

Note: Correct responses are based on Java, J2sdk v 7.0, from Sun Microsystems, Inc. All provided code segments are intended to be syntactically correct, unless otherwise stated (i. e. `error` is an answer choice) and any necessary Java 2 Standard Packages have been imported. Ignore any typographical errors and assume any undefined variables are defined as used.

**QUESTION 1**

What is  $1010101_2$  plus  $10101_2$  ?

- A.  $1101010_2$       B.  $1111001_2$       C.  $1011101_2$       D.  $5A_{16}$       E.  $105_{10}$

**QUESTION 2**

What is output by the code to the right?

- A. 13.0      B. 14.5  
C. 12.0      D. 12.5  
E. There is no output due to a syntax error.

```
Double b = 15.0 - 4;
b++;
out.println( b );
```

**QUESTION 3**

What is output by the code to the right?

- A. 75      B. 65  
C. 0      D. 60  
E. 66

```
int z = 0;
for(int i = 0; i < 22; i=i+4)
    z = z + i;
out.print( z );
```

**QUESTION 4**

What is output by the code to the right?

- A. 13      B. ghost  
C. ghost13      D. y13  
E. x

```
String x = "ghost";
String y = x + 13;
out.print( x );
```

**QUESTION 5**

What is output by the code to the right?

- A. 2.00      B. 2.50  
C. 5.00      D. 3.33  
E. 4.00

```
double[] b = {5,10,2,2,0,-1,-2};
out.printf("%.2f", b[1] / b[3] );
```

**QUESTION 6**

What is output by the code to the right?

- A. 5 20      B. 6 16  
C. 6 25      D. 6 26  
E. 6 20

```
int x = 4;
int y = x++ * x++;
out.print( x + " " + y );
```

**QUESTION 7**

How many combinations of values for the `boolean` variables `a` and `b` will result in `c` being set to `true`?

- A. 2      B. 3  
C. 1      D. 4  
E. 0

```
boolean a, b;
//code to initialize a and b

boolean c = (!a || !b) || a;
```

**QUESTION 8**

What is output by the code to the right?

- A. 24                      B. 13  
C. 1                        D. 23  
E. 34

```
int j = 0;
String s = "vampires";
if( s.charAt(j++) == 'p' )
    out.print( 1 );
if( s.charAt(j++) == 'a' )
    out.print( 2 );
if( s.charAt(j++) == 'i' )
    out.print( 3 );
if( s.charAt(j++) == 'p' )
    out.print( 4 ) ;
```

**QUESTION 9**

What is output by the line marked //1 in the client code to the right?

- A. 0  
B. 1  
C. true  
D. false  
E. There is no output due to a syntax error.

```
public class Troll
{
    public boolean stinksALot;
    public double speed;

    public Troll(double sp){
        stinksALot = false;
        speed = sp;
    }

    public void setSmelly( boolean b){
        stinksALot = b;
    }

    public boolean isFast(){
        if( stinksALot && speed > 27 )
            return true;
        if( speed > 50 )
            return true;
        return false;
    }
}

////////////////////////////////////
// client code
Troll dude = new Troll( 29.4 );
out.println( dude.isFast() );    //1
dude.setSmelly(true);
out.println( dude.isFast() );    //2
```

**QUESTION 10**

What is output by the line marked //2 in the client code to the right?

- A. 0  
B. 1  
C. true  
D. false  
E. There is no output due to a syntax error.

**QUESTION 11**

What is output by the code to the right?

- A. 16                      B. 24  
C. 22                      D. 20  
E. 14

```
int boo = 9;
boo++;
++boo;
boo = boo + 2;
boo += 3;
boo %= 2 * boo;
System.out.println( boo );
```

**QUESTION 12**

What is output by the code to the right?

- A. 4                        B. 6  
C. 14                      D. 10  
E. 12

```
int one = 4;
int two = one * one - 1 / one - 2;
out.print( Math.max( one, two ) );
```

**QUESTION 13**

What is output by the code to the right?

- A. pumpkins
- B. pu\\mp\\ki\\ns
- C. pu\\mpki\\ns
- D. pu\\mp\\ki\\ns
- E. There is no output due to a syntax error.

```
String guess = "pu\\mp\\ki\\ns";
out.print( guess );
```

**QUESTION 14**

What is output by the code to the right?

- A. 7
- B. 8
- C. 9
- D. 78
- E. 89

```
String s = "dog";
switch( s )
{
    case "dag" : System.out.print("7");
    case "dog" : System.out.print("8");
    case "dug" : System.out.print("9");
}
```

**QUESTION 15**

What is returned by the method call `test(17, 3)`?

- A. 5.0
- B. 6.0
- C. 7.5
- D. 6.7
- E. There is no output due to a syntax error.

```
public double test(long a, long b)
{
    a %= b;
    a = a * b;
    return a;
}
```

**QUESTION 16**

What is output by the client code to the right?

- A. [2, 2, 4]
- B. [2, 2, 5]
- C. [2, 2, 4, 1]
- D. [2, 7, 3, 0]
- E. [0, 0, 0, 1]

```
public void fun(int[] list){
    list[2]++;
    list[1] = list[0];
    list = new int[4];
    list[2]++;
}

////////////////////
// client code
int[] vals = {2, 7, 3};
fun(vals);
out.print( Arrays.toString(vals) );
```

**QUESTION 17**

Which of the following types could be assigned the value '3'?

- A. char
- B. int
- C. long
- D. Character
- E. more than one of these

**QUESTION 18**

What is output by the code to the right?

- A. false false
- B. true false
- C. false true
- D. true true
- E. false

```
String sam = "scary";
String ben = new String("scary");
String wil = "scary";
out.print( sam == ben );
out.print( " " + (sam == wil) );
```

**QUESTION 19**

What is output by the line marked `//1` to the right?

- A. 1
- B. 11
- C. 111
- D. 111111
- E. 0

```
int o = 0b11111111;
int x = 0;
```

```
while( o > 0 )
{
    if( o % 10 == 1 )
        x = x + 1;
    o /= 10;
}
```

```
out.println( o );           //1
out.println( x );           //2
```

**QUESTION 20**

What is output by the line marked `//2` to the right?

- A. 1
- B. 2
- C. 7
- D. 4
- E. 9

**QUESTION 21**

Which of the following is not a primitive data type in Java?

- A. boolean
- B. shorts
- C. char
- D. byte
- E. double

**QUESTION 22**

Which of the following could replace `<*1>` in the code to the right so that method `getIt` can return a list of integers?

- A. `List<Integer>`
- B. `ArrayList<Integer>`
- C. `Object[]`
- D. `Integer[]`
- E. A and B only

```
public static <*1> getIt(int num)
{
    ArrayList<Integer> it;
    it = new ArrayList<Integer>();

    for(int i = 1; i <= num; i++)
        if( num % i == 0 && i % 2 == 0 )
            it.add( i );

    return it;
}
```

Assume `<*1>` has been filled in correctly.

**QUESTION 23**

What is the intended purpose of method `getIt`?

- A. It returns a list of all digits in `num`.
- B. It returns a list of all even factors of `num`.
- C. It returns a list of all odd factors of `num`.
- D. It returns a list of all factors of `num`.
- E. It returns a list of some of the factors of `num`.

**QUESTION 24**

What is output by the code to the right?

- A. 0
- B. 40
- C. 20
- D. 30
- E. -1

```
System.out.println( 100 % 30 * 2 );
```

**QUESTION 25**

What is output by the code to the right?

- A. iuy
- B. 453
- C. 987
- D. ghosts
- E. There is no output due to a runtime error.

```
String ghoul =
    "11cats453ghosts987iuy13";
String[] bats = ghoul.split("\\D+");
out.println( bats[2] );
```

**QUESTION 26**

What is output by the following client code?

```
int[] values = {2, 7, -5, 8, 3};
sort(values);
out.print(Arrays.toString(values));
```

- A. [-5, 2, 3, 7, 8]
- B. [-5, 8, 3, 7, 2]
- C. [-5, 3, 2, 8, 7]
- D. [-5, 2, 7, 3, 8]
- E. [8, 7, 3, 2, -5]

```
public static void sort(int[] nms)
{
    ArrayList<Integer> bu;
    bu = new ArrayList<Integer>();

    for(int i = 1; i < nms.length; i++)
    {
        int j = i;
        while(j > 0 && nms[j] < nms[j-1])
        {
            bu.add( 0, nms[j - 1] );
            bu.add( 0, nms[j] );
            nms[j - 1] = bu.remove( 0 );
            nms[j] = bu.remove( 0 );
            j--;
        }
    }
}
```

**QUESTION 27**

Which sorting algorithm does method sort implement?

- A. bubble sort
- B. selection sort
- C. merge sort
- D. quick sort
- E. insertion sort

**QUESTION 28**

Which of the following could replace **<\*1>** in the code to the right to add 75 to the stack?

- A. ls.add( (long)75 );
- B. ls.add( 75L );
- C. ls.add( 75 );
- D. A and B only
- E. A, B, and C

```
List<Long> ls;
ls = new Stack<Long>();

ls.add( 56L );
```

**QUESTION 29**

Assuming that **<\*1>** is filled correctly, what is output by the code to the right?

- A. [ 45, 56, 75 ]
- B. [ 56, 75, 45 ]
- C. [ 45, 75, 56 ]
- D. [ 56L, 75L, 45L ]
- E. [ ]

```
<*1>

ls.add( 45L );

System.out.println( ls );
```

**QUESTION 30**

What is output by the code to the right?

- A. 97
- B. 90
- C. 65
- D. 12
- E. There is no output due to a runtime error.

```
String m = "fouk monster";
int v = m.charAt(0) * m.charAt(4);
v = v / ( m.length() * 3 );
System.out.println( v );
```

**QUESTION 31**

Assume the method `getDown(int[] data)` is  $O(N)$  where  $N = \text{data.length}$ . When the method `getDown` is passed an array with `length = 200,000` it takes 8 seconds for method `getDown` to complete. If method `getDown` is then passed an array with `length = 25,000` what is the expected time it will take method `getDown` to complete?

- A. 16 seconds
- B. 1 second
- C. 6 seconds
- D. 2 seconds
- E. 4 seconds

**QUESTION 32**

What is output by the code to the right?

- A. 82
- B. 24
- C. 96
- D. 48
- E. 51

```
int blood = 3;
int monst = blood << 4 | blood;
out.print( monst );
```

**QUESTION 33**

Given the graph at right, how many edges are present?

- A. 9
- B. 10
- C. 13
- D. 11
- E. 6

**QUESTION 34**

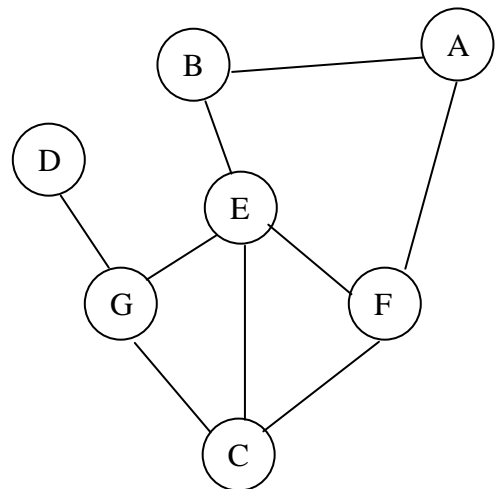
Given the graph at right, how many vertices are present?

- A. 11
- B. 9
- C. 7
- D. 10
- E. 8

**QUESTION 35**

Given the graph at right, how many neighbors does E possess?

- A. 2
- B. 3
- C. 4
- D. 1
- E. 5



**QUESTION 36**

The following values are inserted one at a time in the order shown into a binary search tree using a standard insertion algorithm.

40 80 70 50 20 10 90

What is the result of a postorder traversal of the resulting tree?

- A. 10 40 50 70 90 80 20
- B. 10 50 20 70 80 90 40
- C. 10 20 40 50 70 80 90
- D. 40 80 90 70 50 20 10
- E. 10 20 50 70 90 80 40

**QUESTION 37**

How many levels are contained in the tree resulting from question 36?

- A. 4
- B. 0
- C. 2
- D. 1
- E. 3

**QUESTION 38**

What is output by //1 at right?

- A. 0
- B. 1
- C. true
- D. false
- E. There is no output due to a syntax error.

**QUESTION 39**

What is output by //2 at right?

- A. 0
- B. 1
- C. true
- D. false
- E. There is no output due to a syntax error.

**QUESTION 40**

What is output by //3 at right?

- A. 0
- B. 1
- C. true
- D. false
- E. There is no output due to a syntax error.

```
String regex = "^(0[0-9]|1[0-9]| 2[0-3])
               :[0-5][0-9]$";

out.println( "1:40".matches(regex) );    //1
out.println( "19:50".matches(regex) );   //2
out.println( "05:17".matches(regex) );   //3
```