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

What is the sum of 1001_2 - 111_2 + 1_2?

A. 10_2 B. 111_2 C. 101_2 D. 100_2 E. 11_2

QUESTION 2

What is output by the code to the right?

A. 9 B. 0 C. 14 D. 23 E. 17

```
int x = 14;
int y = 23;
System.out.println(x % y);
```

QUESTION 3

What is output by the code to the right?

A. 5 B. 3 C. 4 D. 6 E. 7

```
int[] a = {1,3,2,5,4,3,6,2,7,8};
System.out.println( a[a.length/2] );
```

QUESTION 4

What is output by the code to the right?

A. 6 B. 7 C. 2 D. 3 E. 8

```
String s = "autocrat";
System.out.println(s.indexOf("t",3));
```

QUESTION 5

How many values of x will output in the code shown on the right?

A. 7 B. 5 C. 6 D. 8

E. infinitely many

```
int x = 1;
while(true)
{
  x*=2;
  if(x<100)
    System.out.println(x);
  else
    break;
}
```

QUESTION 6

For which values of p and q would the code at right output `false`?

A. p = `false` q = `true` B. p = `false` q = `false`

C. p = `true` q = `true` D. p = `true` q = `false`

E. There are no values that be given p and q that would output false.

```
boolean p = //some value
boolean q = //some value
System.out.println( ! ( p & q) );
```

QUESTION 7

What is the output of the code to the right if the first input is 5 and the second input is 4?

A. `false` B. `true`

C. 9 D. 1

E. 8

QUESTION 8

What is the output of the code to the right if the first input is 2 and the second input is 7?

A. `false` B. `true`

C. 9 D. -5

E. 4

```
Scanner keyboard;
keyboard = new Scanner(System.in);
int a = keyboard.nextInt();
int b = keyboard.nextInt();
out.println(a>b?false?a-b:a+b:true);
```

QUESTION 9

What is the output of the code to the right if the first input is `45` and the second input is `34`?

A. `hot` B. `cold`

C. `true` D. `false`

E. There is no output due to a runtime error.

QUESTION 10

What is the output of the code to the right if the first input is `55` and the second input is `34`?

A. `hot` B. `cold`

C. `true` D. `false`

E. There is no output due to a runtime error.

```
Scanner keyboard;
keyboard = new Scanner(System.in);
int c = keyboard.nextInt();
int d = keyboard.nextInt();
if(c < 50 && 100 / (d / c)>0)
 System.out.println("hot");
else
 System.out.println("cold");
```

QUESTION 11

What is output by the code to the right?

A. `0` B. `1` C. `3` D. 30 E. `80`

```
int x = 10;
System.out.println(x<<3);
```

QUESTION 12

What is output by the code to the right?

A. `3.000` B. `3.1` C. `3.14` D. `3.141` E. `3.142`

```
double f = 3.14159;
String F = String.format("%.3f",f);
System.out.println(F);
```

QUESTION 13

What is output by the code to the right?

A. `sdfoiu` B. `ab`

C. `sdf;lk` D. `jq`

E. the output is an empty string

```
String Y = "rlkjbsdfoiuaasdf;lkabjq";
String [] z = Y.split("[abc]");
System.out.println(z[3]);
```

QUESTION 14

What is output by the code to the right?

A. `1010-1` B. `01010-1`

C. `01010` D. `10101`

E. `00110`

```
int x1=14;
do
{
  x1-=3;
  out.print(x1%2);
}while(x1>0);
```

QUESTION 15

What value is contained in the variable m after the expression shown to the right is executed?

A. `-127` B. `127`

C. `-128` D. `128`

E. error - possible loss of precision

```
int m = Math.abs(Byte.MIN_VALUE);
```

QUESTION 16

What is output by the code to the right?

A. `1 4 4 7` B. `0 4 5 7`

C. `3 6` D. `3 2 5 6 2 8`

E. `1 2 4 6 7`

```
int [] list2 = {1,3,2,5,4,4,6,2,7,8};
for(int i:list2)
  if(i%3==1)
     System.out.print(i+" ");
```

QUESTION 17

What is output by the code to the right?

A. `falsefalsefalsetrue`

B. `truetruetruefalse`

C. `truefalsetruefalse`

D. `falsetruefalsefalse`

E. `truefalsetruetrue`

```
boolean [] flags = new boolean[4];
flags[3]=true;
flags[2]=false;
for(boolean b:flags)
   System.out.print(b);
```

QUESTION 18

For what values of a, b, and c will the code to the right output `false true`?

A. a = `false` b = `false` c = `false`

B. a = `false` b = `true` c = `true`

C. a = `false` b = `true` c = `false`

D. a = `true` b = `false` c = `true`

E. a = `true` b = `true` c = `false`

```
boolean a = //some value
boolean b = //some value
boolean c = //some value
System.out.print((a && b ^ c) + " ");
System.out.println(a & b ^ c);
```

QUESTION 19

What is output by the code to the right?

A. `45` B. `52` C. `43` D. `41` E. 55

```
int x = Integer.parseInt("45",7);
String s = Integer.toString(x,8);
System.out.println(s);
```

QUESTION 20

What is output by the code to the right?

A. `18` B. `-18` C. `1` D. `-1`

E. output cannot be determined

```
int x = "beach".compareTo("beauty");
System.out.println(x);
```

QUESTION 21

What is output by the code to the right ?

A. `1 3 5`

B. `3 1 5`

C. `5 1 3`

D. `5 3 3`

E. `5 3 1`

```
int j = 5, k = 1, h = 3, w, u, v;
if (j < k || h < j)
{
  w = j; u = k;
}
else
{
  w = k; u = j;
}
if (u < h && w < k)
  v = h;
else
{
  v = u;  u = h;
}
System.out.println(w+" "+u+" "+v);
```

QUESTION 22

What is the last value output by the code shown on the right?

A. `11` B. `9` C. `12` D. `8` E. `10`

```
int [][] grid = new int[6][11];
for(int r=5;r>=1;r--)
 for(int g=3;g<=10;g+=2)
 {
  grid[r][g]=r+g;
  System.out.println(grid[r][g]+" ");
 }
```

QUESTION 23

If the initial value of the String variable a has a length of 128, what is the output of the code on the right?

A. 136 B. 137 C. 138 D. 140 E. 141

```
String a =".......";//LENGTH 128
String b = a.substring(0,100);
String c = a.substring(52,64) +
           b.substring(26,39);
String d =
         c.substring(c.length()-13);
String e = b+c+d;
System.out.println(e.length());
```

QUESTION 24

What is output by the code to the right?

A. A B. B C. C D. D E. E

```
Stack <String>stk;
stk = new Stack<String>();
stk.push("A");
stk.push("B");
stk.pop();
stk.push("C");
stk.pop();
stk.pop();
stk.push("D");
stk.push("E");
stk.push("F");
stk.pop();
stk.pop();
System.out.println(stk.peek());
```

QUESTION 25

What is output by the code to the right?

A. A B. B C. C D. D E. E

```
PriorityQueue <String> stq;
stq = new PriorityQueue<String>();
stq.add("A"); stq.add("C");
stq.poll();   stq.add("B");
stq.poll();   stq.poll();
stq.add("D"); stq.add("E");
stq.add("A"); stq.poll();
System.out.println(stq.peek());
```

QUESTION 26

Which boolean expression below is equivalent to the boolean expression shown on the right?

A. !a&&!b B. a||b C. a&&!b D. !a||!b E. !a||b

```
!(a&&b)||a&&(!(b||c))
```

QUESTION 27

Assuming no precision errors occur, what is output by the code to the right?

A. 65 B. 170 C. 43 D. 2776 E. 0

```
int dx = 0;
for(int di=1;di<=4;di++)
  for(int dj=1;dj<=di;dj++)
  {
     dx = (dx + di) * dj;
     if(dx/2 == (double)dx/2)
        dx/=2;
  }
System.out.println(dx);
```

QUESTION 28

What is output by the code to the right?

A. z B. Z C. y D. Y E. 90

```
int x = 90;
System.out.println((char)x);
```

QUESTION 29

How many constructors are shown in the TreeNode class definition on the right?

A. 1 B. 2 C. 3 D. 4 E. none

QUESTION 30

Which choice below contains the best series of statements to replace the line marked `//1` in the class definition to the right in order to create a constructor for a standard binary search tree?

A. `x=0;leftChild=rightChild="";`

B. `x=0;leftChild=new TreeNode();`
`rightChild=new TreeNode();`

C. `x=1;leftChild=rightChild=null;`

D. `x=0;leftChild=rightChild=null;`

E. `x=1;leftChild=new TreeNode();`
`rightChild=new TreeNode();`

QUESTION 31

What is the output of the line marked `//2` in the client code on the right?

A. 1 2 2 3 4 6 6 9

B. 2 2 3 4 4 6 6 9

C. 2 2 6 4 4 6 3 9

D. 2 3 6 4 9 6 2 1

E. 4 2 6 9 4 6 2 3

QUESTION 32

What is the output of the line marked `//3` in the client code on the right?

A. 1 2 2 3 4 6 6 9

B. 2 2 3 4 4 6 6 9

C. 3 2 4 2 6 9 6 4

D. 2 3 6 4 9 6 2 1

E. 2 3 4 2 6 9 6 4

```
public class TreeNode
{
  private int x;
  private TreeNode leftChild;
  private TreeNode rightChild;

  public TreeNode()
  {
    //1
  }

  public TreeNode(int n)
  {
    x=n;
    leftChild=null;
    rightChild=null;
  }

  public TreeNode add(int n,TreeNode t)
  {
    if(t == null)
      t = new TreeNode(n);
    else if(n<=t.x)
      t.leftChild=add(n, t.leftChild);
    else
      t.rightChild=add(n, t.rightChild);
    return t;
  }

  public void traverse1(TreeNode t)
  {
    if(t!=null){
      traverse1(t.leftChild);
      System.out.print( t.x + " ");
      traverse1(t.rightChild);
    }
  }
  public void traverse2(TreeNode t)
  {
    if(t!=null){
      traverse2(t.leftChild);
      traverse2(t.rightChild);
      System.out.print( t.x + " ");
    }
  }
}

////////////////////////////////////////
//client code
int [] list={4,2,6,9,4,6,2,3};
TreeNode t=new TreeNode(list[0]);
for(int x=1;x<list.length;x++)
    t.add(list[x],t);
t.traverse1(t);         //2
t.traverse2(t);         //3
```

QUESTION 33

What are the contents of the array after the following program is executed?

A. 0 7 5 2 1 0 0 -2 -3

B. 1 8 4 2 1 0 0 -2 -2

C. 0 8 5 2 1 0 0 -2 -3

D. 0 8 5 2 1 1 0 -2 -3

E. 0 8 5 2 5 0 0 -2 -3

```
int[] list = {0,7,4,2,5,8,3,6,1};
int n = list.length-1;
for(int j=1;j<n;j++)
  if (list[j] > list[j+1])
    list[j] = list[j] + 1;
  else
    list[j + 1] = list[j] - 1;
for(int k = 1;k<n;k++)
  if(2 * list[k]== list[k + 1])
    list[k] = 0;
```

QUESTION 34

What is output by the code to the right?

A. hello world HELLO WORLD Hello World

B. HELLO WORLD Hello World hello world

C. Hello World hello world HELLO WORLD

D. Hello World HELLO WORLD hello world

E. Hello World Hello World hello world

```
String s = "Hello World ";
System.out.print(s);
s.toUpperCase();
System.out.println(s+s.toLowerCase());
```

QUESTION 35

In the code on the right there are three versions of the `doThis` method. What term refers to this feature of class definition?

A. overbearing B. inheritance

C. autoboxing D. overriding

E. overloading

QUESTION 36

What feature of the three `doThis` methods causes them to be different?

A. parameter signature

B. return type

C. they way they are called in the client code

D. nothing discernable

E. the compiler just "knows"

QUESTION 37

What is output by the line marked `//1` in the client code to the right?

A. 196 B. 25 C. 0 D. 32 E. 16384

QUESTION 38

What is output by the line marked `//2` in the client code to the right?

A. 4.3truetrue B. 4.3

C. 25 D. 14truefalse

E. 4.3falsetrue

QUESTION 39

What is output by the line marked `//3` in the client code to the right?

A. 0.0 B. 5falsetrue

C. 32.0 D. 4.3truefalse

E. 15.0

```
public class Sample
{
  private String str;
  public int i;
  private double dec;
  private char c;
  private boolean boo;

  public Sample(){
      this("hello",5);
      dec=3.0;
      c='a';
      boo=true;
  }
  public Sample(String s,int x){
      str=s;
      i=x;
      c='@';
  }
  public int doThis(){
      return (int)Math.pow(i,2);
  }
  public double doThis(int x, boolean b){
      return dec*x;
  }
  public String doThis(double y,
                       boolean f){
      return ""+y+boo+f;
  }
}

////////////////////////////////////////
//client code

Sample o = new Sample();
Sample p = new Sample("hi",14);

out.println(o.doThis());          //1
out.println(p.doThis(4.3,true));  //2
out.println(o.doThis(5,false));   //3
```

QUESTION 40

If N can be any non-negative value, what is the running time of the code shown on the right? Select the most restrictive answer.

A. O(1) B. O(N) C. O(log N)

D. O(N^2) E. O(N log N)

```
int N = ?;
while(N > 0)
   N/=2;
```