

**QUESTION 1**

What is the sum of  $123_{16}$  and  $DEF_{16}$ ?

- A.  $1022_{16}$       B.  $F12_{16}$       C.  $EF0_{16}$       D.  $1000_{16}$       E.  $FF1_{16}$

**QUESTION 2**

What is output by the code to the right?

- A. 2.0      B. 2.75      C. 3.0  
D. 2      E. 3

```
int x = 11;
int y = 4;
System.out.print( x / y );
```

**QUESTION 3**

What is output by the code to the right?

- A. 26      B. 25      C. 0  
D. 1      E. 325

```
int accum = 0;
for(int i = 1; i <= 25; i++)
    accum = accum + 1;
System.out.print( accum );
```

**QUESTION 4**

What is output by the code to the right?

- A. esort      B. Merg      C. s  
D. Merge      E. sort

```
String alg = "Mergesort";
String sub = alg.substring( 4 );
System.out.print( sub );
```

**QUESTION 5**

What is output by the code to the right?

- A. 9      B. 1      C. 3  
D. 6      E. 0

```
int[] nums = new int[5];
nums[1] = 3;
nums[3] = 3 + nums[1] * 2;
System.out.print( nums[1] );
```

**QUESTION 6**

What is output by the code to the right?

- A. 5      B. 5.0      C. 5.5  
D. 6.0      E. 4.0

```
double b = 1.5;
b = b * 2 + 5 / 2;
System.out.println( b );
```

**QUESTION 7**

What is output by the code to the right?

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

```
boolean p = false;
boolean q = true;
System.out.print( !p && !q );
System.out.print( " " );
System.out.print( !(p && q) );
```

<p><b>QUESTION 8</b></p> <p>What is output by the code to the right?</p> <p>A. 3                      B. 4                      C. 2</p> <p>D. 6                      E. 5</p>	<pre>int z = 3; if( z &lt;= 3 )     z++; if( z &gt; 3 )     z++; else     z--; System.out.print( z );</pre>
<p><b>QUESTION 9</b></p> <p>How may constructors does the class Book have?</p> <p>A. 1</p> <p>B. 2</p> <p>C. 3</p> <p>D. 4</p> <p>E. 5</p>	<pre>public class Book{     private String title;     private int pages;      public Book(String t){         title = t;     }      public Book(String t, int len){         title = t;         pages = len;     }      public boolean longBook(){         return pages &gt; 250;     } }</pre>
<p><b>QUESTION 10</b></p> <p>What is output by the client code to the right?</p> <p>A. false</p> <p>B. true</p> <p>C. Blink</p> <p>D. 200</p> <p>E. Blink:true</p>	<pre>//////////////////////////////////// // client code Book bk = new Book("Blink", 200); System.out.print( bk.longBook() );</pre>
<p><b>QUESTION 11</b></p> <p>What is output by the code to the right?</p> <p>A. 32                      B. 16                      C. 48</p> <p>D. 0                      E. 1</p>	<pre>int f = 48; int g = 16; System.out.print( f   g );</pre>
<p><b>QUESTION 12</b></p> <p>What is output by the code to the right?</p> <p>A. 3                      B. 3.5                      C. 4</p> <p>D. -3                      E. -3.0</p>	<pre>double org = -3.5; System.out.print( Math.abs(org) );</pre>

<p><b>QUESTION 13</b></p> <p>What is output by the code to the right?</p> <p>A. A "hard class"</p> <p>B. A hard class</p> <p>C. A "hard class"</p> <p>D. A "hard" class</p> <p>E. a hard class</p>	<pre>System.out.print("A \"hard class");</pre>
<p><b>QUESTION 14</b></p> <p>What is output by the code to the right?</p> <p>A. +C                      B. 12.0                      C. +12</p> <p>D. -12                      E. 012</p>	<pre>System.out.printf( "%+3d", 12 );</pre>
<p><b>QUESTION 15</b></p> <p>What is returned by the method call <code>example(2)</code>?</p> <p>A. 5                      B. 1                      C. 2</p> <p>D. 4                      E. 3</p>	<pre>public static int example(int x){     x++;     return x + x - 1; }</pre>
<p><b>QUESTION 16</b></p> <p>What is output by the code to the right?</p> <p>A. 983                      B. ..                      C. 8</p> <p>D. 5                      E. gh:</p>	<pre>String garbage = "851..983gh:23(10"; String[] data = garbage.split("\\D+"); System.out.print( data[1] );</pre>
<p><b>QUESTION 17</b></p> <p>What is output by the code to the right?</p> <p>A. 3                      B. 4                      C. 0</p> <p>D. There is no output due to a syntax error.</p> <p>E. There is no output due to a <code>ClassCastException</code>.</p>	<pre>String car = "Ford"; Object obj = car; System.out.print( ((String)obj).length() );</pre>
<p><b>QUESTION 18</b></p> <p>What is output by the code to the right?</p> <p>A. null                      B. 10                      C. 0</p> <p>D. There is no output due to a syntax error.</p> <p>E. There is no output due to a runtime error.</p>	<pre>ArrayList&lt;String&gt; classes; classes = new ArrayList&lt;String&gt;(); System.out.print( classes.size() );</pre>

<p><b>QUESTION 19</b></p> <p>What is output by the code to the right?</p> <p>A. -9</p> <p>B. 30</p> <p>C. 20</p> <p>D. 10</p> <p>E. 9</p>	<pre>String first = "rock"; String second = "roll"; int result = first.compareTo( second );  if( result &lt; 0 )     System.out.print( 10 ); else if( result &gt; 0 )     System.out.print( 20 ); else     System.out.print( 30 );</pre>
<p><b>QUESTION 20</b></p> <p>What replaces <b>&lt;*1&gt;</b> in the code to the right to set the new Soda object's size instance variable to the value of the parameter sz?</p> <p>A. size = sz</p> <p>B. super.size = sz</p> <p>C. super(sz)</p> <p>D. this.size = sz</p> <p>E. More than one of these.</p>	<pre>public class Drink{     private int size;      public Drink(int sz){         size = sz;     }      public void sip(){         size--;     } }</pre>
<p>Assume <b>&lt;*1&gt;</b> is filled in correctly.</p>	<pre>public class Soda extends Drink{     private int caffeine;</pre>
<p><b>QUESTION 21</b></p> <p>What is output by the client code to the right?</p> <p>A. 0</p> <p>B. 1</p> <p>C. 1240</p> <p>D. true</p> <p>E. false</p>	<pre>    public Soda(int sz, int caf){         &lt;*1&gt;;         caffeine = caf;     } }</pre> <pre>//////////////////////////////////// // client code Soda coke = new Soda(12, 40); Soda pepsi = new Soda(12, 40); System.out.print(coke == pepsi );</pre>
<p><b>QUESTION 22</b></p> <p>What is output by the code to the right when given this input?</p> <p>2 2.1 3</p> <p>A. 2                      B. 4                      C. 5</p> <p>D. 7                      E. 8</p>	<pre>Scanner sc = new Scanner(System.in); int sum = 0; while( sc.hasNextInt() )     sum += sc.nextInt(); System.out.print( sum );</pre>

<p><b>QUESTION 23</b></p> <p>What is output by the code to the right?</p> <p>A. false false B. false true C. true false D. true true E. true</p>	<pre>String name = "bob"; System.out.print( name.matches( "bo" ) ); System.out.print( " " ); System.out.print( name.matches( "b." ) );</pre>
<p><b>QUESTION 24</b></p> <p>What is output by the code to the right?</p> <p>A. [0, 2, 3]      B. [3, 0, 1] C. [0, 1]          D. [0, 1, 0, 3] E. [3, 2, 0]</p>	<pre>ArrayList&lt;Integer&gt; ar; ar = new ArrayList&lt;Integer&gt;(); ar.add(3); ar.add(0); ar.add(0); ar.set(1, 2); System.out.print( ar.toString() );</pre>
<p><b>QUESTION 25</b></p> <p>Which of the following are valid identifiers in Java?</p> <p>I. 2far II. twoFar III. TWO_FAR</p> <p>A. I only      B. II only      C. III only      D. I and II      E. II and III</p>	
<p><b>QUESTION 26</b></p> <p>What is output by the code to the right?</p> <p>A. 4 B. 3 C. 0 D. 1 E. 2</p>	<pre>String vals = "abac"; int total = 0; char ch;  for( int i = 0; i &lt; vals.length(); i++){     ch = vals.charAt(i);     switch ( ch ) {         case 'a' : total++; break;         case 'b' : total *= 2; break;         default : total--;     } }  System.out.print( total );</pre>
<p><b>QUESTION 27</b></p> <p>What is returned by the method call <code>loopy("", 5)</code> ?</p> <p>A. 531-1      B. 531      C. -1135 D. 135      E. 135531</p>	<pre>public static String loopy(String s, int x){     if( x &lt;= 0 )         return s;     else         return x + s + loopy(s, x - 2); }</pre>

<p><b>QUESTION 28</b></p> <p>Which sorting algorithm does the method <code>sort</code> implement?</p> <p>A. Insertion sort      B. Quick sort</p> <p>C. Merge sort      D. Heap sort</p> <p>E. Selection sort</p>	<pre>public void swap(int[] data, int i, int j){     int t = data[i];     data[i] = data[j];     data[j] = t; }  public void sort(int[] list){     int j;     int temp;     boolean done;      for(int i = 1; i &lt; list.length; i++){         temp = list[i];         j = i;         done = temp &lt;= list[j - 1];          // line A          while( !done ){             swap(list, j, j - 1);             j--;             done = j == 0    temp &lt;= list[j - 1];         }     } }</pre>
<p><b>QUESTION 29</b></p> <p>Assume the array <code>list</code> initially contains these elements:</p> <p>[9, 4, 11, 7, 5, 13]</p> <p>What are the contents of the array <code>list</code> at the point marked <code>//line A</code> when the variable <code>i</code> equals 4?</p> <p>A. [4, 7, 9, 11, 5, 13]</p> <p>B. [5, 4, 7, 9, 11, 13]</p> <p>C. [13, 11, 9, 7, 5, 4]</p> <p>D. [11, 9, 7, 4, 5, 13]</p> <p>E. [9, 4, 11, 7, 5, 13]</p>	<pre>public static int one(int x){     x++;     return x + x; }  public static int one(int x, int y){     x--;     y++;     return x * y; }  public static int two(int x){     return one(x) + one(x, x); }</pre>
<p><b>QUESTION 30</b></p> <p>What is returned by the method call <code>one(2)</code>?</p> <p>A. 3      B. 2      C. 9</p> <p>D. 4      E. 6</p>	
<p><b>QUESTION 31</b></p> <p>What is returned by the method call <code>two(3)</code>?</p> <p>A. 9      B. 24      C. 16</p> <p>D. 17      E. 26</p>	
<p><b>QUESTION 32</b></p> <p>What are the elements in the <code>Set</code> named <code>hold</code> after the code to the right executes?</p> <p>A. [-1, 1, -1, 2]</p> <p>B. [-1]</p> <p>C. [3, 5]</p> <p>D. [2, -1]</p> <p>E. The <code>Set</code> named <code>one</code> is empty after the code to the right executes.</p>	<pre>int[] data = {-1, 1, -1, 2}; Set&lt;Integer&gt; hold = new HashSet&lt;Integer&gt;(); for(int i : data)     hold.add( i );  Set&lt;Integer&gt; otherHold; otherHold = new TreeSet&lt;Integer&gt;(); for(int i : data)     otherHold.add( i + 2 );  hold.removeAll( otherHold );</pre>

**QUESTION 33**

What replaces **<\*1>** in the code to the right so that the variable `con` is made to refer to the same array as the variable `temp`?

- A. `con = temp`
- B. `con.equals(temp)`
- C. `con = new E[temp]`
- D. `con = new Object[temp.length]`
- E. More than one of these.

Assume **<\*1>** is filled in correctly.

**QUESTION 34**

What is output by the code to the right when method `structDemo` is called?

- A. 5
- B. 4
- C. 32
- D. 8
- E. 15

**QUESTION 35**

What type of data structure does the `Structure` class implement?

- A. A binary search tree
- B. A list
- C. A set
- D. A heap
- E. A queue

**QUESTION 36**

In the code to the right, what kind of `Collection` must `col` be so that its elements are always printed out in ascending order?

- A. `HashSet`                      B. `TreeSet`
- C. `LinkedList`                D. `ArrayList`
- E. `Stack`

```
public class Structure<E>{
    private E[] con;
    private int size;

    public Structure(){
        size = 0;
        resize(1);
    }

    public void add(E obj){
        if( size == con.length )
            resize( size * 2 );
        con[size] = obj;
        size++;
    }

    public E get(int pos){
        return con[pos];
    }

    public int cap(){
        return con.length;
    }

    private void resize(int len){
        E[] temp = (E[]) (new Object[len]);
        for(int i = 0; i < size; i++)
            temp[i] = con[i];
        <*1>;
    }
}

////////////////////////////////////
// client code
public static void structDemo(){
    Structure<Integer> s;
    s = new Structure<Integer>();
    for(int i = 1; i <= 5; i++)
        s.add( i );
    System.out.print( s.cap() );
}
```

```
public void show(Collection<Integer> col){
    for(int i : col)
        System.out.println( i );
}
```

<p><b>QUESTION 37</b></p> <p>What is output by the code to the right?</p> <p>A. 6</p> <p>B. 5</p> <p>C. 9</p> <p>D. There is no output due to an infinite loop.</p> <p>E. There is no output due to a runtime error.</p>	<pre> ArrayList&lt;String&gt; list; list = new ArrayList&lt;String&gt;(); list.add("AA"); list.add("BB"); list.add("A");  ListIterator&lt;String&gt; it = list.listIterator(); while( it.hasNext() )     if( it.next().length() &gt; 1 )         it.add( "CC" );  System.out.print( list.size() ); </pre>
<p><b>QUESTION 38</b></p> <p>What is the running time of method <code>sample</code>? Assume <code>N</code> equals <code>x</code>. Choose the most restrictive correct answer.</p> <p>A. <math>O(N^2)</math>      B. <math>O(1)</math>      C. <math>O(N!)</math></p> <p>D. <math>O(N\log N)</math>      E. <math>O(\log N)</math></p>	<pre> public static int sample(int x){     int total = 0;     for(int i = 1; i &lt;= x; i++){         for(int j = 1; j &lt;= x; j *= 2){             total++;         }     }     return total; } </pre>
<p><b>QUESTION 39</b></p> <p>What replaces <b>&lt;*1&gt;</b> in the code to the right to set the elements at index <code>i</code> in the arrays <code>guess</code> and <code>ans</code> to -1?</p> <p>A. <code>guess[i], ans[i] = -1;</code></p> <p>B. <code>guess[i] = -1; ans[i] = guess[i];</code></p> <p>C. <code>guess[i] *= -1; ans[i] *= -1;</code></p> <p>D. <code>guess[i] = ans[i] = -1;</code></p> <p>E. More than one of these.</p>	<pre> public static String eval(int[] guess,                           int[] ans){      int w = 0;     int b = 0;     boolean go;     int j;      for(int i = 0; i &lt; guess.length; i++){         if( guess[i] == ans[i] ){             b++;             <b>&lt;*1&gt;</b>         }     } } </pre>
<p>Assume <b>&lt;*1&gt;</b> is filled in correctly.</p>	<pre> for(int i = 0; i &lt; guess.length; i++){     go = guess[i] != -1;     j = i + 1;     while( go &amp;&amp; j &lt; ans.length){         if( guess[i] == ans[j] ){             go = false;             w++;             guess[i] = -1;             ans[j] = -1;         }         j++;     } }  return b + "_" + w; } </pre>
<p><b>QUESTION 40</b></p> <p>What is output by the following client code?</p> <pre> int[] g = {2, 12, 1, 4, 1, 2}; int[] a = {1, 11, 2, 4, 12, 12}; System.out.print( eval(g, a) ); </pre> <p>A. 0_0</p> <p>B. 1_2</p> <p>C. 1_6</p> <p>D. 1_7</p> <p>E. 1_12</p>	