

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 CAD_{16} minus 11110001_2 ?

A. $D9E_{16}$ B. BCC_{16} C. $1CC_{16}$ D. BBC_{16} E. $B19_{16}$ **QUESTION 2**

What is output by the code to the right?

A. 7.5

B. 10

C. 12

D. 15

E. 7

```
int high = 10;
int low = 5;
int mid = high + low / 2;
System.out.println( mid );
```

QUESTION 3

What is output by the code to the right?

A. 4.0

B. 4.5

C. 3.0

D. 7.0

E. 3.5

```
double amt = 0.0;
for(int i = 4; i < 11; i++){
    amt += 0.5;
}
System.out.print( amt );
```

QUESTION 4

What is output by the code to the right?

A. 8

B. 1

C. 3

D. 7

E. -1

```
String dna = "aggtggacgg";
String sr = "cgg";
System.out.println(dna.indexOf(sr));
```

QUESTION 5

What is output by the code to the right?

A. true

B. 0

C. null

D. There is no output due to a syntax error.

E. There is no output due to a `NullPointerException`.

```
String[] names = new String[5];
System.out.println( names[1] );
```

QUESTION 6

What is output by the code to the right?

A. -7

B. 2

C. 0

D. 1

E. -1

```
int r = 29;
int s = 8;
int t = 3;
System.out.print( r % s % t );
```

QUESTION 7

What is output by the code to the right?

A. false true

B. true true

C. true false

D. truefalse falsefalse

E. false false

```
boolean p = true;
boolean q = 5.5 > 5;
System.out.print( p && !p );
System.out.print( " " );
System.out.print( !q || q );
```

QUESTION 8

What is output by the code to the right?

A. 123

B. 2

C. 3

D. 23

E. 1

```
String ex = "!!**!!";
char cx = ex.charAt(0);
if(Character.isUpperCase(cx))
    System.out.print( 1 );
if( Character.isDigit(ex.charAt(3)) )
    System.out.print( 2 );
if( ex.charAt(0) == ex.charAt(4) )
    System.out.print( 3 );
```

QUESTION 9

Which of the following correctly replaces `<*1>` in the code to the right? The code segment with the parameter `np` is a constructor for the `Book` class that can be accessed in all other classes.

- A. `Book`
- B. `public Book`
- C. `private Book`
- D. `public static Book`
- E. `public void Book`

```
public class Book{

    private int numPages;

    <*1> (int np){
        numPages = np;
    }

    public void addPage(){
        numPages++;
    }

    public int getLen(){
        return numPages;
    }
}
```

QUESTION 10

What is output by the client code to the right?

- A. 12
- B. 10
- C. 14
- D. 2
- E. 0

```
////////////////////////////////////
//////// client code
Book draft = new Book(10);
Book other = draft;
other.addPage();
draft.addPage();
System.out.print( draft.getLen() );
```

QUESTION 11

What is output by the code to the right?

- A. 5
- B. -6
- C. 625
- D. -5
- E. false

```
int m = 5;
m = ~m;
m = ~m;
System.out.print( m );
```

QUESTION 12

What is output by the code to the right?

- A. 0.0
- B. 1.0
- C. -2.0
- D. -1.5
- E. -1.0

```
double a2 = -1.5;
System.out.print( Math.floor(a2) );
```

QUESTION 13

How many lines of output does the code to the right produce?

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

```
String name = "Bob\nGibson";
System.out.println( name + name );
```

QUESTION 14

What is output by the code to the right?

- A. +-012
- B. ++-12
- C. 012
- D. -12
- E. +12-24

```
System.out.printf( "%0+3d", (12-24) );
```

QUESTION 15

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

- A. 9
- B. 4
- C. 6
- D. 5
- E. 0

```
public int manip(int x, int y){
    y = x;
    x = y;
    return x * y;
}
```

QUESTION 16

How many distinct possible outputs are there for the code to the right?

- A. 4
- B. 2
- C. 3
- D. 6
- E. 5

```
int x, y, z;
// code to initialize x, y, and z

String result = "";
if ( x > 10 )
    result += "a";
if( y > 10 )
    result += "a";
if( z > 10 )
    result += "a";
else
    result += "b";
System.out.println(result.length());
```

QUESTION 17

What is output by the following client code?

```
School s1 = new School(100);
System.out.print( s1.stu() );
```

- A. 1000 B. 0 C. UIL D. ACSL E. 100

```
public class School{

    private int numStu;

    public School(){ this(1000); }

    public School(int numStu){
        this.numStu = numStu;
    }

    public int stu(){ return numStu; }

    public String contest(){
        return "UIL";
    }
}
```

QUESTION 18

What is output by the following client code?

```
PrivateSchool p1 = new PrivateSchool();
System.out.println( p1.stu() );
```

- A. 1000 B. 100 C. 0
- D. There is no output due to a syntax error in the client code.
- E. There is no output due to a `ClassCastException`.

```
public class PrivateSchool
    extends School{

    public String contest(){
        return "ACSL";
    }
}
```

QUESTION 19

What is output by the following client code?

```
School s2 = new PrivateSchool();
System.out.println( s2.contest() );
```

- A. ACSL B. UIL C. null
- D. There is no output due to a syntax error in the client code.
- E. There is no output due to a runtime error.

QUESTION 20

Which of the following is a valid Java identifier?

- A. Score12
- B. 12score
- C. **score
- D. score*times
- E. None of these are valid identifiers.

QUESTION 21

How many *'s are output by the code to the right?

- A. 100 B. 81 C. 10 D. 9 E. 90

```
for(int i = 1; i <= 10; i++)
    for(int j = 1; j < 10; j++)
        System.out.print('*');
```

QUESTION 22

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

- A. 120 B. 2 C. 5 D. 7 E. 121

```
public int process(int n){
    int result = 0;
    if( n <= 0 )
        result = 2;
    else
        result = 1 + process(n-1);
    return result;
}
```

QUESTION 23

What is output by the following client code?

```
Picture p2 = new Picture(100, 200);
System.out.print( p2.isPortrait() );
```

- A. true B. false C. 0
D. There is no output due to a syntax error in the client code.
E. There is no output due to a runtime error.

```
public class Picture{
    private int width;
    private int height;

    public Picture(int w, int h){
        height = h;
        width = w;
    }

    public boolean isPortrait(){
        return height > width;
    }
}
```

QUESTION 24

What is output by the following client code?

```
Picture p3 = new Picture(100, 100);
Picture p4 = new Picture(100, 100);
System.out.print( p3 == p4 );
```

- A. true B. false C. 0
D. There is no output due to a syntax error in the client code.
E. There is no output due to a runtime error.

QUESTION 25

What is output by the code to the right?

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

```
int x = 3;
double a = 3;
double b = 4;
boolean res = (x == a) && !(a > b);
System.out.print( res );
```

QUESTION 26

What is output by the code to the right?

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

```
int[] data = {3, 1, 4, 1, 5, 9};
int tally = 0;
for(int i : data)
    if( i > data[0] )
        tally++;
System.out.print(tally);
```

QUESTION 27

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

- A. hB B. hc C. ch D. Bllelmoch E. Bh

```
ArrayList<Character> h;
h = new ArrayList<Character>();
String n = "Bllelmoch";

for(int i = 0; i < n.length(); i++)
    h.add(0, n.charAt(i) );
```

QUESTION 28

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

- A. e B. h C. l D. m E. o

```
String one = "" + h.get(0) +
                h.get(h.size() - 1);
System.out.print( one );      //line 1
char ch = h.get(h.size()/2);
System.out.print(ch);      //line 2
```

QUESTION 29

Which of the following statements regarding Java keywords are true?

- I. They cannot be used as identifiers in Java programs.
- II. All keywords are primitive data types.
- III. Keywords only contain upper case.

A. I only B. II only C. III only D. I and II only E. II and III only

QUESTION 30

What is output by the code to the right?

A. 2.0 B. 2.5 C. 2 D. 3.5 E. 3.0

```
double c = 1.5;
c++;
System.out.print( c );
```

QUESTION 31

What must be the data type of the parameter `vals` be so that the elements of the `Collection` are always printed in sorted order?

A. TreeSet B. HashSet C. ArrayList
D. a native array E. LinkedList

```
public <T> void showAll
    (Collection<T> vals){
    for(T obj : vals)
        System.out.println( obj );
}
```

QUESTION 32

Assume the method `process(int[] data)` is $O(N^3)$ where $N = \text{data.length}$. When the method `process` is passed an array with `length = 10,000` it takes 8 seconds for method `process` to complete. If method `process` is then passed an array with `length = 15,000` what is the expected time it will take method `process` to complete?

A. 64 seconds B. 32 seconds C. 100 seconds D. 27 seconds E. 256 seconds

QUESTION 33

Which answer is logically equivalent to the following Boolean expression? `p` and `q` are boolean variables.

`p || q || !p`

A. false B. `p && q && !p` C. `!p || !q || !p` D. true E. `!(p && !q && p)`

QUESTION 34

Consider the following statement from method `f` to the right.

```
c2 = f(s, t1) + 1;
```

Which of the following best describes the programming feature the statement uses?

A. method overloading
B. inheritance
C. Java generics
D. recursion
E. method overriding

```
public int f(String s, String t){
    if( s.length() == 0 )
        return t.length();
    else if( t.length() == 0 )
        return s.length();
    else{
        char sc = s.charAt(s.length()-1);
        char tc = t.charAt(t.length()-1);
        String s1, t1;
        s1 = s.substring(0,s.length()-1);
        t1 = t.substring(0,t.length()-1);
        int c1, c2, c3;
        if( sc == tc )
            c1 = f(s1, t1);
        else
            c1 = f(s1, t1) + 1;
        c2 = f(s, t1) + 1;
        c3 = f(t1, s) + 1;
        c2 = Math.min(c1, c2);
        return Math.min(c2, c3);
    }
}
```

QUESTION 35

What is returned by the method call `f("two", "two")`?

A. 2 B. 3 C. 0 D. -1 E. 6

QUESTION 36

What is returned by the method call `f("sit", "kin")`?

A. 2 B. 3 C. 1 D. 0 E. 6

QUESTION 37

What is output by the following client code?

```
String[] list = {"K", "B", "A", "B"};
sort(list);
System.out.print( Arrays.toString(list) );
```

- A. [K, B, B, A] B. [A, B, B, K]
 C. [A, B, K] D. [K, B, A]
 E. LinkedList

```
public void sort(String[] d){
    final int lim = d.length;
    for(int i = 0; i < lim - 1; i++){
        int m = i;
        for(int j = i; j < lim; j++){
            if(d[j].compareTo(d[m]) > 0 )
                m = j;
        }
        String temp = d[i];
        d[i] = d[m];
        d[m] = temp;
    }
}
```

QUESTION 38

Which sorting algorithm does method `sort` implement?

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

QUESTION 39

Consider the `Structure` class to the right. What is output by the following client code?

```
Structure s = new Structure();
s = s.add(5);
s = s.add(3);
s = s.add(5);
s = s.add(1);
while( !s.isEmpty() ){
    System.out.print( s.get() );
    s = s.remove();
}
```

- A. 1535 B. 5351 C. 135 D. 531 E. 1355

```
public class Structure{

    private static final Object END =
                                   new Object();

    private Object data;
    private Structure rest;

    public Structure(){
        data = END;
    }

    public Structure add(Object obj){
        Structure result = new Structure();
        result.rest = this;
        result.data = obj;
        return result;
    }

    public Structure remove(){
        return rest;
    }

    public Object get(){
        return data;
    }

    public boolean isEmpty(){
        return data == END;
    }
}
```

QUESTION 40

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

- A. an array based list
 B. a hash table
 C. a set
 D. a stack
 E. a queue