

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 1010_2 plus 1010_2 ?	
A. 42_6 B. 20_{10} C. 24_9 D. 14_{10} E. 42_7	
QUESTION 2	
What is output by the code to the right?	<code>double a = 1079 / 10 ; System.out.println(a);</code>
A. 1.0 B. 9.0 C. 79.0 D. 107.0 E. There is no output due to a syntax error.	
QUESTION 3	
What is output by the code to the right?	<code>int b = 1079; b %= 10; System.out.println(b);</code>
A. 9 B. 1 C. 79 D. 107 E. There is no output due to a syntax error.	
QUESTION 4	
What is output by the code to the right?	<code>for(int c=1; c<=25; c+=4) System.out.print(c);</code>
A. 1591317212529 B. 159131721 C. 7101316192225 D. 14710131619 E. 15913172125	
QUESTION 5	
What is output by the code to the right?	<code>String d = "apluscompsci rocks"; System.out.print(d.substring(10));</code>
A. rocks B. irocks C. compsci D. cirocks E. compsci rocks	
QUESTION 6	
What is output by the code to the right?	<code>int[] e = {3,5,9,3,2,4,8}; e[0] = e[3] + e[5]; System.out.println(e[0]);</code>
A. 7 B. 11 C. 12 D. 8 E. There is no output due to a syntax error.	
QUESTION 7	
How many combinations of values for b and c could make a true?	<code>a = !(b ^ c);</code>
A. 0 B. 1 C. 3 D. 2 E. 4	
QUESTION 8	
What is output by the code to the right?	<code>double t = Math.ceil(Math.sqrt(40)); if(t > 5.0) System.out.print(0); else if(t > 6.0) System.out.print(1); System.out.print(2);</code>
A. 2 B. 12 C. 02 D. 012 E. There is no output due to a syntax error.	

QUESTION 9

Which of the following could replace **<*1>** in the code of class `Bear` to the right so that method `isBadHombre()` would correctly return true if the `Bear` has more than 15 teeth and more than 6 claws?

- A. `return (numTeeth>15 || numClaws>6);`
 B. `return (numTeeth>15 && numClaws>6);`
 C. `return (getNumTeeth())>15 && getNumClaws()>6);`
 D. A and B only
 E. B and C only

```
public class Bear
{
    private int numClaws;
    private long numTeeth;

    public Bear(int ns, long nt){
        numClaws = ns;
        numTeeth = nt;
    }

    public long getNumTeeth(){
        return numTeeth;
    }

    public int getNumClaws(){
        return numClaws;
    }

    public boolean isBadHombre(){
        <*1>
    }
}

////////////////////////////////////
//client code
Bear b = new Bear(5, 200);
out.print(b.isBadHombre() + " ");
b = new Bear(50, 26);
out.println(b.isBadHombre());
```

QUESTION 10

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

- A. false true
B. true true
C. false false
D. true false
E. There is no output.

```

    public boolean isBadHombre(){
        <*1>
    }
}

////////////////////////////////////
//client code
Bear b = new Bear(5, 200);
out.print(b.isBadHombre() + " ");
b = new Bear(50, 26);
out.println(b.isBadHombre());

```

QUESTION 11

What is output by the code to the right?

- A. 4 B. 2 C. 5 D. 6
- E. There is no output due to a syntax error.

```
byte tr = 5;
tr = (++tr > 5) ? tr++ : tr--;
out.println( tr );
```

QUESTION 12

What is output by the code to the right?

- A. -3.33 B. (-3.33)
C. (-3.330) D. (3.330)
E. There is no output due to a runtime exception.

```
System.out.printf("%.3f",-3.33);
```

QUESTION 13

What is output by the code to the right?

- A. 0 B. 4 C. 6 D. 2 E. 3

```
String g = "/big//tall//funny";
String[] bg = g.split("[//]");
System.out.println(bg.length);
```

QUESTION 14

What is output by the code to the right?

- A. 0
B. -4
C. 5
D. 1
E. -2

```
String vals = "footballgainer";
int total = 0;
for(int i=0; i<vals.length(); i++){
    char ch = vals.charAt(i);
    switch( ch ){
        case 'e' : total+=3; break;
        case 'o' : total+=2; break;
        case 'n' : total-=1; break;
        default : total--;
    }
}
System.out.print( total );
```

QUESTION 15 What is output by the code to the right? A. 11 B. 12 C. -1 D. 5 E. 7	<pre>String j = "aplustcompsciiscool"; out.print(j.lastIndexOf("i",7));</pre>
QUESTION 16 What is output by the line marked //1 in the code to the right? A. 16 B. 10 C. 48 D. 96 E. There is no output due to a syntax error.	<pre>public class ACat { private int size; public ACat(int s){ size = s; } public int getIt(){ return size * 2; } public int getThat(){ return getIt(); } }</pre>
QUESTION 17 What is output by the line marked //2 in the code to the right? A. 16 B. 10 C. 48 D. 96 E. There is no output due to a syntax error.	<pre>public class BigCat extends ACat { private int size; public BigCat(int s){ super(s); size = s * 2; } public int getThat() { return super.getThat() + getIt(); } public int getIt(){ return size * 3; } } //////////////////////////////////// // client code ACat d = new ACat(5); System.out.println(d.getIt()); //1 d = new BigCat(8); System.out.println(d.getThat()); //2</pre>
QUESTION 18 What is output by the code to the right? A. 17 B. 22 C. 15 D. 23 E. 21	<pre>System.out.printf("%x",33);</pre>
QUESTION 19 What is the output by the code to the right? A. 0 B. 5 C. 10 D. There is no output due to a syntax error. E. There is no output due to a runtime error.	<pre>LinkedList list = new LinkedList(); for(int i = 0; i < 200; i++) list.add(Integer.toString(i,i)); Iterator i = list.listIterator(); i.next(); i.next(); System.out.println(i.next());</pre>

<p>QUESTION 20</p> <p>What is the output by the code to the right?</p> <p>A. 325 B. 313 C. 3 D. 127 E. 440</p>	<pre>System.out.println(313^3^127);</pre>
<p>QUESTION 21</p> <p>What is output by the code to the right?</p> <p>A. -32 B. -22 C. 5 D. 24 E. -14</p>	<pre>int bit = 24 5 ^ 10; int wise = ~bit; out.print(wise);</pre>
<p>QUESTION 22</p> <p>What is output by the code to the right?</p> <p>A. 3 8 B. 3 9 C. 4 8 D. 4 9 E. 5 8</p>	<pre>int ei = 102; int c = ei % 11; int r = ei / 11; System.out.println(c + " " + r);</pre>
<p>QUESTION 23</p> <p>What is output by the client code to the right?</p> <p>A. [2, 3, 0, 1, 4] B. [3, 3, 0, 1, 4] C. [3, 4, 0, 1, 4] D. [0, 1, 0, 0] E. [1, 1, 0, 0]</p>	<pre>public static void fun(int[] list) { list = new int[4]; list[0]++; list[1]++; } //////////////////////////////////// // client code int[] bob = {2,3,0,1,4}; fun(bob); out.print(Arrays.toString(bob));</pre>
<p>QUESTION 24</p> <p>What is returned by the method call <code>fizz(7)</code> ?</p> <p>A. 56 B. 12 C. 16 D. 64 E. There is no output due to a syntax error.</p>	<pre>public static int fizz(int st)</pre>
<p>QUESTION 25</p> <p>What is returned by the method call <code>fizz(16)</code> ?</p> <p>A. 56 B. 72 C. 76 D. 64 E. There is no output due to a syntax error.</p>	<pre>{ int cnt = 0; for(int i = 1; i<=st; i+=2) { for(int j = i; j<=st; j+=1) { cnt = cnt + 1; } } return cnt; }</pre>
<p>QUESTION 26</p> <p>What is the running time of method <code>fizz</code>? Choose the most restrictive correct answer.</p> <p>A. $O(N^2)$ B. $O(1)$ C. $O(N+N/2)$ D. $O(N\log N)$ E. $O(\log N)$</p>	

Use the following matrix m for questions 27 and 28.

5	4	3	2	1
2	2	2	2	2
3	3	3	3	3
1	2	3	4	5
2	4	6	8	10

QUESTION 27

What is returned by the method call `chk(m, 1, 1)` ?

- A. 14
B. 16
C. 13
D. 15
E. Nothing is returned due to a runtime exception.

QUESTION 28

What is returned by the method call `chk(m, 3, 2)` ?

- A. 14
B. 16
C. 13
D. 15
E. Nothing is returned due to a runtime exception.

QUESTION 29

What is returned by the method call `boom(5)` ?

- A. 33
C. 29
E. 31
- B. 26
D. 21

QUESTION 30

What is returned by the method call `boom(10)` ?

- A. 111
C. 99
E. 101
- B. 115
D. 108

QUESTION 31

What is output by the code to the right?

- A. abbbabaabba
B. bbbbaabb
C. bbbbbb
D. bbbbbbbbbbb
E. bbbb

```
public static int chk(int[][] m,
                      int r,
                      int c)
{
    Integer sum = 0;
    int rowCap = m.length;
    int colCap = m[0].length;
    do{
        sum = sum + m[r][c];
        if(m[r][c] % 2 == 0)
            r--;
        else
            c++;
    }while( r < rowCap && c < colCap);
    return sum;
}
```

```
public static int boom(int x)
{
    if(x<=0)
        return 1;
    else
        return x + boom(x-1) + x;
}
```

```
String s = "abbbabaabba";
String a = s.replaceAll("a+", "b");
System.out.println(a);
```

QUESTION 32

What is output by the client code to the right?

- A. 756
- B. 746
- C. 777
- D. 721
- E. 800

```
public static int guess(String s,
                        int spot,
                        int ans)
{
    if( spot == s.length() )
        return ans;
    return guess(s, spot + 1,
                ans + s.charAt(spot));
}
```

QUESTION 33

Which of the following best describes what method `guess` does?

- A. Returns the maximum ascii value in `s`.
- B. Returns the minimum ascii value in `s`.
- C. Returns the ASCII value sum of some or all letters in `s`.
- D. Returns the first ascii value in `s`.
- E. Returns the last ascii value in `s`.

```
////////////////////////////////////
// client code
String word = "skywanders";
out.print( guess(word, 3, 0) );
```

QUESTION 34

Consider the class headers to the right. Assume all of the classes to the right have a default constructor. Which of the following statements will compile without error?

- I. `Wacky d = new TreeWex();`
 - II. `Wacky b = new SuperTree();`
 - III. `Wacky b = new Wacky();`
- A. I only
 - B. II only
 - C. III only
 - D. I and II only
 - E. I and III only

```
public interface Wacky

public class TreeWex implements Wacky

public class Links implements Wacky

public class BigLinks extends Links

public class SuperTree extends TreeWex
```

QUESTION 35

What is output by the code to the right?

- A. [5, 3, 9]
- B. [9, 3, 5]
- C. [3, 3, 5]
- D. [3, 5, 9]
- E. [9, 5, 3]

```
int[] arr = {5, 3, 9};

for(int i : arr)
{
    arr[i%3] = i;
}

String out = Arrays.toString(arr);
System.out.println(out);
```

QUESTION 36

What are the contents of `list` after the method call `sort (new Integer[]{7,2,1,9,8,3}, 1, 4) ?`

- A. [1, 2, 3, 7, 8, 9]
- B. [1, 9, 7, 3, 8, 2]
- C. [3, 2, 1, 7, 9, 8]
- D. [1, 2, 7, 9, 8, 3]
- E. [7, 1, 2, 8, 9, 3]

```
void sort(Comparable[] list, int low, int high)
{
    if(low < high)
    {
        int p = help(list, low, high);
        sort(list, low, p);
        sort(list, p+1, high);
    }
}
```

```
int help(Comparable[] list, int low, int high)
{
    Comparable x = list[low];
    int bot = low-1;
    int top = high+1;

    while(bot<top)
    {
        while(list[--top].compareTo(x) > 0)
        {}

        while(list[++bot].compareTo(x) < 0)
        {}

        if (bot >= top){
            return top;
        }

        Comparable temp = list[bot];
        list[bot] = list[top];
        list[top] = temp;
    }
    return 0;
}
```

QUESTION 37

What standard sorting algorithm is being demonstrated by method `sort () ?`

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

QUESTION 38

What is output by the code to the right?

- A. 38
- B. 39
- C. 40
- D. 42
- E. 45

```
int j = -1;
int sum = 0;

while(j <= 11)
{
    sum += j;
    sum -= 2;
    j++;
}

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

QUESTION 39

```
Struct s = new Struct();
s.add("hello");
s.add("halo");
s.add("help");
s.add("hiccup");
s.add("alf");
s.add("elf");
```

After the code above runs, how many instantiated Struct's are in the s.nodes[8] subtree (including the root node)?

- A. 20
- B. 19
- C. 13
- D. 14
- E. 21

QUESTION 40

```
Struct s = new Struct();
s.add("and");
s.add("bart");
s.add("bell");
s.add("call");
s.add("wow");
s.add("aplus");
s.add("comp");
s.add("sci");
s.add("uil");
s.add("ap");
```

After the code above runs, how many Struct's have been instantiated (including the root node)?

- A. 34
- B. 31
- C. 33
- D. 37
- E. 25

```
public class Struct
{
    public Struct[] nodes;

    public Struct()
    {
        nodes = new Struct[26];
    }

    public void add(String str)
    {
        if (str.length()==0)
            return;

        int fCh = str.charAt(0)-96;

        if (nodes[fCh] == null)
            nodes[fCh] = new Struct();

        nodes[fCh].add(str.substring(1));
    }
}
```