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 33_{14} plus 11_{11} ?

A. 60_{10} B. 212_5 C. 59_{10} D. 112_7 E. 63_{10}

QUESTION 2

What is output by the code to the right?

A. 14 B. 10 C. 34 D. 24

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

```java
int a = 10 + 24;
System.out.println(a);
```

QUESTION 3

What is output by the code to the right?

A. 1.67 B. 1 C. 0 D. 1.00

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

```java
double b = 5 / 3;
System.out.printf("%.2f",b);
```

QUESTION 4

What is output by the code to the right?

A. 0 B. 1

C. 2 D. -1

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

```java
int c = 0;
for(c = 20; c>1; c=c-2)
{
    c=c-3;
}
System.out.print(c);
```

QUESTION 5

What is output by the code to the right?

A. 7"\4 B. 7"\\4 C. 7\\4 D. 74 E. 7\"\\4

```java
String d = "7\"\\4";
System.out.print(d);
```

QUESTION 6

What is output by the code to the right?

A. 10 B. 5 C. 4 D. 7 E. 1

```java
long[] ray = {1,5,6,3,2,8,9,5};
ray[0] = ray[ray.length-1];
ray[ray.length-1] = ray[0];
out.println(ray[ray.length-1]);
```

QUESTION 7

What is output by the code to the right?

A. yes B. no

C. false D. true

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

```java
boolean sam = false;
boolean ben = sam & true;
ben = !ben;
ben = ben | !sam;
System.out.println(ben);
```

QUESTION 8

What is output by the code to the right?

A. rtuv

B. uv

C. rtu

D. tv

E. rv

```java
int theNum = 2;
if(theNum>4)
  System.out.print("r");
else
  if(theNum<1)
    System.out.print("t");
  else
    System.out.print("u");
System.out.print("v");
```

QUESTION 9

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

A. RED

B. GREEN

C. BLUE

D. NOT-RGB

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

QUESTION 10

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

A. RED

B. GREEN

C. BLUE

D. NOT-RGB

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

```
public class Brick
{
    private Color color;

    public Brick(Color c)
    {
        color = c;
    }

    public String getColor()
    {
        if(color.equals(Color.RED))
            return "RED";
        if(color.equals(Color.GREEN))
            return "GREEN";
        if(color.equals(Color.BLUE))
            return "BLUE";
        return "NOT-RGB";
    }
}

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

Brick brik = new Brick(Color.BLUE);
out.println(brik.getColor());    //1

brik = new Brick(Color.YELLOW);
out.println(brik.getColor());    //2
```

QUESTION 11

What is output by the code to the right?

A. >==   B. <

C. ==   D. ><

E. <==

```
Character ch1 = new Character('B');
Character ch2 = new Character('D');

if(ch1.hashCode() > ch2.hashCode())
    System.out.print(">");
else
    System.out.print("<");

System.out.print("==");
```

QUESTION 12

What is output by the code to the right?

A. 0   B. B

C. 66   D. b

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

```
System.out.printf("%c",66);
```

QUESTION 13

What is returned by method `getIt`?

A. the top left element from the matrix

B. the bottom right element from the matrix

C. the bottom left element from the matrix

D. the top right element from the matrix

E. There is no output due to an `IndexOutOfBoundsException`.

```
public static int getIt(int[][] iMat)
{
    int top = iMat.length-1;
    top = iMat[top-top][top-top];
    return top;
}
```

QUESTION 14

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

A. 36   B. 100

C. 40   D. 48

E. 18

```java
public static int doIt(int times)
{
  int val = 0;
  for(int i=0; i<times; i++)
    for(int j=0; j<times; j++)
      val = val + i + j;
  return val;
}

/////////////////////////////////////////
//client code
out.println(doIt(4));    //1
```

QUESTION 15

What is output by the code to the right?

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

```java
String j = "asciiisfun";
out.print(j.charAt(0)-j.charAt(2));
```

QUESTION 16

What is output by the code to the right?

A. 6   B. 4

C. 0   D. 3

E. 8

```java
int bug = 8/3;
switch(bug){
  case 2 : bug = 4; break;
  case 3 : bug = 6; break;
  case 4 : bug = 8; break;
  case 5 : bug = 0; break;
}
System.out.println(bug);
```

QUESTION 17

What is output by the code to the right?

A. 48   B. 50   C. 38   D. 56   E. 0

```java
int trap = 0;
for(int z=1; z<=100; z++)
{
  z=z%2==0?z+2:z+1;
  trap++;
}
System.out.println(trap);
```

QUESTION 18

What is output by the code to the right?

A. false   B. true   C. stop   D. 0   E. 1

```java
boolean k=false, m=true, p=false;
System.out.println(k || m && (k || p));
```

QUESTION 19

What is output by the code to the right?

A. [3, 2, 7, 1, 4, 5]

B. [2, 3, 4, 1, 8, 5]

C. [7, 1, 8, 3, 5, 2]

D. [2, 3, 7, 1, 8, 5]

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

```java
ArrayList<Integer> bunch;
bunch = new ArrayList<Integer>();
bunch.add(7);
bunch.add(1);
bunch.add(0,4);
bunch.add(8);
bunch.set(0,3);
bunch.add(5);
bunch.add(0,2);
System.out.println(bunch);
```

QUESTION 20

What is output by the code to the right?

A. 7   B. 8.0   C. 8   D. 9   E. 9.0

```java
double dbl = Math.round(Math.sqrt(87));
System.out.print(dbl);
```

QUESTION 21

What is output by the code to the right?

A. 2   B. 4   C. 9   D. 5   E. 11

```
System.out.println(9 | 8 ^ 11);
```

QUESTION 22

What is returned by the
method call `what(new int[]{7,1,2,5,-8,0,3})` ?

A. 10   B. -4   C. 6   D. -2   E. 8

QUESTION 23

What is returned by the
method call `what(new int[]{0,1,-1,0,-1,2,1})` ?

A. 10   B. -4   C. 6   D. -2   E. 8

```
public static int what(int[] x)
{
  int back=0;
  for(int it : x)
  {
    if((it ^ 2)==0)
      back = back - 2;
    else
      back = back + it;
  }
  return back;
}
```

QUESTION 24

What is returned by the method call `OL.ooh(3.0)` ?

A. 9   B. 6

C. 6.0   D. 9.0

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

```
public class OL
{
  public static double ooh(int x){
    return 3*x;
  }
  public static double ooh(double x){
    return 2*x;
  }
}
```

QUESTION 25

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

A. 15   B. 60   C. 30   D. 120   E. 5040

QUESTION 26

What is returned by the method call `wow(7)` ?

A. 15   B. 60   C. 30   D. 120   E. 5040

```
public static int wow(int x)
{
  if(x<1)
    return 1;
  else
    return wow(x-1) * x;
}
```

QUESTION 27

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

A. 3.0   B. 9.9

C. 1.1   D. 4.5

E. 7.5

QUESTION 28

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

A. 3.0   B. 9.9

C. 1.1   D. 4.5

E. 7.5

```
Double[] dbls = {2.1,4.5,6.2,3.0,7.5,9.9};
List<Double> dList = Arrays.asList(dbls);
List<Double> list;
list = new LinkedList<Double>(dList);


ListIterator<Double> iter;
iter = list.listIterator();
iter.next();
iter.add(3.1);
iter.next();
iter.set(1.1);
out.println(iter.previous());          //1

iter.remove();
iter.add(7.8);
iter.next();
iter.set(9.9);
out.println(iter.next());              //2
```

QUESTION 29

Method `go` is which standard sorting algorithm?

A. bubble sort

B. quick sort

C. merge sort

D. selection sort

E. insertion sort

QUESTION 30

Which of the following could replace **<*1>** in the code to the right so that `br` could be passed to any of the methods of class `Pain`?

A. `Integer`

B. `Comparable`

C. `Object`

D. A and B only

E. A, B, and C

QUESTION 31

Assuming that **<*1>** is filled correctly, what is output by the line marked `//1` in the client code to the right?

A. 1   B. 6

C. 8   D. 2

E. 5

QUESTION 32

Assuming that **<*1>** is filled correctly, what is output by the line marked `//2` in the client code to the right?

A. 1   B. 6

C. 8   D. 2

E. 5

```java
public class Pain
{
  public static void go(Comparable[] list)
  {
    int end = list.length-1;
    go(list, 0, end);
  }


  private static void go(Comparable[] list,
                   int low, int high)
  {
    if(low < high)
    {
      int p = how(list, low, high);
      go(list, low, p);
      go(list, p+1, high);
    }
  }


  public static int how(Comparable[] list,
                   int low, int high)
  {
    Comparable p = list[low];
    int b = low-1;
    int t = high+1;
    boolean run = true;
    while(run)
    {
      do{
        --t;
      }while(list[t].compareTo(p) > 0);

      do{
        ++b;
      }while(list[b].compareTo(p) < 0);

      if (b >= t){
        run = false;
      }
      else{
        Comparable temp = list[b];
        list[b] = list[t];
        list[t] = temp;
      }
    }
    return t;
  }
}

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

<*1> [] br = {3,5,6,8,2,1,4,9,7,0};


Pain.how(br, 2, 6);
out.println(br[br.length/2]);    //1


Pain.go(br);
out.println(br[br.length/2]);    //2
```

QUESTION 33

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

A. `UIL`

B. `L`

C. `C`

D. `I`

E. `CS`

QUESTION 34

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

A. `11`

B. `5`

C. `7`

D. `3`

E. `10`

```
String x = "UILCSISFUN";
String[] group = x.split("\\W*");

out.println(group[3]);              //1
out.println(group.length);          //2
```

QUESTION 35

How many class variables are there in class `Box`?

A. 0   B. 2   C. 1   D. 3   E. 9

QUESTION 36

Which of the following could replace **`<*1>`** in the client code to the right?

A. `implements`   B. `inherits`

C. `extends`   D. `borrows`

E. There is not enough information to determine.

QUESTION 37

Assuming that **`<*1>`** is filled correctly, what is the minimum number of methods that class `Trunk` could contain?

A. 1

B. 2

C. 3

D. 4

E. more than one of these

```
public abstract class Box
{
   private int width;
   private int height;
   public static int boxCount;

   public int getHeight(){
      return height;
   }
   public int getWidth(){
      return width;
   }

   public abstract void show();
}

public class Trunk <*1> Box
{

}
```

QUESTION 38

Assume that method `superSort(Object[] objs)` is $O(N^3)$ where $N = obj.length$. When method `superSort` is passed an Object array of length 10000 it takes 0.50 seconds for method `superSort` to complete. If method `superSort` is passed an Object array of length 20000, how many seconds would it take `superSort` to complete?

A. 1.00   B. 1.50   C. 2.00   D. 4.00   E. 3.00

QUESTION 39

Which of the following replaces **<*1>** in class Factors so that method generate would be defined in a way that would allow it to receive set as its third parameter?

A. Set<Integer> factors

B. TreeSet<Integer> factors

C. HashSet<Integer> factors

D. A and B only

E. A, B, and C

QUESTION 40

Which of the following replaces **<*2>** in the generate code to the right in order to correctly call generate recursively?

A. generate(n, f, factors);

B. generate(n, f+1, factors);

C. generate(n, f-1, factors);

D. generate(n-1, f, factors);

E. generate(n-1, f-1, factors);

```java
public class Factors
{
  private Map<Integer, Set<Integer>> map;

  public Factors(int[] nums)
  {
     map = new TreeMap<Integer,Set<Integer>>();
     for( int num : nums )
     {
         Set<Integer> set = new TreeSet<Integer>();
         generate(num, num, set);
         map.put(num,set);
     }
  }

  private void generate(int n, int f, <*1> )
  {
     if(f>0)
     {
         if(n%f==0)
         {
             factors.add(f);
           <*2>
         }
         <*2>
     }
  }

  public String toString()
  {
     String output = "";
     for(int num : map.keySet())
     {
         output = output + num;
         output = output + "  " + map.get(num) + "\n";
     }
     return output;
  }
}
```