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 the product of 110_2 and 1001_2 ?

A. 53_{10} B. 206_5 C. 110111_2 D. 54_{10} E. 103_7

QUESTION 2

What is output by the code to the right?

A. 16 B. 14 C. 21 D. 10 E. 17

```
int a = 5;
a++;
int who = a++ + 3 + ++a;
System.out.println(who);
```

QUESTION 3

What is output by the code to the right?

A. 9 B. 10 C. 8 D. 12

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

```
long c = 2;
double b = 2.5;
c *= b + 2;
System.out.println( c );
```

QUESTION 4

What is output by the code to the right?

A. tos B. 227s

C. 227 D. to

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

```
String d = "toregionalweshallgo";
out.print(d.charAt(0)+ d.charAt(1) + "s");
```

QUESTION 5

What is output by the code to the right?

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

```
Integer[] array = {0, 2, 1, 3, 4};
for( Integer it : array )
  array[it] = array[it].intValue() + 1;
System.out.println(array[2]);
```

QUESTION 6

What is output by the code to the right?

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

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

```
int e = 3;
double f = 10;
e -= f * e / f;
System.out.print( (Integer)e );
```

QUESTION 7

What is output by the code to the right?

A. true true B. false false

C. true false D. false true

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

```
boolean g = true;
boolean h = !g;
System.out.print( !g && !h );
System.out.print( " " );
System.out.print( !(h || g) );
```

QUESTION 8

What is output by the code to the right?

A. 1234

B. 12

C. 123

D. 24

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

```
double j = 9.0;
Double k = 9.0;
if( j >= k )
  System.out.print("1");
if( j <= k )
  System.out.print("2");
if( j == k )
  System.out.print("3");
System.out.println("4");
```

QUESTION 9

Which of the following could replace **<*1>** in the `Creature` class at right?

A. `public void fun();`

B. `private static int speed = 90;`

C. `private static final float num = 4.3;`

D. B and C only

E. A, B, and C

QUESTION 10

Assuming that **<*1>** is filled correctly, which of the following could fill blank **<*2>** in the client code at right?

A. `System.out.println(c.getName());`

B. `System.out.println(c.howMean());`

C. `System.out.println(c.mean);`

D. A and B only

E. A, B, and C

```
public abstract class Creature
{
  <*1>
  public abstract double howMean();
}

public class Sasquatch extends Creature
{
   private String name;
   private double mean;

   public Sasquatch(String n, double m)
   {
      name = n;
      mean = m;
   }

   public double howMean()
   {
     //implementation not shown
   }

   public String getName()
   {
     //implementation not shown
   }
}

////////////////////////////////////////////
//client code
Creature c = new Sasquatch("jimmy",900.00);
<*2>
```

QUESTION 11

What is output by the code to the right?

A. `76`

B. `88`

C. `78`

D. `[]`

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

```
List<Integer> stuff;
stuff = new ArrayList<Integer>();
stuff.add(78);
stuff.add(88);
stuff.add(76);
stuff.add(88);
stuff.remove(88);
stuff.remove(0);
java.util.Collections.sort(stuff);
System.out.println(stuff.get(0));
```

QUESTION 12

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

A. `40`

B. `39`

C. `37`

D. `34`

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

```
public static int process(int z){
  final static int LOCAL;
  LOCAL = z * 5;
  z--;
  z = z + LOCAL;
  return --z;
}
```

QUESTION 13

What is output by the client code to the right?

A. `\\b\\u\b`

B. `bub`

C. `\\u`

D. `b\\u`

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

```
System.out.println("\\\\b\\\\u\\b");
```

QUESTION 14

What is the purpose of method `doIt`?

A. The method returns a list containing the reversed values of c.

B. The method returns a list containing the sorted values of c.

C. The method returns an empty list.

D. The method returns a list containing the even values of c.

E. The method returns a list containing the same values as c.

```
public static List doIt(Collection c)
{
    Queue q = new LinkedList();
    q.retainAll(c);
    List ret = new ArrayList();
    while(!q.isEmpty())
        ret.add(q.remove());
    return ret;
}
```

QUESTION 15

What is output by the code to the right?

A. `fun`

B. `funcs`

C. `csfun`

D. `cs`

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

```
String uil = "c-s-f-u-n";
uil = uil.replaceAll("\\-","");
char[] uilRay = uil.toCharArray();
String uilString;
uilString = new String(uilRay);
System.out.println(uilString);
```

QUESTION 16

What is output by the code to the right?

A. `82`

B. `0.82`

C. `8.2`

D. `0.082`

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

```
Object nub = new Double("8.2e-2");
out.println(nub.toString());
```

QUESTION 17

What is output by the code to the right?

A. `55`

B. `51`

C. `61`

D. `62`

E. `54`

```
int much = 0;
for(int g1 = 0; g1 < 9; g1=g1+3){
  much++;
  for(int g2 = 0; g2 <= g1; g2++){
     much++;
     for(int g3 = 0; g3<=g2; g3++)
     much++;
  }
}
System.out.println(much);
```

QUESTION 18

Given the following measurements, what is the most likely running time for method `sample(int[] data)` where N is equal to data.length? Choose the most restrictive correct answer.

Value of N	Time for method sample to complete
2,000	1 second
4,000	4 seconds
8,000	16 seconds

A. O(N)

B. O(NlogN)

C. $O(N^2)$

D. O(1)

E. $O(N^{3/2})$

QUESTION 19

Which of the following can replace `<*1>` in the code to the right so that the code segment compiles without error?

I. `26.2`
II. `new Double(26.2)`
III. `new Double("26.2")`

A. I only

B. II only

C. III only

D. I and II

E. I,II, and III

```
ArrayList<Double> decs;
decs = new ArrayList<Double>();
decs.add(<*1>);
```

QUESTION 20

What is the output by the code to the right?

A. `6la`

B. `7la`

C. `5etyzac`

D. `6etyzac`

E. `6elsoc`

```
String line = "blacklabelsocietyzackwylde";
String[] chunks = line.split("[kbi]");
System.out.print(chunks.length);
System.out.println(chunks[3]);
```

QUESTION 21

Which of the following could replace **<*1>** in the code at right so that `words` would refer to a string array containing ***only*** the words from `stuff`?

A. `stuff.split("\\s*");`

B. `stuff.split("\\s+");`

C. `stuff.split("\\w+");`

D. `stuff.split("\\d+");`

E. `stuff.split("\\S*");`

QUESTION 22

Assuming that **<*1>** is filled correctly, what is the output by the line marked `//line 1`?

A. `5` B. `4`

C. `8` D. `6`

E. `7`

QUESTION 23

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

A. `agh` B. `al`

C. `dgo` D. `gip`

E. `fnu`

QUESTION 24

Assuming that **<*1>** is filled correctly, what is the output by the line marked `//line 3`?

A. `agh` B. `al`

C. `dgo` D. `gip`

E. `fnu`

```
String stuff = "dog1pig2boot3fun";
stuff += "4all5tom6hag";

String[] words = <*1>

ArrayList<String> list;
list = new ArrayList<String>();

for(int i=0; i<words.length; i++)
{
  char[] charList = words[i].toCharArray();
  Arrays.sort(charList);
  String s = "";
  for( char c : charList )
  {
     if(s.indexOf(c)==-1)
        s+=c;
  }
  list.add(s);
}

System.out.println(list.size());  //line 1

Collections.sort(list);

System.out.println( list.get(1) );//line 2
System.out.println( list.get(5) );//line 3
```

QUESTION 25

What is the output by the code to the right?

A. `19`

B. `18`

C. `20`

D. `21`

E. `17`

```
int count = 0;
for(int i = 0; i < 13; i++){
  for(int j = i; j >= 0; j=j-2){
     if( (i * j) % 2 == 0)
        continue;
     count++;
  }
}
System.out.print(count);
```

QUESTION 23

What is the output by the line marked `//line 1`?

A. `3 3`

B. `3 5`

C. `5 5`

D. `5 3`

E. `3`

QUESTION 27

What is the output by the line marked `//line 2`?

A. `5 5 3`

B. `5 3 5`

C. `5 5 8`

D. `8 5 5`

E. `3 3`

QUESTION 28

What is the output by the line marked `//line 3`?

A. `3.0`

B. `8.0`

C. `0.0`

D. `5.0`

E. `3.0`

```
public class Mario
{
   private int it, thing;

   public Mario() {
      it=thing=5;
   }
   public void fun() {
      it=3;
   }
   public double go() {
      return it;
   }
   public void back() {
      fun();
   }
   public String toString() {
      return it + " " + thing;
   }
}

public class SuperMario extends Mario
{
   private int it;

   public SuperMario() {
      it=3;
   }
   public void fun() {
      it=8;
   }
   public double go() {
      return it;
   }
   public void back() {
      super.back();
   }
   public String toString() {
      return super.toString() + " " + it;
   }
}

////////////////////////////////////
//client code
Mario one = new Mario();
one.back();
out.println(one);             // line 1
one = new SuperMario();
one.fun();
out.println(one);             // line 2
one.fun();
one.back();
out.println(one.go());        // line 3
```

QUESTION 29

Which of the following should fill **<*1>** to correctly complete method `swapDown`?

A. `root * 2;`

B. `root * 2 - 1;`

C. `root * 2 + 2;`

D. `root * 2 + 1;`

E. more than one of these

QUESTION 30

Assuming that **<*1>** is filled correctly, which of the following should fill **<*2>** to correctly complete method `go`?

A. `swapDown(i-1);`

B. `swapDown(i);`

C. `swapDown(i+1);`

D. `swapDown(i/2);`

E. more than one of these

QUESTION 31

What standard sorting algorithm is being implemented by `go`?

A. radix

B. merge

C. heap

D. quick

E. more than one of these

```
public class What{
  private ArrayList<Integer> list;

  public What(){
    list = new ArrayList<Integer>();
  }

  public void swapUp(int index){
    int bot = index;
    while(bot > 0){
      int parent = (bot-1)/2;
      if(list.get(parent) < list.get(bot)){
        swap(parent, bot);
        bot=parent;
      }
      else
        break;
    }
  }

  public void swapDown(int index){
    int root=0;
    while(root < index)
    {
      int max=0;
      int left = <*1>
      int right = root * 2 + 2;
      if(left < index){
        if(right < index){
          if (list.get(left) <= list.get(right))
            max = right;
          else
            max = left;
        }
        else
          max = left;
      }
      else break;
      if (list.get(root) < list.get(max)) {
        swap(root, max);
        root=max;
      }
      else break;
    }
  }

   public void go(int[] nums) {
     for(int item : nums)
       list.add(item);
     for(int i = 1; i<nums.length; i++)
        swapUp(i);
     for(int i=list.size()-1; i>=1; i--){
        swap(0, i);
        <*2>
     }
   }

   private void swap(int first, int last)
   {
     Integer temp = list.get(first);
     list.set(first, list.get(last));
     list.set(last, temp);
   }
}
```

QUESTION 32

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

A. `17`

B. `14`

C. `13`

D. `12`

E. `9`

```
public static int fancy(int n){
   int ans = 0;
   if( n <= 3 )
      ans = 2;
   else
      ans = fancy(n - 2) + (n - 1);
   return ans;
}
```

QUESTION 33

What is output by the code to the right?

A. `0`

B. `20`

C. `-1`

D. `8`

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

```
abstract class Kong{
   private static final int max = 20;
}

class Donkey extends Kong{
   public static final int max = 8;
}

//client code
Kong dk = new Donkey();
System.out.print( dk.max );
```

QUESTION 34

Which of the following could replace **<*1>** in the code to the right so that the `Monster` constructor will increment the `count` variable by one each time it is called.

A. `count++;`

B. `count = count + 1;`

C. `++count;`

D. `count+=1;`

E. More than one of these.

QUESTION 35

Which of the following could replace **<*2>** in the code to the right so that the `BigMonster` constructor will correctly call the `Monster` constructor.

A. `Monster(n);`

B. `Monster();`

C. `super(n);`

D. `super();`

E. `super(n,s);`

QUESTION 36

Assuming that **<*1>** and **<*2>** are filled correctly, what is output by the line marked `//line 1`?

A. `meany`

B. `chuck`

C. `sully`

D. `dude`

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

QUESTION 37

Assuming that **<*1>** and **<*2>** are filled correctly, what is output by the line marked `//line 2`?

A. 1

B. 2

C. 3

D. 4

E. 5

```
public abstract class Monster{
   private static int count = 0;
   private String name;

   public Monster(String n){
     name = n;
     <*1>
   }

   public String getName(){
     return name;
   }

   public int getCount(){
     return count;
   }

   public void setCount(int c){
     count = c;
   }
}


public class BigMonster extends Monster{
   private int size;

   public BigMonster(String n, int s){
     <*2>
     size = s;
   }

   public String toString(){
     return size + getName();
   }
}

public class Sullivan extends BigMonster{
   private Color color;

   public Sullivan(String n, int s, Color c){
     super(n, s);
     color = c;
   }

   public String toString(){
     return color + super.toString();
   }
}

////////////////////////////////////
//client code
Monster m = new BigMonster("meany",78);
m = new Sullivan("sully", 9, Color.RED);
Monster r = new BigMonster("dude", 33);
r = new Sullivan("nancy", 99, Color.BLUE);

System.out.println(m.getName());      //line 1
System.out.println(r.getCount());     //line 2
```

QUESTION 38

If N equals `oList.length`, what is the Big O of method `why` when `c` is an `ArrayList` and when `c` is a `PriorityQueue`? Choose the most restrictive set of correct answers.

	ArrayList	PriorityQueue
A.	O(1)	$O(N*Log_2N)$
B.	O(N)	$O(N*Log_2N)$
C.	$O(N^2)$	$O(N*Log_2N)$
D.	$O(Log_2N)$	O(N)
E.	O(N)	O(N)

```
public static void why(
    Collection<Object> c, Object[] oList)
{
  for(Object obj : oList)
  {
    c.add(obj);
  }
}
```

QUESTION 39

Which of the following could replace **<*1>** in the code to the right to correctly insert `obj` at the proper location?

A. `stuff[++size] = obj;`

B. `stuff[size++] = obj;`

C. `stuff[size] = obj;`

D. `stuff[size*2] = obj;`

E. `stuff[size--] = obj;`

QUESTION 40

Assuming that **<*1>** has been filled correctly, which of the following could replace **<*2>** in the code to the right to allocate a new array of the proper type with `max` elements?

A. `(Object[])(new Object[max])`

B. `(E)(new Object[max])`

C. `E[max]`

D. `(E[])(new Object[max])`

E. more than one of these

```
public class Structure<E>
{
  private int size;
  private E[] stuff;

  public Structure(){
    stuff = getStuff(10);
  }

  public void add(E obj){
    if( size == stuff.length )
      stuff = getStuff( size * 2 );
    <*1>
  }

  public E get(int pos){
    return stuff[pos];
  }

  public void remove(int pos){
    size--;
    for(int i = pos; i < size; i++)
      stuff[i] = stuff[i + 1];
  }

  public int size(){
    return size;
  }

  private E[] getStuff(int max){
    E[] temp = <*2>;
    for(int i = 0; i < size; i++)
      temp[i] = stuff[i];
    return temp;
  }
}
```