Note: Correct responses are based on Java, J2sdk v 7.0, 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 1110_2 minus 1010_2 ?

A. 101_2 B. 5_{10} C. 11_6 D. 4_{16} E. 111_3

QUESTION 2

What is output by the code to the right?

A. 97 B. L

C. 98 D. 97L

E. There is no output due to syntax error.

```
Long aplus = 97L;
out.println( aplus );
```

QUESTION 3

What is output by the code to the right?

A. 55 B. 0

C. 1 D. 54

E. 2

```
char cplusplus = 55;
out.println( cplusplus );
```

QUESTION 4

What is output by the code to the right?

A. 16.0 B. 64.0

C. 12 D. 256.0

E. 4

```
double dplus = Math.pow(4,4);
out.println( dplus );
```

QUESTION 5

What is output by the code to the right?

A. 0 B. 6

C. 4 D. 2

E. 5

```
int ogre = (7*2/3+8%3);
out.println( ogre );
```

QUESTION 6

What is output by the code to the right?

A. -1 B. 4

C. 6 D. 10

E. 8

```
String f = "aplus is very cool";
out.println(f.lastIndexOf("y"));
```

QUESTION 7

What is output by the code to the right?

A. 0 B. 1

C. true D. false

E. -1

```
String g = "aplus_cs";
String h = new String("aplus_cs");
out.println( g==h );
```

QUESTION 8

What is output by the code to the right?

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

```
int i = 256;
i = 512/i;
out.println(i);
```

QUESTION 09

What is output by the code to the right?

A. `[5, 3, 9]`

B. `[9, 3, 5]`

C. `[3, 3, 5]`

D. `[3, 5, 9]`

E. `[9, 5, 3]`

```
int[] arr = {5, 3, 9};
for(int i : arr)
{
  arr[i%3] = i;
}
String out = Arrays.toString(arr);
System.out.println(out);
```

QUESTION 10

What is output by the code at right?

A. `dog`

B. `cat`

C. `tac`

D. `god`

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

```
System.out.println( "dog" );
```

QUESTION 11

Which of the following methods can be used to set decimal places?

A. `print()` B. `printf()` C. `println()` D. `printformat()` E. `printfln()`

QUESTION 12

What is output by the code to the right?

A. `4` B. `4.0` C. `2.0` D. `8.0` E. error

```
double n = 8.0f;
float o = 2.0;
out.println(n/o);
```

QUESTION 13

What is output by the code to the right?

A. `2` B. `3`

C. `1` D. `[1, 2, 3]`

E. `[3, 2, 1]`

```
List<Integer> p;
p = new ArrayList<Integer>();
p.add(2);
p.add(3);
p.add(0,1);
out.println(p);
```

QUESTION 14

What correctly replaces **<*1>** in the code to the right ?

A. `Collection` B. `LinkedList` C. `Map`

D. A and B only E. A, B, and C

```
<*1> <Double> that;
that = new  <*1>  <Double>();
```

QUESTION 15

What is output by the code to the right?

A. `36` B. `14` C. `44` D. `41` E. `53`

```
out.println(11 << 2 | 33 >> 1 & 8);
```

QUESTION 16

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

A. `1` B. `2`

C. `3` D. `4`

E. more than one of these

```
public int why(int a, int b)
{
  if(a%b==0)  return 1;
  else if(a%b==1)  return 2;
  else if(a%b==2)  return 3;
  return 4;
}
```

QUESTION 17

What is output by the code to the right?

A. `341` B. `34.01`

C. `1` D. `4.0`

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

```
Object[] u = {3,Math.ceil(3.1),"1"};
String theSum="";
for(Object v : u)
  theSum += v;
out.println(theSum);
```

QUESTION 18

What correctly replaces **<*1>** in the code to the right so all elements of `pieces` are inspected?

A. `String word : chunks`

B. `word : chunks`

C. `String word : pieces`

D. `word : pieces`

E. `String word : output`

QUESTION 19

Assume **<*1>** was replaced correctly. What is the output of `// line 1`?

A. `n my way` B. `my way` C. `on my`

D. `on my way to` E. `on my way state`

QUESTION 20

Assume **<*1>** was replaced correctly. What is the output of `// line 2`?

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

```
String output="";
String it = "[to]";
String chunks = "on my way to state";
String[] pieces = chunks.split(it);
for(  <*1>  )
{
  if(word.matches(".*y.*"))
    output = output + word;
}
out.println(output);         // line 1
out.println(pieces.length); // line 2
```

QUESTION 21

Which of the following is ***not*** a subinterface of `Collection`?

A. `List` B. `Map` C. `Set` D. `SortedSet` E. `Queue`

QUESTION 22

What is output by the code to the right?

A. `23` B. `23*2` C. `46`

D. `232` E. error

```
Object xkcd = new Short("23");
xkcd = (Short)xkcd * 2;
out.println(xkcd);
```

QUESTION 23

What is the output of `// line 1`?

A. `2` B. `3`

C. `4` D. `5`

E. `0`

QUESTION 24

What is the output of `// line 2`?

A. `2` B. `3`

C. `4` D. `5`

E. `0`

```
public void fun(int[][] mat)
{
  for(int r=0; r<mat.length; r++)
    for(int c=0; c<=r; c++)
       mat[c][r] = c * c + r * r;
}

////////////////////////////////
//client code
int[][] m = {{1,2,3},{1,2,3},{1,2,3}};
fun(m);
out.println(m[1][2]+m[0][0]);  // line 1
out.println(m[2][1]+m[1][1]);  // line 2
```

QUESTION 25

What is output by the code to the right?

A. 0 B. 1 C. 2 D. 5 E. 3

```
int j = 10;
if(j%2==0)
  out.println(j/2);
else if(j%2==1)
  out.println(j/3);
```

QUESTION 26

What is output by the code to the right?

A. 32
B. 20
C. 22
D. 25
E. 28

```
int what=0;
for(int k=1; k<25; k+=2)
{
  if(k/3==1||k/3==3)
    what=what+k;
}
out.println(what);
```

QUESTION 27

What is output by the code to the right?

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

```
boolean first = true;
boolean last = false;
out.println(!first && !last || last);
```

QUESTION 28

What is returned by the method call `ack(2,1)`?

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

QUESTION 29

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

A 58
B. 61
C. 63
D. 67
E. 72

```
public static int ack(int m, int n)
{
  if(m == 0)
  {
    return n+1;
  }
  if(n == 0)
  {
    return ack(m-1, 1);
  }
  return ack(m-1, ack(m, n-1));
}
```

QUESTION 30

Which of the following is a quadratic algorithm?

A. merge sort
B. linear search
C. binary search
D. selection sort
E. quick sort

QUESTION 31

What is method `isIt` trying to determine about `stuff`?

A. if all items in ascending order
B. if all items in descending order
C. if all items the same
D. if all items integers
E. if all items bigger than spot 0

QUESTION 32

What is method `doSomething` doing to `stuff`?

A. putting all odd values first
B. putting all values in ascending order
C. putting all values in descending order
D. putting all even values first
E. putting all null values first

QUESTION 33

What is the best case runtime efficiency of `isIt`?
Choose the most restrictive correct answer.

A. $O(N)$
B. $O(N^2)$
C. $O(\log_2 N)$
D. $O(N)*O(\log_2 N)$
E. $O(1)$

QUESTION 34

What is the output of `// line 1`?

A. `0` B. `1`
C. `true` D. `false`
E. There is no output due to a syntax error.

QUESTION 35

What is the output of `// line 2`?

A. `0` B. `1`
C. `true` D. `false`
E. There is no output due to a syntax error.

```
public class Surprise
{
  boolean isIt(Comparable[] stuff)
  {
    for(int i=0; i<stuff.length-1; i++){
       if(stuff[i].compareTo(stuff[i+1]) < 1)
          return false;
     }
    return true;
  }

  void doSomething(Comparable[] stuff)
  {
    if(isIt(stuff)) return;

    for(int i=0;i<stuff.length-1;i++)
    {
      int spot=i;
      for(int j=i;j<stuff.length;j++){
        if(stuff[j].compareTo(stuff[spot])>0)
          spot=j;
      }
      if(spot==i) continue;
      Comparable save=stuff[i];
      stuff[i]=stuff[spot];
      stuff[spot]=save;
    }
  }
}


//////////////////////////////////////
/////client code
Surprise why = new Surprise();
Comparable[] list = {11,88,3,2,5,6,1,9};

out.println(why.isSurprise(list));   // line 1
why.doSomething(list);
out.println(why.isSurprise(list));   // line 2
```

QUESTION 36

What replaces **<*1>** in the code to the right so that the code to the right compiles?

A. `push`

B. `parse`

C. `split`

D. `sub`

E. `separate`

```
public static void process(String[] s)
{
  Map<String, Integer> m;
  m = new TreeMap<String, Integer>();

  for(String x : s)
  {
    String[] arr = x.<*1>(" ");
    String type = arr[0];
    String id = arr[1];
    if(type.equals("E"))
    {
      Integer c = m.get(id);
      if(c == null) {
        c = new Integer(0);
      }
      if(c != -1) {
        m.put(id, c+1);
      }
    }
    else
    {
      m.put(id, -1);
    }
  }
  System.out.print(m.get("x"));
  System.out.print(m.get("y"));
}
```

QUESTION 37

Assuming that **<*1>** is filled in correctly, what is output by the following client code?

```
String[] arr = {"E x","E y","E x","S y"};
process(arr);
```

A. `-1-1`

B. `2-1`

C. `11`

D. `31`

E. `21`

QUESTION 38

Assuming that **<*1>** is filled in correctly, what is output by the following client code?

```
String[] arr =
        {"E x","E x","S x","E y","E x"};
process(arr);
```

A. `1-1`

B. `11`

C. `-1-1`

D. `-11`

E. `12`

QUESTION 39

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

A. `51`

B. `15`

C. `5`

D. `1`

E. `11`

```
public static void f(int x)
{
  int y = 1;
  try
  {
    y = 5/x;
  }
  catch(Exception e)
  {
    System.out.print(y);
  }
  finally
  {
    System.out.print(x);
  }
}
```

QUESTION 40

What is returned by the method call `f(0)`?

A. `11`

B. `10`

C. `01`

D. `0`

E. `1`