

Note: Correct responses are based on Java, J2sdk v 5.0, 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	
1010 <sub>2</sub> - 1011 <sub>2</sub> = ?	
A. 001 <sub>2</sub>	B. 3 <sub>10</sub>
C. 11 <sub>6</sub>	D. 7 <sub>16</sub>
E. -1 <sub>9</sub>	
QUESTION 2	
What is output by the code to the right?	Boolean why = 7 > 2; out.println(why);
A. 0	B. 1
C. true	D. false
E. error	
QUESTION 3	
What is output by the code to the right?	String c = "www.tcea.org"; out.println(c.split("\\.")[1]);
A. www	B. tcea
C. org	D. tc
E. ww	
QUESTION 4	
What is output by the code to the right?	double d = Math.round(8.45); out.println(d);
A. 9.0	B. 8.0
C. 9	D. 8
E. 7.0	
QUESTION 5	
What is output by the code to the right?	int e = (7 << 6 >> 7); out.println(e);
A. 1	B. 4
C. 5	D. 2
E. 3	
QUESTION 6	
What is output by the code to the right?	String f = "beanandhamgocamping"; out.println(f.matches(".*am.*"));
A. 0	B. 1
C. true	D. false
E. yes	
QUESTION 7	
What is output by the code to the right?	Integer[] g = {2, 4, 6, 8, 0}; Integer[] h = {2, 4, 6, 8, 0}; out.println(g.equals(h));
A. 0	B. 1
C. true	D. false
E. error	
QUESTION 8	
What is output by the code to the right?	int i = 3 + 3 + 3; out.println(i);
A. 9	B. 6
C. 3	D. 0
E. error	
QUESTION 9	
What is returned by the call <code>getIt(3, "bub")</code> ?	public int getIt(int x, String s) { if(s.charAt(x) == 'a') return 7; else if(s.charAt(x) == 'b') return 8; else if(s.charAt(x) == 'c') return 9; return 5; }
A. 7	
C. 9	D. 5
E. runtime error	
QUESTION 10	
What is returned by the call <code>getIt(8, "beanandham")</code> ?	
A. 7	B. 8
C. 9	D. 5
E. runtime error	
QUESTION 11	
Which of the following methods can be used to determine if a value exists in an ArrayList?	
A. <code>indexOf()</code>	B. <code>contains()</code>
C. <code>binarySearch()</code>	D. A and B only
E. A, B, and C	

<b>QUESTION 12</b> What is output by the code to the right? A. 5.3      B. 5.0      C. 6.0      D. 5.4      E. 5.5	<pre>Double dbl = (double) (16/3); out.println(dbl);</pre>
<b>QUESTION 13</b> What is output by the code to the right? A. [2, 3, 2]      B. [2, 3, 0]      C. [2, 3] D. runtime error      E. compile error	<pre>Collection&lt;Integer&gt; p; p = new TreeSet&lt;Integer&gt;(); p.add(2); p.add(3); p.add(0,2); out.println(p);</pre>
<b>QUESTION 14</b> What is output by the code to the right? A. 1      B. 2      C. 3 D. 4      E. 5	<pre>Scanner chop; chop = new Scanner("3 5 7 9 11"); int cnt=0; while(chop.hasNextInt(8)){     chop.nextInt(8);     cnt++; } out.println(cnt);</pre>
<b>QUESTION 15</b> What is output by the code to the right? A. 8      B. 27      C. 34      D. 25      E. 17	<pre>out.println(11 ^ 21 &amp; 8   17);</pre>
<b>QUESTION 16</b> What is returned by the call <code>why(9,2)</code> ? A. zero      B. one C. two      D. whoot E. more than one of these	<pre>public String why(int a, int b) {     switch(a%b){         case 0 : return "zero";         case 1 : return "one";         case 2 : return "two";     }     return "whoot"; }</pre>
<b>QUESTION 17</b> What is output by the code to the right? A. 6      B. 1      C. 9 D. runtime error      E. compile error	<pre>TreeMap u = new TreeMap(); u.put(3,6); u.put(3,1); u.put(3,9); out.println(u.get(3));</pre>
<b>QUESTION 18</b> What is output by the code in <code>// line 1</code> ? A. 4      B. 8      C. 1      D. 3      E. null	<pre>class Node {     public Object data;     public Node nxt;      public Node(Object d, Node n){         data=d;         nxt=n;     } } // test code in the same class Node n = new Node(4,     new Node(8,         new Node(1,             new Node(3,null)))); out.println(n.nxt.data);    // line 1 out.println(n.data);      // line 2 Object obj; obj = n.nxt.nxt.data; out.println(obj);          //line 3</pre>
<b>QUESTION 19</b> What is output by the code in <code>// line 2</code> ? A. 4      B. 8      C. 1      D. 3      E. null	
<b>QUESTION 20</b> What is output by the code in <code>// line 3</code> ? A. 4      B. 8      C. 1      D. 3      E. null	

<b>QUESTION 21</b>	
Which of the following methods can be used to round a decimal value to the next larger integer?	
A. round	B. floor      C. ceil      D. up      E. down
<b>QUESTION 22</b>	
What is output by the code to the right?	
A. 11      B. 44      C. 5	<code>out.println(Integer.parseInt("11",4));</code>
D. 9      E. 13	
<b>QUESTION 23</b>	
What is output by the code in // line 1?	
A. [2]      B. [2, 3]	<pre> class A {     public void modOne(ArrayList a){         a.add(3);     }     public void modTwo(ArrayList b) {         b=new ArrayList();         b.add(5);     } }  //test code in client program A test = new A(); ArrayList ray = new ArrayList(); ray.add(2); test.modOne(ray); out.println(ray);           //line 1 test.modTwo(ray); out.println(ray);           //line 2 </pre>
C. [2, 3, 5]      D. [5]	
E. [2, 5]	
<b>QUESTION 24</b>	
What is output by the code in // line 2?	
A. [2]      B. [2, 3]	
C. [2, 3, 5]      D. [5]	
E. [2, 5]	
<b>QUESTION 25</b>	
What is output by the code to the right?	
A. 12      B. 4      C. -8      D. 2      E. 6	<pre> int j = 4; if(j &gt; 2)     out.println(j*3); else if(j &lt; 2)     out.println(j*-2); </pre>
<b>QUESTION 26</b>	
What is output by the code to the right?	
A. 45      B. 66      C. 28      D. 40      E. 38	<pre> int what = 0; for(int k=1; k&lt;20; k+=4){     what = what + k; } out.println(what); </pre>
<b>QUESTION 27</b>	
What is output by the code to the right?	
A. true      B. false      C. 0      D. 1      E. error	<pre> boolean first = false; boolean last = true; out.println(!(first &amp;&amp; !last)); </pre>
<b>QUESTION 28</b>	
Which of the following $O(N) * O(\log_2 N)$ sorts will degenerate into a quadratic sort when used on sorted data?	
A. binary sort	B. merge sort      C. linear sort      D. radix sort      E. quick sort
<b>QUESTION 29</b>	
What can you <u>not</u> do to an interface?	
A. instantiate it	B. implement it      C. extend it      D. A and B only      E. A and C only

**QUESTION 30**

Which of the following is a logarithmic algorithm?

- A. merge sort                      B. linear search                      C. binary search                      D. selection sort                      E. quick sort

**QUESTION 31**

What is method `isWhat` trying to determine about `stuff`?

- A. if all items are in ascending order  
 B. if all items are in descending order  
 C. if all items are the same  
 D. if all items are integers  
 E. if all items are bigger than spot 0

```
class What
{
    public boolean isWhat(Comparable[] stuff)
    {
        for(int i=0; i<stuff.length-1; i++){
            if(stuff[i].compareTo(stuff[i+1]) > 0)
                return false;
        }
        return true;
    }
}
```

**QUESTION 32**

What is method `doWhat` doing to `stuff`?

- A. putting all odd values first  
 B. putting all values in ascending order  
 C. putting all values in descending order  
 D. putting all even values first  
 E. putting all null values first

```
public void doWhat(Comparable[] stuff)
{
    if(isWhat(stuff)) return;

    for(int i=0; i<stuff.length-1; i++)
    {
        int spot=i;
        for(int j=i; j<stuff.length; j++){
            if(stuff[j].compareTo(stuff[spot])<0)
                spot=j;
        }
        if(spot==i) continue;
        Comparable save=stuff[spot];
        for(int k=spot; k>i; k--)
        {
            stuff[k]=stuff[k-1];
        }
        stuff[i]=save;
    }
}
```

**QUESTION 33**

What is the worst case runtime efficiency of `doWhat`?  
 Choose the most restrictive correct answer.

- A.  $O(N)$   
 B.  $O(N^2)$   
 C.  $O(\log_2 N)$   
 D.  $O(N) * O(\log_2 N)$   
 E.  $O(2^N)$

**QUESTION 34**

What is output by the code in `// line 1`?

- A. 0                                      B. 1  
 C. true                                      D. false  
 E. syntax error

```
//test code in the main of another class
What huh = new What();
Comparable[] list = {8,3,2,5,6,4,1,9,7};
out.println(huh.isWhat(list)); // line 1
huh.doWhat(list);
out.println(huh.isWhat(list)); // line 2
```

**QUESTION 35**

What is output by the code in `// line 2`?

- A. 0                                      B. 1  
 C. true                                      D. false  
 E. syntax error

**QUESTION 36**

What replaces **<\*1>** in the code to the right so that the `toString()` method in Class `Kid` would be complete?

- A. `super.toString()`
- B. `Parent.toString()`
- C. `toString()`
- D. `sub.toString()`
- E. A and B only

**For Questions #37 – 40, assume **<\*1>** was replaced correctly.**

**QUESTION 37**

What is output by the code in `// line 1`?

- A. 8 3                      B. 3 3
- C. 6 3                      D. 1 3
- E. 1 6

**QUESTION 38**

What is output by the code in `// line 2`?

- A. 1 3 6                      B. 1 3 8
- C. 1 3 3                      D. 6 3 1
- E. 6 3 3

**QUESTION 39**

What is output by the code in `// line 3`?

- A. 3.0                      B. 1.0
- C. 8.0                      D. 6.0
- E. 0.0

**QUESTION 40**

What is output by the code in `// line 4`?

- A. 1 3 6                      B. 1 3 8
- C. 1 3 3                      D. 6 3 1
- E. 6 3 3

```
class Parent {
    private int it, thing;
    public Parent() {
        it=thing=3;
    }
    public void fun() {
        it=8;
    }
    public double go() {
        return it;
    }
    public void back() {
        fun();
    }
    public String toString() {
        return it + " " + thing;
    }
}
```

```
class Kid extends Parent {
    private int it;
    public Kid() {
        it=1;
    }
    public void fun() {
        it=6;
    }
    public double go() {
        return it;
    }
    public void back() {
        super.back();
    }
    public String toString() {
        return it + " " + <*1> ;
    }
}
```

`//test code in a client class`

```
Parent one = new Parent();
one.back();
out.println(one);           // line 1
one = new Kid();
out.println(one);           // line 2
one.fun();
out.println(one.go());      // line 3
one.back();
out.println(one);           // line 4
```