QUESTION 1

What is the sum of 757_8 and 363_8?

A. 1342_8 B. 1120_8 C. 1777_8 D. 1111_8 E. 1130_8

QUESTION 2

What is output by the code to the right?

A. 1.0 B. 1.5 C. 1

D. 0 E. 0.0

```
double a = 3.0;
double b = 2.0;
System.out.print( a / b );
```

QUESTION 3

What is output by the code to the right?

A. 13 B. 0 C. 12

D. 14 E. 28

```
int counter = 0;
for(int i = 0; i < 12; i++)
  counter++;
System.out.print( counter );
```

QUESTION 4

What is output by the code to the right?

A. en_co B. hen_ C. hen

D. enco E. en_c

```
String sci = "stephen_cook";
String some = sci.substring(5, 9);
System.out.print( some );
```

QUESTION 5

What is output by the code to the right?

A. 2 B. 0 C. 1

D. 3 E. 13

```
int[] values = {3, 5, 2, 12, 7};
values[2]++;
System.out.print( values[2] );
```

QUESTION 6

What is output by the code to the right?

A. 10 B. 16 C. 18

D. 8 E. 9

```
int x = 5;
int y = 2;
y = x * (y + 2) - y;
System.out.print( y );
```

QUESTION 7

What is output by the code to the right?

A. false false

B. false true

C. true false

D. true true

E. false true false

```
boolean p = true;
boolean q = false;
System.out.print( !p || q );
System.out.print( " " );
System.out.print( !(p || q) );
```

QUESTION 8

What is output by the code to the right?

A. 5.0 B. 3.5 C. 6.0

D. 4.0 E. 2.5

```
double c = 2.5;
if( c > 1.5 ){
  if( c > 3 )
    c = c * 2;
  else
    c = c + 1;
}
System.out.print( c );
```

QUESTION 9

What replaces **<*1>** in the code to the right so that DEFAULT_SIDES is a class constant that is accessible in all other classes?

A. public final

B. static final

C. public static

D. public static final

E. public static final void

Assume **<*1>** is filled in correctly.

```
public class NumberDie{

  <*1> int DEFAULT_SIDES = 6;

  private int sides;

  public NumberDie(){
    sides = DEFAULT_SIDES;
  }

  public NumberDie(int s){
    sides = s;
  }

  public int getSides(){
    return sides;
  }
}

////////////////////////////////////////
// client code
NumberDie d = new NumberDie();
System.out.print( d.getSides() );
```

QUESTION 10

What is output by the client code to the right?

A. 0 B. d C. s

D. 5 E. 6

QUESTION 11

What is output by the code to the right?

A. 15 B. 7 C. 22

D. 0 E. 1

```
int f = 7;
int g = 15;
System.out.print( g & f );
```

QUESTION 12

What is output by the code to the right?

A. 0 B. 2 C. 7

D. 14 E. 21

```
int top = Math.max(7, 14);
System.out.print( top );
```

QUESTION 13

What is output by the code to the right?

A. \Easy B. "easy" C. Easy

D. "Easy E. \\Easy

```
System.out.print("\\Easy");
```

QUESTION 14

What is output by the code to the right?

A. `.3679` B. `3679` C. `1.3600`

D. `1.37` E. `+1.3`

```
System.out.printf("%4.2f", 1.3679);
```

QUESTION 15

What is returned by the method call `sample(3)`?

A. `3` B. `1` C. `4`

D. `16` E. `6`

```
public static int sample(int y){
  y--;
  return y * y;
}
```

QUESTION 16

What is output by the code to the right?

A. `*=` B. `can`

C. `putt` D. `-`

E. There is no output.

```
String trash = "ham+can--putt*=cut";
String[] sp = trash.split("\\W+");
System.out.print( sp[2] );
```

QUESTION 17

What is output by the code to the right?

A. `0` B. `1` C. `3`

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

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

```
Object obj = new Object();
String st = obj;
System.out.print( st.length() );
```

QUESTION 18

What is output by the code to the right?

A. `9` B. `0`

C. `3` D. `6`

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

```
int x = 3;
int y = 3;
char[] letters = new char[ x * y ];
System.out.print( letters.length );
```

QUESTION 19

What is output by the code to the right?

A. `3`

B. `2`

C. `1`

D. `0`

E. `-1`

```
Double d1 = new Double( -1.23 );
Double d2 = new Double( 1.5 );
int comp = d2.compareTo( d1 );

if( comp < 0 )
  System.out.print( 1 );
else if ( comp == 0 )
  System.out.print( 2 );
else
  System.out.print( 3 );
```

QUESTION 20

What replaces **<*1>** in the code to the right to set the new `Pizza` object's `cost` instance variable equal to `10`?

A. `super(10)`

B. `Pizza(10)`

C. `this.Pizza(10)`

D. `this(10)`

E. `c = 10`

```
public class Pizza{
  private int cost;

  public Pizza(){
    <*1>;
  }

  public Pizza(int c){
    cost = c;
  }

  public int getCost(){
    return cost;
  }
}

public class SquarePizza extends Pizza{

  private int sideLength;

  public SquarePizza(int sz){
    sideLength = sz;
  }

  public int pizzaPerDollar(){
    int area = sideLength * sideLength;
    return area / getCost();
  }
}

////////////////////////////////////////
// client code
SquarePizza pz = new SquarePizza(20);
System.out.print( pz.pizzaPerDollar() );
```

Assume **<*1>** is filled in correctly.

QUESTION 21

What is output by the client code to the right?

A. `0`

B. `40`

C. `10`

D. `20`

E. There is no output due to a syntax error in the `SquarePizza` class.

QUESTION 22

What is output by the code to the right when given this input?

```
1.2 0.9 .3 -.4 ZZ
```

A. `2` B. `2.1` C. `4`

D. `3` E. `2.0`

```
Scanner sc = new Scanner( System.in );
int count = 0;
while( sc.hasNextDouble() ){
  count++;
  sc.nextDouble();
}

System.out.print( count );
```

QUESTION 23

What is output by the code to the right?

A. `false`

B. `false false`

C. `false true`

D. `true false`

E. `true true`

```
String thing = "cat";
System.out.print( thing.matches( "ca" ) );
System.out.print( " " );
System.out.print( thing.matches( "c.*" ) );
```

QUESTION 24

What is output by the code to the right?

A. `[1, 0, 3]` B. `[0, 1, 3]`

C. `[3, 1, 0]` D. `[0, 3, 1]`

E. `[1, 3, 0]`

```
ArrayList<Integer> ar;
ar = new ArrayList<Integer>();

ar.add(3);
ar.add(0, 1);
ar.add(1, 0);

System.out.print( ar.toString() );
```

QUESTION 25

Which of the following are Java keywords?

I. `method`
II. `throws`
III. `foreach`

A. I only B. II only C. III only D. II and III E. none of these

QUESTION 26

What is output by the code to the right?

A. `7`

B. `11`

C. `8`

D. `6`

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

```
String vals = "ab12CC3";
int pos = 0;
int cnt = 0;
boolean ts;

do{
  ts = Character.isLetter(vals.charAt(pos));
  if( ts ){
    cnt++;
    pos += 2;
  }
  else{
    cnt += 2;
    pos++;
  }
}while( pos < vals.length() );

System.out.print( cnt );
```

QUESTION 27

What is returned by the method call `again(1)`?

A. `4` B. `-1`

C. `2` D. `0`

E. `1`

```
public static int again(int x){
  int result = 0;
  if( x <= 0 )
    result = 2;
  else
    result = 2 + again( x - 1 );
  return result;
}
```

QUESTION 28

What is the running time of method `process`? Assume N equals `data.length`. Choose the most restrictive correct answer.

A. $O(N^2)$ B. $O(N \log N)$ C. $O(N^3)$

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

```
public static void process(int[] data,
                           int min,
                           int max){
  int result = 0;
  for( int val : data )
    if( val >= min && val <= max )
      result++;
    else
      result--;

  for(int i = 0; i < data.length; i++)
    data[i] += result;
}
```

QUESTION 29

Which searching algorithm does method `search` implement?

A. sequential search

B. insertion search

C. binary search

D. merge search

E. fibonacci search

QUESTION 30

What must the pre-condition for method `search` be so that it always fulfills its post-condition?

A. The elements of `data` must be in ascending order.

B. The elements of `data` must be in descending order.

C. The elements of `data` must be distinct. There can't be any duplicated values.

D. The length of `data` must be even.

E. More than one of these.

```
/* pre: see question 30
   post: return an index in data
         that contains tgt.
         If tgt is not present return -1.
*/
public static int search(int tgt,
                         int[] data){
  int high = data.length - 1;
  int low = 0;
  int mid = (low + high) / 2;

  while( data[mid] != tgt && low <= high){
    if( data[mid] > tgt )
      low = mid + 1;
    else
      high = mid - 1;
    mid = (low + high) / 2;
  }

  if( data[mid] == tgt )
    return mid;
  else
    return -1;
}
```

QUESTION 31

What is returned by the method call `one(2)`?

A. `0` B. `2` C. `4`

D. `3` E. `-1`

QUESTION 32

What is returned by the method call `three(1)`?

A. `3` B. `2` C. `5`

D. `6` E. `4`

```
public static int one(int a){
  return a * 2;
}

public static int two(int b){
  b = one(b + 1);
  return b;
}

public static int three(int c){
   c = two(c);
   c += 2;
   return c;
}
```

QUESTION 33

What are the elements in the `Set` named `beta` after the code to the right executes?

A. `[-2, -1, 0, 1, 2]`

B. `[-2, -1, 0, 0, 1, 1, 2, 2, 3]`

C. `[0, 1, 2]`

D. `[3]`

E. `[-2, -1, 0, 1, 2, 3]`

```
Set<Integer> alpha;
alpha = new TreeSet<Integer>();
Set<Integer> beta = new TreeSet<Integer>();

for(int i = 2; i > -3; i--)
  alpha.add(i);

for(int i = 0; i < 4; i++)
  beta.add( i );

beta.addAll(alpha);
```

QUESTION 34

What replaces **<*1>** in the code to the right to set the variable `pos` equal to the number of elements in the `ArrayList` named `con`?

A. `con.size()`

B. `con.length()`

C. `con.size`

D. `super.size()`

E. `this.size()`

Assume **<*1>** is filled in correctly.

QUESTION 35

What is output by the client code to the right?

A. `[Z, Z, B, A]`

B. `[A, B, Z]`

C. `[A, B, Z, Z]`

D. `[Z, B, A]`

E. `[Z, A, Z, B]`

QUESTION 36

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

A. A stack

B. A list

C. A priority queue

D. A set

E. A regular queue

```
public class Structure
                 <E extends Comparable<E>>{

  private ArrayList<E> con;

  public Structure(){
    con = new ArrayList<E>();
  }

  public boolean isEmpty(){
    return con.size() == 0;
  }

  public E get(){
    return con.get(0);
  }

  public E remove(){
    return con.remove(0);
  }

  public void add(E obj){
    int pos = <*1>;
    boolean done = false;
    E temp;
    while( pos > 0 && !done ){
      temp = con.get( pos - 1 );
      done = obj.compareTo( temp ) >= 0;
      if( !done )
        pos--;
    }
    con.add(pos, obj);
  }

  public String toString(){
    return con.toString();
  }
}

//////////////////////////////////////////
// client code
Structure<String> s;
s = new Structure<String>();
s.add("Z");
s.add("A");
s.add("Z");
s.add("B");
System.out.println(s);
```

QUESTION 37

In the code to the right, what kind of `Collection` must `col` be so that no `int` appears more than once?

A. `ArrayList` B. `Stack` C. `Queue`

D. `LinkedList` E. `HashSet`

```
public void show(Collection<Integer> col){
  for(int i : col)
    System.out.print( i );
}
```

QUESTION 38

What is output by the code to the right?

A. `true`

B. `false`

C. The output cannot be determined until runtime.

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

E. There is no output due to `ClassCastException`.

```
LinkedList<Integer> first;
first = new LinkedList<Integer>();
first.add( 12 );
first.add( 16 );

ArrayList<Integer> second;
second = new ArrayList<Integer>();
second.add( 12 );
second.add( 16 );

System.out.print( first.equals(second) );
```

QUESTION 39

Which of the following is most likely to occur when the program `RunLong` is compiled and run on a real computer?

A. The program will not compile due to a syntax error.

B. The program will run forever with no output.

C. The program will run forever printing out always increasing values.

D. The program will run forever printing out always decreasing values.

E. The program will eventually crash when it runs out of memory.

```
public class RunLong{

  public static void main(String[] args){
    go(1);
  }

  public static void go(int x){
    go( x + 1 );
    System.out.println( x );
  }
}
```

QUESTION 40

Class `C` to the right will not compile due to a syntax error. Which of the following best explains the syntax error?

A. Class `C` cannot extend two classes.

B. Class `A` and class `B` contain an instance variable with the same name.

C. Classes with `public` instance variables cannot be extended.

D. Class `C` does not override the `toString` method.

E. Class `C` must include a constructor.

```
public class A{
  public int x;
}

public class B{
  public int x;
}

public class C extends A, B{
  public int y;
}
```