

Note: Correct responses are based on Java, J2sdk v 6.0, 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 1000_2 minus 100_2 ?	
A. 100_2 B. 110_2 C. 111_2 D. 1111_2 E. 1011_2	
QUESTION 2	
What is output by the code to the right?	<code>System.out.println(10 + -12);</code>
A. -1 B. 2 C. -2 D. 1 E. There is no output due to a syntax error.	
QUESTION 3	
What is output by the code to the right?	<code>System.out.println(19.5 % 5);</code>
A. 4.5 B. 4.0 C. 3.5 D. 5.0 E. 0.0	
QUESTION 4	
What is output by the code to the right?	<code>int a = 7; a *= 2.3; System.out.println(a);</code>
A. 14 B. 14.1 C. 16.1 D. 16 E. 21	
QUESTION 5	
What is output by the code to the right?	<code>int[] rah = {0,1,2,3,4,5,6,7,8,9}; System.out.println(rah[3].length);</code>
A. 10 B. 2 C. 1 D. 0 E. There is no output due to a syntax error.	
QUESTION 6	
What is output by the code to the right?	<code>System.out.println("district".length());</code>
A. 8 B. 7 C. 9 D. 6 E. There is no output due to a syntax error.	
QUESTION 7	
What is output by the code to the right?	<code>boolean b = false; boolean c = false; System.out.println(!b !c b);</code>
A. true B. false C. 1 D. 0 E. There is no output due to a syntax error.	
QUESTION 8	
What is output by the code to the right?	<code>System.out.println(512 ^ 256);</code>
A. 512 B. 256 C. 768 D. 1024 E. There is no output due to a syntax error.	
QUESTION 9	
What is output by the code to the right?	<code>System.out.println(Math.abs(-7)*2);</code>
A. -14 B. 14 C. 5 D. -5 E. -9	

<p>QUESTION 10</p> <p>What is output by the code to the right?</p> <p>("-" indicates a blank space)</p> <p>A. \$17.24---</p> <p>B. \$17.23---</p> <p>C. \$---17.24</p> <p>D. \$---17.23</p> <p>E. \$17.25---</p>	<pre>System.out.printf("\$%-8.2f",17.235);</pre>
<p>QUESTION 11</p> <p>What is output by the code to the right?</p> <p>A. 0-2-4-6-8-10-12-14</p> <p>B. 0-2-4-6-8-10-12-14-16</p> <p>C. 0-2-4-6-8-10-12-14-16-18</p> <p>D. 0-2-4-6-8-10-12-14-</p> <p>E. There is no output due to a syntax error.</p>	<pre>for(int x = 0; x < 15; x+=2) System.out.print(x + "-");</pre>
<p>QUESTION 12</p> <p>Examine the statement to the right and select the answer below that best completes the sentence, "This statement..."</p> <p>A. compiles and runs error-free.</p> <p>B. compiles and runs, but causes a logic error.</p> <p>C. compiles error-free but causes a run-time error.</p> <p>D. causes an incompatible type syntax-error.</p> <p>E. causes a possible loss of precision syntax error.</p>	<pre>float var = 99.4;</pre>
<p>QUESTION 13</p> <p>What is output by the code to the right?</p> <p>A. 7 3</p> <p>B. 7 4</p> <p>C. a 4</p> <p>D. a 3</p> <p>E. There is no output due to a syntax error.</p>	<pre>char[][] bom = {{'a','7','c','5'}, {'e','3','g'}}; System.out.print(bom[0][1] + " " + bom[1].length);</pre>
<p>QUESTION 14</p> <p>What is output by the code to the right?</p> <p>A. o</p> <p>B. Object</p> <p>C. dog</p> <p>D. There is no output due to a runtime error.</p> <p>E. There is no output due to a syntax error.</p>	<pre>Object o = new Object("dog"); System.out.println(o);</pre>

<p>QUESTION 15</p> <p>What is output by the code to the right?</p> <p>A. 3 4 B. 3 5 C. 4 4 D. 4 5 E. 5 5</p>	<pre>int x = 5; int y = 2; int r = x / y * y; int q = x * (y / y); System.out.println(r + " " + q);</pre>
<p>QUESTION 16</p> <p>What is output by the code to the right?</p> <p>A. 128 B. 16 C. 8 D. 32 E. 64</p>	<pre>System.out.println(Double.SIZE);</pre>
<p>QUESTION 17</p> <p>What is output by the code to the right?</p> <p>A. 81.2 B. 81.2 false C. 81.2 true D. num true E. There is no output due to a syntax error.</p>	<pre>Object num = 81.2; Boolean bb = num instanceof Float; System.out.println(num + " " + bb);</pre>
<p>QUESTION 18</p> <p>What is output by the code to the right?</p> <p>A. 5 B. 9 C. 6 D. 7 E. 8</p>	<pre>int y=700, cnt=0; while(y > 0) { y /= 4; cnt = cnt + 1; } System.out.println(cnt);</pre>
<p>QUESTION 19</p> <p>What is output by the code to the right?</p> <p>A. false B. true C. 0 D. -1 E. 1</p>	<pre>String ti = "reference"; String tu = "reference"; System.out.println(ti == tu);</pre>
<p>QUESTION 20</p> <p>What is output by the code to the right?</p> <p>A. 86 B. 54 C. 48 D. 60 E. There is no output due to a syntax error.</p>	<pre>int go = Integer.parseInt("54",6); int gi = Integer.parseInt("32",4); System.out.println(go + gi);</pre>

<p>QUESTION 21</p> <p>What is output by the code to the right?</p> <p>A. truefalse B. falsefalse C. falsetrue D. truetrue E. There is no output due to a syntax error.</p>	<pre>boolean p = "guess78".matches(".*"); boolean q = "what78".matches("\\w+"); System.out.println(" " + p + q);</pre>
<p>QUESTION 22</p> <p>What is output by the code to the right?</p> <p>A. 3 B. 2 C. 1 D. 5 E. 6</p>	<pre>ArrayList<Integer> list; list = new ArrayList<Integer>(); list.add(1); list.add(2); list.add(3); list.add(4); list.add(5); list.remove(2); System.out.println(list.get(3));</pre>
<p>QUESTION 23</p> <p>What is output by the code to the right?</p> <p>A. 2165 B. 9875 C. 96354 D. 96355 E. 96353</p>	<pre>String wrd = "abc"; System.out.println(wrd.hashCode());</pre>
<p>QUESTION 24</p> <p>What is output by the code to the right?</p> <p>A. 5 B. 6 C. 6.0 D. 5.0 E. 0</p>	<pre>System.out.println(Math.sqrt(36));</pre>
<p>QUESTION 25</p> <p>What is output by the code to the right?</p> <p>A. 22 B. 23 C. 24 D. 25 E. 27</p>	<pre>int sum = 0; for(int i = 1; i < 10; i++){ for(int k = i%2; k < 3; k++){ sum++; } } System.out.println(sum);</pre>
<p>QUESTION 26</p> <p>What is output by the code to the right?</p> <p>A. 1430.0 B. 5932.0 C. 53932.0 D. 50932.0 E. 1432.0</p>	<pre>String s = "53.9327"; int ind = s.indexOf("."); String sa = s.substring(0, ind-1); String sb = s.substring(ind+1, 6); double res = Integer.parseInt(sa); res *= Math.pow(10, ind); res += Integer.parseInt(sb); System.out.println(res);</pre>

QUESTION 27

What is output by the code to the right?

- A. 24
- B. 123459
- C. 1234590
- D. 954321
- E. 9543210

```
int j = 0;
int[] c = {1,2,3,4,5,9};
for(int i : c){
    j += i;
    j *= 10;
}
System.out.println(j);
```

QUESTION 28

What is output by `sort(cmp)` if `cmp` was the following matrix?

```
{FFF}
{TFF}
{TTF}
```

- A. 012
- B. 120
- C. 111
- D. 210
- E. 201

```
public void doit(int[] r,
    int x, int pos) {
    for(int i=x-1;i>=pos;i--){
        r[i+1]=r[i];
    }
    r[pos]=x;
}
```

QUESTION 29

What is output by `sort(cmp)` if `cmp` was the following matrix?

```
{FTTFT}
{FFTTF}
{FFFFT}
{TFTFT}
{FFFFF}
```

- A. 30124
- B. 40132
- C. 31024
- D. 41023
- E. 01234

```
public void sort(boolean[][] cmp) {
    int n = cmp.length;
    int[] r = new int[n];
    for(int i=0;i<n;i++) r[i] = i;
    if( !cmp[r[0]][r[1]] ){
        int temp = r[0];
        r[0] = r[1];
        r[1] = temp;
    }
    for(int i=2;i<n;i++){
        if(cmp[r[i]][r[0]]){
            doit(r, i, 0);
        }
        else if(!cmp[r[i-1]][r[i]]){
            for(int k=1;k<i;k++){
                if(cmp[r[k-1]][r[i]] &&
                    cmp[r[i]][r[k]]){
                    doit(r, i, k);
                }
            }
        }
    }
    for(int x : r )
        System.out.print(x);
}
```

QUESTION 30

What is the average case runtime of the code to the right assuming `cmp` is an n by n matrix ?

- A. $O(N)$
- B. $O(N^2)$
- C. $O(N\log N)$
- D. $O(N^3)$
- E. $O(N!)$

QUESTION 31

What replaces **<*1>** in the code to the right to set `len` equal to the number of digits in `x`?

- A. `Integer.length(x);`
- B. `(int)Math.ceil(Math.log10(x + 1e-5));`
- C. `Math.floor(Math.log10(x)) + 1;`
- D. Both B and C
- E. All of the above

QUESTION 32

Assuming **<*1>** is filled correctly, what is returned by the method call `mangle(95316, 5)`?

- A. 555552
- B. 124356
- C. 117303
- D. 113111
- E. 117103

QUESTION 33

Assuming **<*1>** is filled correctly, what is returned by the method call `mangle(5555, 7)`?

- A. 7658
- B. 7599
- C. 5555
- D. 1111
- E. 7569

QUESTION 34

What is output by the code to the right?

- A. 5 0
- B. 5 4
- C. 5 5
- D. 6 5
- E. 6 6

```
public int mix(int x, int i, int j) {
    int[] p10 = new int[10];
    p10[0] = 1;
    for(int ii=1;ii<10;ii++) {
        p10[ii] = p10[ii-1]*10;
    }
    int k = x / p10[i] % 10;
    x += j * p10[i] - k;
    return x;
}
```

```
public int mangle(int x, int k){
    int len = <*1>
    for(int i=0;i<len;i++){
        x = mix(x, i, x%k);
    }
    return x;
}
```

```
int x = 5;
int y = 7;
int q = y + (x - y);
int r = y * (x / y);

System.out.println(q + " " + r);
```

QUESTION 35

What is the output of the client code to the right?

- A. 4 1 5 7 2 :0
7 5 4 2 1 :22
- B. 4 1 5 7 2 :0
7 5 4 2 1 :12
- C. 4 1 5 7 2 :0
1 2 4 5 7 :10
- D. 4 1 5 7 2 :0
4 2 7 5 1 :0
- E. 4 1 5 7 2 :0
1 2 4 5 7 :22

QUESTION 36

What standard sorting routine is method `sort` in class `Sort` to the right?

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

QUESTION 37

What is the expected runtime of method `sort` in class `Sort` to the right?

- A. $O(1)$
- B. $O(\log n)$
- C. $O(n)$
- D. $O(n \log n)$
- E. $O(n^2)$

```
public class Sort
{
    private int list[] = {4,1,5,7,2};
    private int count;

    public void sort()
    {
        int index;
        count=0;
        for(int x=0;x<list.length-1;x++)
        {
            index=x;
            for(int y=x+1;y<list.length;y++)
            {
                count++;
                if(list[y] < list[index])
                    index=y;
            }
            count+=3;
            int temp=list[x];
            list[x]=list[index];
            list[index]=temp;
        }
    }

    public void display()
    {
        for(Integer i : list)
            out.print(i + " ");
        out.println(": " + count);
    }
}

////////////////////////////////////
//client code
Sort test = new Sort();
test.display();
test.sort();
test.display();
```

QUESTION 38

What is returned by the following client code?

```
ternary( new int[]{10,9,5,6,7,8,12} )?
```

- A. 1.0
- B. 2.0
- C. 3.0
- D. 4.0
- E. 5.0

```
public static double ternary(int[] f){
    double lo = 0;
    double hi = f.length-1;

    while(lo <= hi){
        int L = (int)(2 * lo + hi) / 3;
        int R = (int)(lo + 2 * hi) / 3;
        if(f[L] < f[R]){
            hi = R;
        }else if(f[L] > f[R]){
            lo = L + 1;
        }else{
            return L;
        }
    }
    return lo;
}
```

QUESTION 39

What is output by the code to the right?

- A. 5
- B. 6
- C. 7
- D. 8
- E. 9

```
int y = 1534;
int count = 0;
for(int i=0; i<10; i++)
{
    if((y & (1<<i)) != 0)
    {
        y = y & ~(1<<i);
        count++;
    }
}
System.out.println(count);
```

QUESTION 40

What is output by the code to the right?

- A. 0
- B. 1
- C. There is no output due to a syntax error.
- D. There is no output due to a NullPointerException.
- E. There is no output due to an
ArrayIndexOutOfBoundsException.

```
Integer[] myst = new Integer[10];
System.out.println(myst[0]*2);
```