QUESTION 1

Which of these is NOT equivalent to $10101_2 + 10000_2$?

A. 35_{10} B. 45_8 C. 25_{16} D. 100101_2 E. All are equivalent

QUESTION 2

For which initial values of p and q will the code on the right output `true`?

A. `p=true, q=true;`   B.   `p=false, q=true;`

C. `p=true, q=false;`   D.   `p=false, q=false;`

E. None of these

```
boolean p=<value1>, q=<value2>;
out.println(p&&q);
```

QUESTION 3

What is output by the code to the right?

A. 4   B. 4.0   C. 5

D. 5.0   E. 6

```
double a = 4.1573;
out.println(Math.ceil(a));
```

QUESTION 4

What is output by the code to the right?

A. 13.9   B. 15.7

C. 27.0   D. 27.4

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

```
double x = 13.7;
x = 2 * x;
out.println(x);
```

QUESTION 5

What is output by the code to the right?

A. `biminitop biminitop`

B. `biminitop bikinitop`

C. `bikinitop bikinitop`

D. `bikinitop biminitop`

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

```
String s = "biminitop";
String t = s.replace('m','k');
out.println(s+" "+t);
```

QUESTION 6

What is output by the code to the right?

A. `-4.0`   B. `-5.0`

C. `-8.2`   D. `-9.0`

E. `17.0`

```
out.printf("%.1f\n",9/2-6.5*2);
```

QUESTION 7

What is output by the code to the right?
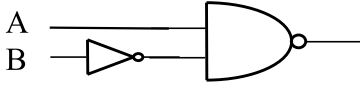
A. `null`   B. `null5`   C. `5`

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

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

```
Integer x = null;
int y = 5;
out.println(x + y);
```

What is output by the code to the right?

A. `-50 -2 1`   B. `-49 -56 57`

C. `-51 -1 0`   D. `-51 -56 55`

E. `-50 -56 56`

```
int x = ~50;
int y = x/7<<3;
int z = ~y;
out.println(x+" "+y+" "+z);
```

What is output by the code to the right?

A. `Chill`   B. `Dude`

C. `Yo`   D. `Sup`

E. `DudeSupWordChill`

```
char a = 'e';
switch(a)
{
   case 'a':out.println("Yo");break;
   case 'e':out.println("Dude");break;
   case 'i':out.println("Sup");break;
   case 'o':out.println("Word");break;
   default :out.println("Chill");
}
```

What is output by the code to the right?

A. 7   B. 6

C. 5   D. 4

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

```
int x=0;
String [] a = {"red","white","blue"};
char[][]list=new char[a.length][];
for(String s:a)
   list[x]=a[x++].toCharArray();
int k=0;
for(char[]j:list)
   for(char m:j)
      k+="yellow".indexOf(m)>=0?0:1;
   out.println(k);
```

The `toString` method is partially implemented in the code to the right. Which statement below would **best** replace <statement1> so that the output in the client code shows `"6 string acoustic"`?

A. `return "6 string acoustic"`

B. `return numStrings + " string " + type`

C. `out.println("6 string acoustic")`

D. `out.println(numStrings + " string " + type)`

E. `"6 string acoustic"`

```
class Guitar
{
   private String type;
   private int numStrings;
   public Guitar()
   {
      type = "acoustic";
      numStrings = 6;
   }
   public Guitar(int n)
   {
      this();
      numStrings = n;
   }
   public Guitar(int n, String s)
   {
      this(n);
      type = s;
   }
   public String toString()
   {
      <statement1>;
   }
}
/////////////////////////////////
////client code
Guitar g = new Guitar();
out.println(g);
```

In what Java class is the `toString` method originally defined ?

A. `Guitar`

B. `Object`

C. `System`

D. `String`

E. `Scanner`

What term refers to redefining the `toString` method as shown in the code to the right ?

A. inheritance

B. overloading

C. overriding

D. polymorphism

E. interfacing

QUESTION 14	
| What is output by the code to the right?<br><br>A. 523      B. 637<br><br>C. 790      D. 951<br><br>E. 1003 | ```java
static int stuf(int [] list){
   int k=0,m=0;
   for(int x:list){
      int c=0;
      String s = Integer.toString(x);
      char []ss=s.toCharArray();
      for(char a:ss)
         c+=a-48;
      if(c>k){
         k=c;m=x;
      }
   }
   return m;
}
//client code
int [] list = {523,637,951,790,1003};
out.println(stuf(list));
``` |

QUESTION 15	
| What is output by the code to the right?<br><br>A. 630      B. 963      C. 9630<br><br>D. There is no error, but there is no output<br><br>E. There is no output due to a compile error | ```java
for(int x=9; x==0;x-=3)
   out.print(x);
``` |

QUESTION 16	
| What is output by the code to the right?<br><br>A. 123456      B. 125456      C. 156456<br><br>D. 153456      E. 433456 | ```java
int [] list = {1,2,3,4,5,6};
list[list[1]]=list[list[4]];
list[1]=list[list[3]];
for(int x:list)
  out.print(x);
``` |

QUESTION 17	
What is output by the client code to the right? A. 2.0 B. 6.0 C. 8.0 D. 10.0 E. 14.0	
| QUESTION 18<br><br>What term best describes the function of the `myst` method defined on the right?<br><br>A. Euclid's greatest common factor algorithm<br><br>B. Pascal's triangle<br><br>C. Leibniz integral rule<br><br>D. Newton's law of gravitation<br><br>E. Pythagorean theorem | ```java
public static double myst(double A,
double B)
{
   double AA = Math.pow(A,2);
   double BB = Math.pow(B,2);
   double C = Math.sqrt(AA+BB);
   return C;
}
//client code
double a = 6.0;
double b = 8.0;
out.println(myst(a,b));
``` |

QUESTION 19	
| What is output by the code to the right?<br><br>A. 1    B. -1    C. 9    D. -9    E. 0 | ```java
String a = "Auburn";
String b = "Alabama";
out.println(a.compareTo(b));
``` |

QUESTION 20	
| What is output by the code to the right?<br><br>A. B4 114 1110010    B. B4 176 10110000<br><br>C. B4 180 10110100    D. B4 B416 1011010000010110 | ```java
String s = "B4";
int i = Integer.parseInt(s,16);
String t = Integer.toBinaryString(i);
out.println(s+" "+i+" "+t);
``` |

QUESTION 21	
| What is output by the code to the right?<br><br>A. -21  B. -27  C. 21<br><br>D. 24  E. 27 | ```java
static int t(int x)
{
    return x%7>3?x-3:x+3;
}
//client code
out.println(t(24));
``` |
| **QUESTION 22** | |
| What is output by the code to the right?<br><br>A. 01100100  B. 0110010  C. 100<br><br>D. 1100100  E. 1101100 | ```java
String s;
s = Integer.toBinaryString(100>>32);
out.println(s);
``` |
| **QUESTION 23** | |
| What is output by the code to the right?<br><br>A. -1.00  B. 0.50  C. 0.71<br><br>D. 1.00  E. 1.73 | ```java
double d = Math.log(Math.E);
out.printf("%.2f\n",d);
``` |
| **QUESTION 24** | |
| What is output by the code to the right?<br><br>A. 10000000000000000000000000000000  (1, 31 0s)<br><br>B. 100000000000000000000000000000000  (1, 32 0s)<br><br>C. 11111111111111111111111111111111  (32 1s)<br><br>D. 11111111111111111111111111111111  (32 1s, 0)<br><br>E. 10000000000000000000000000000001  (1, 30 0s, 1) | ```java
int x = Integer.MIN_VALUE;
String s = Integer.toBinaryString(x);
out.println(s);
``` |
QUESTION 25	
Find f(-4) according to the recursive function definition shown on the right. You may use the space below to do your work. f(-4) = A. -6 B. -2 C. 3 D. 5 E. 9	$$f(x,y) = \begin{cases} 2(f(x+2))-f(x+1)+1 & \text{when } x<0 \\ 1 & \text{when } x=0 \\ 0 & \text{when } x>0 \end{cases}$$
QUESTION 26	
| What is output by the code to the right?<br><br>A. [3, 5, 1, 7]  B. [4, 2, 6, 0]<br><br>C. [1, 3, 5, 7]  D. [0, 2, 4, 6]<br><br>E.  There is no output due to a compile error. | ```java
int [] list = {3,4,2,5,1,6,7,0};
ArrayList<Integer> List1 = new
  ArrayList<Integer>();
ArrayList<Integer> List2 = new
  ArrayList<Integer>();
for(int x:list){
    if(x%2==0)
        List1.add(x);
    List2.add(x);
}
List2.removeAll(List1);
out.println(List1);
``` |

What is output by the code to the right?

A. I   B. L

C. R   D. S

E. T

```
String s = "UILDISTRICTCONTEST";
char[]list = s.toCharArray();
int x=1;
PriorityQueue<Character> pq;
pq = new PriorityQueue<Character>();
for(char a:list){
        pq.offer(a);
        if(x%3==0){
            pq.poll();pq.poll();
        }
        x++;
    }
out.println(pq.peek());
```

QUESTION 28

What is output by the code to the right?

A. 5 4.0   B. 4 5.0

C. 5.0 4.0   D. 4 5

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

```
int j = 100;
double k = 20;
j/=k;
k/=j;
out.println(j+" "+k);
```

QUESTION 29

What is output by the code to the right?

A. 000 011 101 111   B. 000 011 100 110

C. 001 011 101 111   D. 000 010 100 111

```
for(int p = 0; p <= 1; p++)
   for(int q = 0;q <= 1; q++)
      out.print(""+p+q+(p|q^p)+" ");
```

QUESTION 30

Which of the following logical statements is represented by the digital electronics diagram on the right ?

A. !A || !B   B. !(A || !B)

C. !(A && !B)   D. !A && !B

QUESTION 31

There is possibly something wrong with the code on the right that would cause a compile error, or it could be just fine. Which answer choice best describes the situation ?

A. There is nothing wrong…the code is fine as is.

B. The interface methods should not have semicolons

C. The class B method A1 needs something inside the {}

D. {} brackets are missing in the interface methods

E. The word `public` needs to precede each method definition.

```
interface A
{
   void A1();
   int A2();
}
class B implements A
{
   void A1(){}
   int A2(){return 0;}
}
//client code
A b = new B();
b.A1();
out.print(b.A2());
```

QUESTION 32

Assuming the code is correct as is, or that the proper fix has been applied so that method A1 outputs the phrase "Hello World" and method A2 returns the value 0, what is the output of the client code listed?

A. 0   B. HelloWorld0

C. HelloWorld

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

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

QUESTION 33

What is output by the code to the right?

A. {a=5, b=7, e=3, f=7}

B. {a=5, b=7, c=3, e=3, f=7}

C. {c=4, e=3, b=7, a=5, f=7}

D. {e=3, b=7, a=5, f=7}

E. {a=5, e=3, f=7}

```
Map<Character,Integer> m = new
   TreeMap<Character,Integer>();
m.put('c',4);
m.put('e',3);
m.put('b',7);
m.put('a',5);
m.put('c',3);
m.put('f',7);
m.remove('c');
out.println(m);
```

QUESTION 34

Which of these is the most efficient O(N) rating?

A. O(N)   B. O(N^2)   C. O(log N)   D.   O(N log N)   E.   O(1)

QUESTION 35

In the code to the right, what value is the last one popped ?

A.   3
B.   5
C.   6
D.   7
E.   9

```
Stack<Integer> s = new
   Stack<Integer>();
s.push(3);
s.push(5);
s.push(9);
s.pop();
s.push(6);
s.pop();
s.pop();
s.push(2);
s.push(7);
```

QUESTION 36

If A and B are Boolean values, which is the most simplified expression for A*0 + B + 1, where * means AND, + means OR, 0 means false, and 1 means true?

A. 0   B. 1   C. A   D. B   E. A+B

QUESTION 37

What is the length of the longest diagonal of 1s printed by this code?

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

```
for(int x=0;x<8;x++) {
   for(int y=0;y<8;y++)
      out.print(((x+y)%4==0)?1:0);
      out.println();
   }
```

QUESTION 38

What is output by the code to the right?

A. 9   B. 10   C.   11

D. 12   E. 16

```
int a = 45;
int b = 34;
out.println(a%10+b/10+b%10);
```

In graph 1 on the right, the adjacency matrix would look like this, where 1 means a one way connection and 0 would mean no connection:

	A	B	C
A	0	1	1
B	1	1	0
C	0	0	0

Which choice below represents the adjacency matrix for Graph 2 on the right?

A.

	A	B	C	D
A	0	1	1	0
B	1	0	0	1
C	0	0	1	0
D	0	1	0	0

B.

	A	B	C	D
A	0	1	1	1
B	0	0	0	1
C	0	0	0	0
D	0	1	0	0

C.

	A	B	C	D
A	0	1	1	1
B	0	0	0	1
C	0	0	1	0
D	0	1	0	0

D.

	A	B	C	D
A	0	0	0	0
B	1	0	0	1
C	1	0	1	0
D	1	1	0	0

What is output by the code to the right?

A. 16.0 15.0   B. 16.0 16.0

C. 14.0 17.0   D. 12.0 18.0

E. 5.0 20.0

```
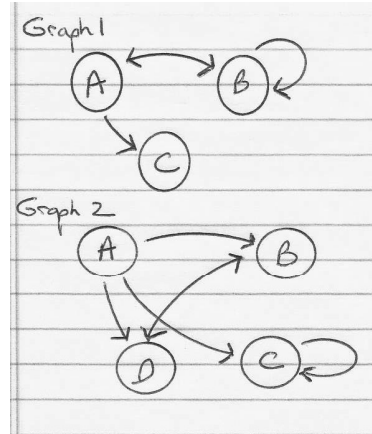double a = 5,b=20;
do{
  if (a<b)
    a=a+(int)(b/a)+1;
  b=b-1;
  }
while(a<=b);
out.println(a+" "+b);
```