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 1010_2 plus 101_2 ?

A. 45_6 B. 1111_2 C. 23_9 D. 14_{10} E. 32_6

QUESTION 2

What is output by the code to the right?

A. `2.0` B. `9.0` C. `872.0` D. `987.0`

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

```
double a = 9872 / 10 ;
System.out.println(a);
```

QUESTION 3

What is output by the code to the right?

A. `9` B. `2` C. `987` D. `872`

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

```
int b = 9872;
b %= 10;
System.out.println(b);
```

QUESTION 4

What is output by the code to the right?

A. `147101316192225` B. `1471013161922`

C. `7101316192225` D. `14710131619`

E. `14710131619222528`

```
for(int c=1; c<=25; c+=3)
  System.out.print(c);
```

QUESTION 5

What is output by the code to the right?

A. `rocks` B. `aplus`

C. `compsci` D. `scirocks`

E. `compscirocks`

```
String d = "apluscompscirocks";
System.out.print(d.substring(12));
```

QUESTION 6

What is output by the code to the right?

A. `14` B. `15`

C. `12` D. `8`

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

```
int[] e = {3,5,9,3,2,4,8};
e[0] =  e[2] + e[0];
System.out.println( e[0] );
```

QUESTION 7

How many combinations of values for b and c could make a true?

A. 0 B. 1

C. 3 D. 2

E. 4

```
a = !(b ^ c);
```

QUESTION 8

What is output by the code to the right?

A. `2` B. `12`

C. `02` D. `012`

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

```
double t = Math.ceil(Math.sqrt(33));
if(t > 5.0)
  System.out.print(0);
else if(t > 6.0)
  System.out.print(1);
System.out.print(2);
```

QUESTION 9

Which of the following could replace **<*1>** in the code of class `Alligator` to the right so that method `isBadHombre()` would correctly return true if the `Alligator` has more than 45 teeth and more than 6 Spikes?

A. `return (numTeeth>45 || numSpikes>6);`

B. `return (numTeeth>45 && numSpikes>6);`

C. `return (getNumTeeth()>45 && getNumSpikes()>6);`

D. A and B only

E. B and C only

QUESTION 10

Assuming that **<*1>** is filled correctly, what is output by the code to the right?

A. `false true`

B. `true true`

C. `false false`

D. `true false`

E. There is no output.

```
public class Alligator
{
  private int numSpikes;
  private long numTeeth;

  public Alligator(int ns, long nt){
    numSpikes = ns;
    numTeeth = nt;
  }

  public long getNumTeeth(){
    return numTeeth;
  }

  public int getNumSpikes(){
    return numSpikes;
  }

  public boolean isBadHombre(){
    <*1>
  }
}

//////////////////////////////////////////
//client code
Alligator b = new Alligator(5, 200);
out.print(b.isBadHombre() + " ");
b = new Alligator(50, 26);
out.println(b.isBadHombre());
```

QUESTION 11

What is output by the code to the right?

A. `4` B. `2` C. `5` D. `3`

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

```
byte tr = 3;
tr = (++tr > 3) ? tr++ : tr--;
out.println( tr );
```

QUESTION 12

What is output by the code to the right?

A. `-7.193` B. `(-7.192)`

C. `(-7.193)` D. `(7.193)`

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

```
System.out.printf("%(.3f",-7.1928);
```

QUESTION 13

What is output by the code to the right?

A. `tall` B. `big` C. `funny` D. `/` E. `/t`

```
String g = "/big/tall/funny";
String[] bg = g.split("[//]");
System.out.println(bg[3]);
```

QUESTION 14

What is output by the code to the right?

A. `0`

B. `-3`

C. `5`

D. `1`

E. `-2`

```
String vals = "heeponnonnomous";
int total = 0;
for(int i=0; i<vals.length(); i++){
  char ch = vals.charAt(i);
  switch( ch ){
    case 'e' : total+=3; break;
    case 'o' : total+=2; break;
    case 'n' : total-=1; break;
    default : total--;
  }
}
System.out.print( total );
```

QUESTION 15

What is output by the code to the right?

A. 6 B. 3 C. -1 D. 5 E. 7

```
String j = "basketball";
out.print(j.indexOf("a",5));
```

QUESTION 16

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

A. 16

B. 10

C. 48

D. 96

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

QUESTION 17

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

A. 16

B. 10

C. 48

D. 96

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

```
public class ABird
{
  private int size;
  public ABird(int s){
    size = s;
  }
  public int getIt(){
    return size * 2;
  }
  public int getThat(){
    return getIt();
  }
}

public class BombBird extends ABird
{
  private int size;
  public BombBird(int s){
    super(s);
    size = s * 2;
  }
  public int getThat()
  {
    return super.getThat() + getIt();
  }
  public int getIt(){
    return size * 3;
  }
}

////////////////////////////////////
// client code
ABird d = new ABird(5);
System.out.println(d.getIt());      //1
d = new BombBird(8);
System.out.println(d.getThat());    //2
```

QUESTION 18

What is output by the code to the right?

A. 17 B. 22 C. 15 D. 21 E. 31

```
System.out.printf("%x",23);
```

QUESTION 19

What is the output by the code to the right?

A. `0`

B. `5`

C. `10`

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

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

```
LinkedList list = new LinkedList();
for(int i = 0; i < 200; i++)
  list.add(Integer.toString(i,i));
Iterator i = list.listIterator();
i.next();
i.next();
System.out.println(i.next());
```

QUESTION 20

What is the output by the code to the right?

A. `4826` B. `4827` C. `4828` D. `4829` E. `4830`

```
out.println(155^4275^654^3^127);
```

QUESTION 21

What is output by the code to the right?

A. `13`

B. `-22`

C. `5`

D. `17`

E. `-17`

```
int bit = 17 | 5;
int wise = ~bit;
out.print( wise );
```

QUESTION 22

What is returned by the method call `huh(100, 25)`?

A. `10.0`

B. `29.0`

C. `104.00`

D. `37.0`

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

```
public static double huh(long a,
                         double b){
  a = (int)(a / b);
  a = (int)(a + b );
  return a;
}
```

QUESTION 23

What is output by the client code to the right?

A. `[2, 3, 0, 1, 4]`

B. `[3, 3, 0, 1, 4]`

C. `[3, 4, 0, 1, 4]`

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

E. `[1, 1, 0, 0]`

```
public static void axe(int[] list){
  list[0]++;
  list[1]++;
  list = new int[4];
  list[0]++;
  list[1]++;
}

////////////////////////////////////
// client code
int[] vals = {2,3,0,1,4};
axe(vals);
out.print( Arrays.toString(vals) );
```

QUESTION 24

What is returned by the method call `box(6)` ?

A. `56` B. `12`

C. `16` D. `64`

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

QUESTION 25

What is returned by the method call `box(15)`?

A. `56` B. `12`

C. `16` D. `64`

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

QUESTION 26

What is the running time of method `box`? Choose the most restrictive correct answer.

A. $O(N^2)$ B. O(1)

C. O(N+N/2) D. O(NlogN)

E. O(logN)

```
public static int box(int amt)
{
  int cnt = 0;
  for(int i = 1; i<=amt; i+=2)
  {
    for(int j = i; j<=amt; j+=1)
    {
      cnt = cnt + 1;
    }
  }
  return cnt;
}
```

Use the following matrix `m` for questions 27 and 28.

5	4	3	2	1
2	2	2	2	2
3	3	3	3	3
1	2	3	4	5
2	4	6	8	10

QUESTION 27

What is returned by the method call `mess(m, 1, 1)` ?

A. 14 B. 16

C. 13 D. 15

E. Nothing is returned due to a runtime exception.

QUESTION 28

What is returned by the method call `mess(m, 3, 2)` ?

A. 14 B. 16

C. 13 D. 15

E. Nothing is returned due to a runtime exception.

```
public static int mess(int[][] m,
                       int r,
                       int c)
{
   Integer sum = 0;
   int rowCap = m.length;
   int colCap = m[0].length;
   do{
      sum = sum + m[r][c];
      if(m[r][c] % 2 == 0)
        r--;
      else
        c++;
   }while( r < rowCap && c < colCap);
   return sum;
}
```

QUESTION 29

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

A. `47`
B. `66`
C. `26`
D. `21`
E. `101`

QUESTION 30

What is returned by the method call `wow(10)` ?

A. `47`
B. `66`
C. `26`
D. `21`
E. `101`

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

QUESTION 31

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

A. `long[]`
B. `Long[]`
C. `Object[]`
D. A & B only
E. A, B, and C

```
long[] trix = {88L,99L,101L,250L};
boolean tr = trix instanceof <*1> ;
```

QUESTION 32

What is output by the client code to the right?

A. `701`
B. `746`
C. `803`
D. `721`
E. `900`

QUESTION 33

Which of the following best describes what method `guess` does?

A. Returns the maximum ascii value in `s`.
B. Returns the minimum ascii value in `s`.
C. Returns the sum of the ascii values of the letters in `s`.
D. Returns the first ascii value in `s`.
E. Returns the last ascii value in `s`.

```
public static int guess(String s,
                        int spot,
                        int ans)
{
  if( spot == s.length() )
    return ans;
  return guess(s, spot + 1,
               ans + s.charAt(spot));
}


////////////////////////////////////
// client code
String word = "bigfoot";
out.print( guess(word, 0, 0) );
```

QUESTION 34

Consider the class headers to the right. Assume all of the classes to the right have a default constructor. Which of the following statements will compile without error?

I. `Wacky d = new Mario();`

II. `Wacky b = new SuperMario();`

III. `Wacky b = new Wacky();`

A. I only

B. II only

C. III only

D. I and II only

E. I and III only

```
public interface Wacky

public class Mario implements Wacky

public class Links implements Wacky

public class BigLinks extends Links

public class SuperMario extends Mario
```

QUESTION 35

What is output by the code to the right?

A. `faba`

B. `aaaa`

C. `ffff`

D. `faab`

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

```
int n = Integer.parseInt("10110")^55;
int lim = (int)Math.log10(n);
for (int a = 0; a < lim; a++){
  out.print((char)(97+((n/=10)%10)));
}
```

QUESTION 36

What are the contents of `list` after the method call `sort(new Integer[]{7,2,1,9,8,3}, 1, 4)`?

A. `[1, 2, 3, 7, 8, 9]`

B. `[1, 9, 7, 3, 8, 2]`

C. `[3, 2, 1, 7, 9, 8]`

D. `[1, 2, 7, 9, 8, 3]`

E. `[7, 1, 2, 8, 9, 3]`

QUESTION 37

What standard sorting algorithm is being demonstrated by method `sort()`?

A. selection sort

B. insertion sort

C. quick sort

D. merge sort

E. heap sort

```
void sort(Comparable[] list, int low, int high)
{
   if(low < high)
   {
       int p = help(list, low, high);
       sort(list, low, p);
       sort(list, p+1, high);
   }
}


int help(Comparable[] list, int low, int high)
{
   Comparable x = list[low];
   int bot = low-1;
   int top = high+1;
   while(bot<top)
   {
      while(list[--top].compareTo(x) > 0);
      while(list[++bot].compareTo(x) < 0);
      if (bot >= top){
         return top;
      }
      Comparable temp = list[bot];
      list[bot] = list[top];
      list[top] = temp;
   }
   return 0;
}
```

QUESTION 38

What is output by the code to the right?

A. 1028 B. 155843 C. 15 D. -1 E. 0

```
System.out.println(-1 >> 28);
```

QUESTION 39

```
Struct s = new Struct();
s.add("hello");
s.add("halo");
s.add("help");
s.add("hiccup");
s.add("alf");
s.add("elf");
```

After the code above runs, how many instantiated `Struct's` are in the `s.nodes[8]` subtree (including the root node)?

A. 20 B. 19
C. 13 D. 14
E. 21

QUESTION 40

```
Struct s = new Struct();
s.add("and");
s.add("bart");
s.add("bell");
s.add("call");
s.add("hall");
s.add("tree");
s.add("elf");
s.add("rage");
s.add("glass");
s.add("glasses");
```

After the code above runs, how many `Struct's` have been instantiated (including the root node)?

A. 34 B. 37
C. 42 D. 39
E. 10 F. 99

```
public class Struct{

  public Struct[] nodes;

  public Struct(){
    nodes = new Struct[26];
  }

  public void add(String str){
    if (str.length()==0)
      return;
    int fCh = str.charAt(0)-96;
    if (nodes[fCh] == null)
      nodes[fCh] = new Struct();
    nodes[fCh].add(str.substring(1));
  }
}
```