g.setColor(green);

(B)   g.setColor(Color.green);

(C)   g.setColor(new Color(20,200,20));

(D)   Color myGreen = new Color(20,200,20);
        g.setColor(myGreen);

---

51.   Look at this program segment:

DecimalFormat output = new DecimalFormat("000");
System.out.println(output.format(1));
System.out.println(output.format(12));
System.out.println(output.format(123));
System.out.println(output.format(1234));

What is the output of this program?

(A)	(B)	(C)
1	0001	001
12	00012	012
123	000123	123
1234	0001234	123

(D)	(E)	
001	001	
012	012	
123	123	
1234	Error	

---

52.   Look at this program segment:

DecimalFormat money = new DecimalFormat("$0,000.00");
System.out.println(money.format(1234.5));
System.out.println(money.format(6623.811));
System.out.println(money.format(3));

What is the output of this program?

(A)	(B)	(C)
1234.5	1234.50	$1234.50
6623.811	6623.81	$6623.81
3	0003.00	$0003.00

(D)	(E)	
1,234.50	$1,234.50	
6,623.81	$6,623.81	
0,003.00	$0,003.00	

53.   Look at this program segment:

```
Random rndInt = new Random(12345);
for (int k = 1; k <= 1000; k++)
{
        int x1 = rndInt.nextInt(800);
        int y1 = rndInt.nextInt(600);
        int x2 = rndInt.nextInt(800);
        int y2 = rndInt.nextInt(600);
        g.drawLine(x1,y1,x2,y2);
}
```

This program draws random lines all over an 800 x 600 applet window.
How would you change this program to make it display half as many **LINES**?

(A)   Change the 1000 to 500
(B)   Change the 800's to 400's
(C)   Change the 600's to 300's
(D)   All of the above
(E)   Choices B and C only

---

54.   Look at this program segment:

```
Random rndInt = new Random(12345);
for (int k = 1; k <= 1000; k++)
{
        int x1 = rndInt.nextInt(800);
        int y1 = rndInt.nextInt(600);
        int x2 = rndInt.nextInt(800);
        int y2 = rndInt.nextInt(600);
        g.drawLine(x1,y1,x2,y2);
}
```

This program draws random lines all over an 800 x 600 applet window.
How would you change this program to make the lines draw only in the **TOP-LEFT QUARTER** of the screen?

(A)   Change the 1000 to 500
(B)   Change the 800's to 400's
(C)   Change the 600's to 300's
(D)   All of the above
(E)   Choices B and C only

---

55.   Which of the following program scenarios can cause a problem when using the *Scanner* class?

(A) The program enters only numbers (ints or doubles)
(B) The program enters only Strings
(C) The program enters a number (int or double) BEFORE entering a string.
(D) The program enters a number (int or double) AFTER entering a string.

---

56.   Assume **g** is an object of the **Graphics** class.
Which of the following will change the graphics color to a shade of **blue**?

(A)   g.setColor(new Color(200,0,0));
(B)   g.setColor(new Color(200,200,200));
(C)   g.setColor(new Color(0,0,200));
(D)   g.setColor(new Color(255,255,255));
(E)   g.setColor(new Color(0,200,0));

---

57.   Assume **g** is an object of the **Graphics** class.
Which of the following will change the graphics color to a shade of **white**?

(A)   g.setColor(new Color(200,0,0));
(B)   g.setColor(new Color(200,200,200));
(C)   g.setColor(new Color(0,0,200));
(D)   g.setColor(new Color(255,255,255));
(E)   g.setColor(new Color(0,200,0));

58.   What is the output of this program segment?

```
Random rnd = new Random(1234);
for (int count = 1; count <= 1000; count++)
{
    int red = rnd.nextInt(256);
    int green = rnd.nextInt(256);
    int blue = rnd.nextInt(256);
    g.setColor(new Color(red,green,blue));
    int x1 = rnd.nextInt(800);
    int y1 = rnd.nextInt(600);
    int x2 = rnd.nextInt(800);
    int y2 = rnd.nextInt(600);
    int diameter = rnd.nextInt(200);
    int shape = rnd.nextInt(3);

    switch (shape)
    {
        case 0 : g.drawLine(x1,y1,x2,y2); break;
        case 1 : g.fillRect(x1,y1,50,50); break;
        case 2 : g.fillOval(x1,y1,diameter,diameter);
    }
}
```

(A)

(B)

(C)

(D)
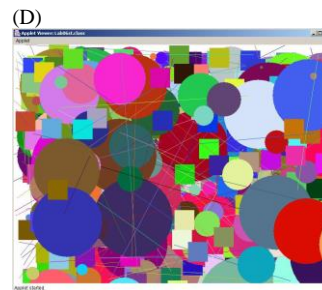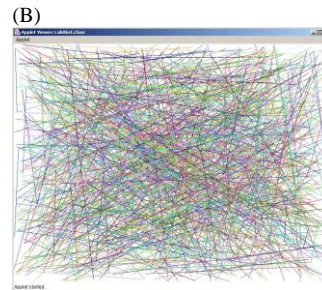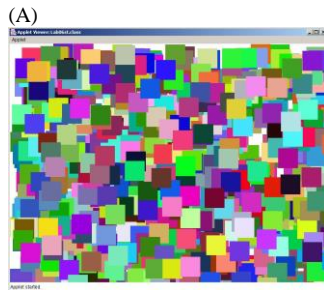
(E) No Output

59.   Which of the following program segments generates a random integer in the range [1000 . . . 9999] ?

(A)   **int range = 9999 - 1000 + 1;**
        int randInt = (int) Math.random() * range + 1000;

(C)   **int randInt = (int) (Math.random() * 9999) + 1000;**

(B)   **int range = 9999 - 1000 + 1;**
        int randInt = (int) (Math.random()) * range + 1000;

(D)   **int range = 9999 - 1000 + 1;**
        int randInt = (int) (Math.random() * range) + 1000;

60.   Assume that **rand** is an object of the **Random** class.
        Numbers generated by a call to **Math.random()** are in the same range as numbers called by

(A)   **rand.nextDouble();**
(B)   **rand.nextInt();**
(C)   **rand.nextDouble(0,1);**
(D)   **rand.nextSeed();**

61.   What is the output of the following program?

```
public class Q61
{
    public static void main(String args [ ])
    {
        method1();
        method2();
        method3();
    }

    public static void method1()      { System.out.println("Calling method 1"); }

    public static void method2()      { System.out.println("Calling method 2"); }

    public static void method3() { System.out.println("Calling method 3"); }
}
```

(A)
```
Calling method 1
Calling method 2
Calling method 3
```

(B)
```
Calling method 3
Calling method 2
Calling method 1
```

(C)
```
Calling method 1
Calling method 3
Calling method 2
```

(D)   Error message

62.   What is the output of the following program?

```
public class Q62
{
    public static void main(String args [ ])
    {
        method1();
        method2();
        method3();
    }
}

class Tango
{
    public static void method1()
    {
        System.out.println("Calling method 1");
    }

    public static void method2()
    {
        System.out.println("Calling method 2");
    }

    public static void method3()
    {
        System.out.println("Calling method 3");
    }
}
```

(A)   Calling method 1
        Calling method 2
        Calling method 3

(B)   Calling method 3
        Calling method 2
        Calling method 1

(C)   Calling method 1
        Calling method 3
        Calling method 2

(D)   Error message

63.   What is the output of the following program?

```java
public class Q63
{
    public static void main(String args [ ])
    {
    Tango.method3();
    Tango.method2();
    Tango.method1();
    }
}

class Tango
{
    public static void method1()
    {
    System.out.println("Calling method 1");
    }

    public static void method2()
    {
    System.out.println("Calling method 2");
    }

    public static void method3()
    {
    System.out.println("Calling method 3");
    }
}
```

(A)   Calling method 1
        Calling method 2
        Calling method 3

(B)   Calling method 3
        Calling method 2
        Calling method 1

(C)   Calling method 1
        Calling method 3
        Calling method 2

(D)   Error message

64.   Which of the following method headings uses proper parameter declarations?

(A)   public static void guess(double rate, double hours, int deductions);
(B)   public static void guess(double rate, hours, int deductions);
(C)   public static void guess(rate, hours, deductions);
(D)   public static void guess(7.85, 42.5, 3);

65.   The parameters in the method call and the method heading must be the same

I.   quantity.
II.   sequence.
III.   type.

(A)   I only
(B)   II only
(C)   I & II only
(D)   II & III only
(E)   I, II & III

66.   In a java file which class must be declared **public**?

(A)   Every class that is contained in the file.
(B)   Only the class or classes that must be accessed from outside the file.
(C)   Only the class with the same name as the file.
(D)   Only the first class in the file.

67.   What is the output of the following program?

```java
public class Q69
{
    public static void main(String args [ ])
    {
        int x = 25;
        int y = 10;
        System.out.println(x + " + " + y + " = " + Calc.add(x,y));
        System.out.println(x + " - " + y + " = " + Calc.sub(x,y));
        System.out.println(x + " * " + y + " = " + Calc.mul(x,y));
        System.out.println(x + " / " + y + " = " + Calc.div(x,y));
    }
}

class Calc
{
    public static int add(int p, int q)
    {
        int result = p + q;
        return result;
    }

    public static int sub(int p, int q)
    {
        int result = p - q;
        return result;
    }

    public static int mul(int p, int q)
    {
        return p * q;
    }

    public static int div(int p, int q)
    {
        return p / q;
    }
}
```

(A)   25 + 10   (B)   25 + 10 = 35   (C)   35
       25 - 10   25 - 10 = 15   15
       25 * 10   25 * 10 = 250   250
       25 / 10   25 / 10 = 2   2

(D)   Error message

68.   What is the output of the following program?

```java
public class Q70
{
    public static void main(String args [ ])
    {
    int x = 25;
    int y = 10;
    Calc.add(x,y);
    Calc.sub(x,y);
    Calc.mul(x,y);
    Calc.div(x,y);
    }
}

class Calc
{
    public static void add(int p, int q)
    {
        int result = p - q;
        System.out.println(p + " - " + q + " = " + result);
    }

    public static void sub(int p, int q)
    {
    int result = p + q;
    System.out.println(p + " + " + q + " = " + result);
    }

    public static void mul(int p, int q)
    {
    int result = p / q;
    System.out.println(p + " / " + q + " = " + result);
    }

    public static void div(int p, int q)
    {
    int result = p * q;
    System.out.println(p + " * " + q + " = " + result);
    }
}
```

(A)   25 + 10 = 35   (B)   25 + 10 = 15   (C) 25 - 10 = 15   (D)   1
      25 - 10 = 15   25 - 10 = 35   25 + 10 = 35   2
      25 * 10 = 250   25 * 10 = 2   25 / 10 = 2   3
      25 / 10 = 2   25 / 10 = 250   25 * 10 = 250   4

(E)   Error message

69. What is the output of the following program?

```java
public class Q71
{
    public static void main(String args [ ])
    {
        int x = 25;
        int y = 10;
        System.out.println(Calc.add(x,y));
        System.out.println(Calc.sub(x,y));
        System.out.println(Calc.mul(x,y));
        System.out.println(Calc.div(x,y));
    }
}

class Calc
{
    public static String add(int p, int q)
    {
        int sum = p + q;
        String result = (String) p + " + " + q + " = " + sum;
        return "1";
    }

    public static String sub(int p, int q)
    {
        int diff = p - q;
        String result = (String) p + " - " + q + " = " + diff;
        return "2";
    }

    public static String mul(int p, int q)
    {
        int prod = p * q;
        String result = (String) p + " * " + q + " = " + prod;
        return "3";
    }

    public static String div(int p, int q)
    {
        int quot = p + q;
        String result = (String) p + " / " + q + " = " + quot;
        return "4";
    }
}
```

(A) 25 + 10 = 35   (B) 25 + 10 = 15   (C) 25 - 10 = 15   (D) 1
    25 - 10 = 15   25 - 10 = 35   25 + 10 = 35   2
    25 * 10 = 250   25 * 10 = 2   25 / 10 = 2   3
    25 / 10 = 2   25 / 10 = 250   25 * 10 = 250   4

(E) Error message

70. Which of the following **boohiss** methods will receive 1 character and return its ASCII value?

(A) public static int boohiss(char c) { return (int) c; }
(B) public static char boohiss(int c) { return (int) c; }
(C) public static char boohiss(char c) { return (int) c; }
(D) public static char boohiss(int c) { return (char) c; }
(E) public static int boohiss(char c) { return (char) c; }

71. What is the essence of *encapsulation*?

(A) Declare data attributes in a class as private.
(B) Declare data attributes in a class as public.
(C) Package the data and the methods that access that data inside the same class.
(D) Package all the data in one class and all the methods in another class.
(E) None of the above

72.   What is the output of the following program?

```
public class Q77
{
    public static void main(String args [ ])
    {
        Q77.method(1);
        Q77.method(3);
        Q77.method(2);
    }

    public static void method(int n)
    {
        System.out.println("Calling method " + n);
    }
}
```

(A)   Calling method 1
        Calling method 2
        Calling method 3

(B)   Calling method 3
        Calling method 2
        Calling method 1

(C)   Calling method 1
        Calling method 3
        Calling method 2

(D)   Error Message

---

73.   Consider the program below.

```
public class Waco
{
    public static void main (String args[ ])
    {
        Piggy kathy = new Piggy("Kathy",1500.0);
        Piggy rachel = new Piggy("Rachel",2500.0);
        kathy.showData();   // Line 1
        System.out.println("Name " + rachel.name);   // Line 2
        System.out.println("Savings " + rachel.savings);   // Line 3
    }
}

class Piggy
{
    private double savings;
    private String name;

    public Piggy(String n, double s)
    {
        name = n;
        savings = s;
    }

    private void showData()
    {
        System.out.println("Name: " + name);   // Line 4
        System.out.println("Savings: " + savings);   // Line 5
    }
}
```

Lines 1 - 5 access data of **Piggy** objects. Which lines have access?

(A)   Lines 2 and 3 only
(B)   Lines 4 and 5 only
(C)   Lines 1, 3, 4 and 5 only
(D)   Lines 1, 2, 4 and 5 only
(E)   All five lines have access

74.   Which of the following method declarations can be a constructor?

I.
public static Qwerty()
{
        start = 0;
        max = 1000;
}

II.
public Qwerty()
{
        start = 0;
        max = 1000;
}

III.
public Qwerty(int s, int m)
{
        start = s;
        max = m;
}

IV.
public void Qwerty()
{
        start = 0;
        max = 1000;
}

V.
public int Qwerty(int s, int m)
{
        start = s;
        max = m;
}

(A)   I only
(B)   II only
(C)   III only
(D)   II & III only
(E)   IV and V only

75.   The scope of a variable

(A)   specifies its data value range.
(B)   is a list of methods that access the variable.
(C)   is the segment of a program where the variable can be accessed.
(D)   is defined by the constructor.

76.   Consider the following code segment and class declaration.

Widget widget = new Widget(12);
System.out.println(widget.getWidgets());

public class Widget
{
        private int numWidgets;

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

        public int getWidgets() { return numWidgets; }
}

What will be the output as a result of executing the code segment?

(A)   A compile error message.
(B)   A runtime error message.
(C)   0
(D)   12

77.   A **private** method

   I.   can only be accessed by methods of the same class.
   II.   is usually a helper method.
   III.   can never be a constructor.

   (A)   I only
   (B)   II only
   (C)   III only
   (D)   I & II only
   (E)   I, II & III

---

78.   What is the output of this program?

```
public class Java0805e
{
    public static void main(String args[])
    {
        Piggy tom = new Piggy();
        tom.addData(1000);
        tom.showData();
    }

}

class Piggy
{

    double savings;

    public Piggy()
    {
        System.out.println("Hello");
        savings = 0;
    }

    public void addData(double s)  {  savings += s;  }

    public void showData()  {  System.out.println("Savings: " + savings);  }
}
```

   (A)   Hello

   (B)   Hello
          Savings: 0.0

   (C)   Hello
          Savings: 1000.0

   (D)   Hello
          Savings: 0.0
          Savings: 1000.0

   (E)   Error

79.   What is the output of this program?

```
public class Java0806
{
    public static void main(String args[])
    {
        Piggy tom = new Piggy();
        tom.showData();

        Piggy sue = new Piggy("Sue",1800);
        sue.showData();
    }
}


class Piggy
{
    double savings;
    String name;

    public Piggy()
    {
        savings = 0;
        name = "";
    }

    public Piggy(String n,double s)
    {
        name = n;
        savings = s;
    }

    public void showData()
    {
        System.out.println("Name:    " + name);
        System.out.println("Savings: " + savings);
    }
}
```

(A)
Name:
Savings: 0.0
Name:
Savings: 0.0

(B)
Name: Tom
Savings: 1000.0
Name:
Savings: 0.0

(C)
Name:
Savings: 0.0
Name: Sue
Savings: 1800.0

(D)
Name: Tom
Savings: 1000.0
Name: Sue
Savings: 1800.0

(E) Error

80.   What is the output of this program?

```
public class Java0806a
{
    public static void main(String args[])
    {
        Piggy tom = new Piggy(1000,"Tom");
        tom.showData();

        Piggy sue = new Piggy("Sue",1800);
        sue.showData();
    }
}


class Piggy
{
    double savings;
    String name;

    public Piggy()
    {
        savings = 0;
        name = "";
    }

    public Piggy(String n,double s)
    {
        name = n;
        savings = s;
    }

    public void showData()
    {
        System.out.println("Name:    " + name);
        System.out.println("Savings: " + savings);
    }
}
```

(A)
Name:
Savings: 0.0
Name:
Savings: 0.0

(B)
Name: Tom
Savings: 1000.0
Name:
Savings: 0.0

(C)
Name:
Savings: 0.0
Name: Sue
Savings: 1800.0

(D)
Name: Tom
Savings: 1000.0
Name: Sue
Savings: 1800.0

(E) Error

81.   What is **<u>WRONG</u>** with this program?

```
public class Java0807
{
    public static void main(String args[])
    {
        Piggy tom = new Piggy("Tom",2000);
        tom.showData();
        tom.name = "George";
        tom.savings = 2500000;
        tom.showData();
    }
}


class Piggy
{
    double savings;
    String name;

    public Piggy()
    {
        savings = 0;
        name = "";
    }

    public Piggy(String n,double s)
    {
        name = n;
        savings = s;
    }

    public void showData()
    {
        System.out.println("Name:    " + name);
        System.out.println("Savings: " + savings);
    }
}
```

(A)
Name:
Savings: 0.0
Name:
Savings: 0.0

(B)
Name: Tom
Savings: 2000.0
Name: George
Savings: 2500000.0

(C)
The program will not compile.

(D)
The program directly accesses the class data.

82.   How can this program be <u>IMPROVED</u>?

```
class Java0816a
{
    public static void main(String args[])
    {
        CardDeck d = new CardDeck();
        d.shuffleCards();
        System.out.println(d.getDecks() + " card deck(s)");
        System.out.println(d.getPlayers() + " players");
        System.out.println(d.getCards() + " cards left");
    }
}

class CardDeck
{
    private int numDecks;      // number of decks in a game
    private int numPlayers;    // number of players in a game
    private int cardsLeft;     // number of cards left in the deck(s)

    public void shuffleCards()
    {
        System.out.println("Shuffling Cards");
    }

    public CardDeck()
    {
        numDecks = 1;
        numPlayers = 1;
        cardsLeft = 52;
    }

    public int getDecks()   { return numDecks; }
    public int getPlayers() { return numPlayers; }
    public int getCards()   { return cardsLeft; }
}
```

(A) 1 card deck(s) 1 players 52 cards left	(C) Shuffling Cards 1 card deck(s) 1 players 52 cards left
(B) The shuffleCards method should be called from the constructor, NOT the main method.	(D) The program is fine as is.

83.   What is the output of this program?

```
import java.awt.*;
import java.applet.*;

public class Java0822 extends Applet
{
    public void paint(Graphics g)
    {
        Cube cube = new Cube(g,50,50,50);
        for (int x = 50; x < 750; x += 50)
            cube.move(g,x,300);
    }
}

class Cube
{
    private int t1X;    // topleft X coordinate of the Cube's position
    private int t1Y;    // topleft y coordinate of the Cube's position
    private int size;   // the size of the cube along one edge

    public Cube(Graphics g)                        { t1X = 50; t1Y = 50; size = 50; }

    public Cube(Graphics g, int x, int y, int s)   { t1X = x;  t1Y = y;  size = s;  }

    public void move(Graphics g, int x, int y)
    {
        erase(g);
        t1X = x;
        t1Y = y;
        draw(g);
        delay(100);
    }

    public void draw(Graphics g)...   // draws the cube at the current t1X,t1Y location

    public void erase(Graphics g)...  // erases the cube from the current t1X,t1Y location

    public void delay(int n)...       // delays the computer for n milliseconds
}
```
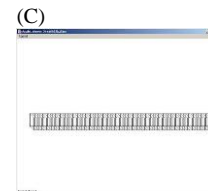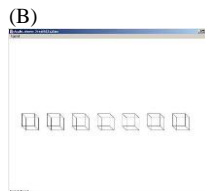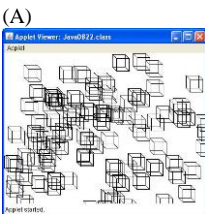
(A)

(B)

(C)

(D)   A single cube moving across the screen.

(E)   A single cube jumping all over the screen.

84. What is the output of this program?

```
import java.awt.*;
import java.applet.*;
import java.util.Random;

public class Java0822 extends Applet
{
    public void paint(Graphics g)
    {
        Cube cube = new Cube(g,50,50,50);
        Random rand = new Random();
        for (int c = 1; c <= 100; c++)
            cube.move(g,rand.nextInt(800),rand.nextInt(600));
    }
}

class Cube
{
    private int t1X;     // topleft X coordinate of the Cube's position
    private int t1Y;     // topleft y coordinate of the Cube's position
    private int size;    // the size of the cube along one edge

    public Cube(Graphics g)                       {  t1X = 50;  t1Y = 50;  size = 50; }

    public Cube(Graphics g, int x, int y, int s)  {  t1X = x;   t1Y = y;   size = s;  }

    public void move(Graphics g, int x, int y)
    {
        t1X = x;
        t1Y = y;
        draw(g);
    }

    public void draw(Graphics g)...    // draws the cube at the current t1X,t1Y location

    public void erase(Graphics g)...   // erases the cube from the current t1X,t1Y location

    public void delay(int n)...        // delays the computer for n milliseconds
}
```
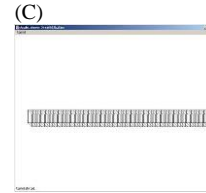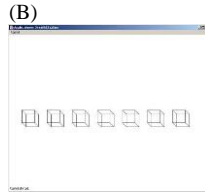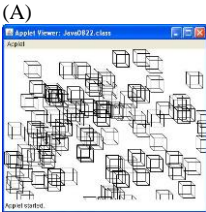
(A)

(B)

(C)

(D) A single cube moving across the screen.

(E) A single cube jumping all over the screen.

---

85. Class interaction is the process of

(A) using classes in the established standard Java Language library.
(B) using features from an existing class.
(C) combining data and the methods, which process the data, inside the same module.
(D)   dividing a program into multiple related files for each class in the program.

---

86. 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.

---

87.   Consider the following program.

```
public class Demo
{
    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.

---

88.   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

---

89.   Consider the following program.

```
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);
    }
}
```

What is the output of this program?

(A)
Person Parameter Constructor
Student's Grade is 12
Student's Age is 17

(B)
Student Parameter Constructor
Student's Grade is 12
Student's Age is 17

(C)
Person Parameter Constructor
Student Parameter Constructor
Student's Grade is 12
Student's Age is 17

(D)
Student Parameter Constructor
Person Parameter Constructor
Student's Grade is 12
Student's Age is 17

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

90. Consider the following program.

```java
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);
    }
}
```

What is the output of this program?

(A)
Person Parameter Constructor
Student's Grade is 12
Student's Age is 17

(B)
Student Parameter Constructor
Student's Grade is 12
Student's Age is 17

(C)
Person Parameter Constructor
Student Parameter Constructor
Student's Grade is 12
Student's Age is 17

(D)
Student Parameter Constructor
Person Parameter Constructor
Student's Grade is 12
Student's Age is 17

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

91.   Consider the program segment and class declarations.

```
int widgetCount = 10;
double widgetCost = 3.75;
int pidgetCount = 20;
int pidgetCost = 6.25;
Widget widget = new Widget(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;
}```
	(C)
	``public Pidget(int w1, double w2, int p1, double p2)
	{
	        pidgetCount = p1;
	        pidgetCost = p2;
	        super(w1,w2);
	}```

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

92.   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

93. Consider the following code segment, class **Xerson**, class **Person** and class **Student**.

```Student tom = new Student(12,15,17);```	What will be the printed as a result of executing the code segment?
```tom.showData();```	
```System.out.println();```	
	(A)
```class Xerson```	12
```{```	12
```private int xer;```	
```public Xerson(int a) { xer = a; }```	(B)
```public int getData() { return xer; }```	15
```}```	17
```class Person extends Xerson```	
```{```	(C)
```private int age;```	17
```public Person(int a, int b) { super(a); age = b; }```	12
```public int getData() { return super.getData(); }```	
```}```	(D)
	12
```class Student extends Person```	15
```{```	17
```private int grade;```	
```public Student(int a, int b, int c) { super(a,b); grade = c; }```	(E) Compile Error Message
```public int getData() { return grade; }```	
```public void showData()```	
```{```	
```System.out.println(getData());```	
```System.out.println(super.getData());```	
```}```	
```}```	

94. What computer science concept benefits from using umbrella classes?

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

95. 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);

96.   A data type that stores only a single value is called a(n)

        (A) simple/primitive data type.
        (B) advanced data type.
        (C) modern data type.
        (D) data Structure.

97.   A data type that stores multiple values and methods is called a(n)

(A)   simple/primitive data type.
(B)   advanced data type.
(C)   modern data type.
        (D)   data Structure.

98.   What method/field tells you how many elements are in a Java static array?

        (A)   The length method
        (B)   The length field
        (C)   The size method
        (D)   The size field

99.   What is the output of this program segment:

        int list[] = new int[10];
        for (int j = 0; j < 10; j++)
                System.out.print(list[j]);

        (A)   0
        (B)   0000000000
        (C)   [0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
        (D)   10 unknown numbers
        (E)   Error

100.   What is the output of this program segment:

int list[] = new int[10];
for (int j = 0; j < 10; j++)
        if (j == j)
                list[j] = 7
        else
                list[j] = 0;

for (int j = 0; j < 10; j++)
        System.out.print(list[j]);

        (A)   7000000000
        (B)   0700000000
        (C)   0000000070
        (D)   0000000007
        (E)   7777777777