Note: Correct responses are based on Java, **J2sdk v 1.7.25**, 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. **For all output statements, assume that the System class has been statically imported…** ***import static java.lang.System.*;***

QUESTION 1

Which choice below represents the value of X in the equation shown?

$$10000_2 * X_{16} - 16_8 = 226_{10}$$

A. 15 B. 0.0242 C. F D. 0.024 E. 14

QUESTION 2

What is the result of the expression shown?

A. `20` B. `22` C. `26` D. `38` E. `92`

```
out.println(6 + 4 * 10 - 8);
```

QUESTION 3

How many line feeds are created by the output statement below?

```
System.out.printf("Hello\nall\\nyou%nbrilliant\npeople!");
```

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

QUESTION 4

What is output by the code segment below?

```
String s = "moonlight";
String t = "sunlight";
int b = s.length();
int a = t.length();
out.println(s.substring(0,a).compareTo(t.substring(b/2)));
```

A. `1` B. `-1` C. `4` D. `-4` E. 0

QUESTION 5

What is output by the code segment to the right?

A. `false` B. `true`

```
boolean p = true;
boolean q = true;
out.println(!(p^q));
```

QUESTION 6

Which of the choices below fills the blank so that output of this code segment is `true`?

A. 2 B. `2*Math.sqrt(2)`
C. `2*Math.cbrt(2)` D. 4
E. 8

```
double b = ___;
double c = 4;
out.println(Math.abs(Math.sin
    (Math.PI/6)-b/c)<0.00001);
```

QUESTION 7

What is output by the code to the right?

A. `6` B. `7` C. `54` D. `55`
E. There is no output due to an error.

```
long j = 2;
char a = '9';
out.println(a+=~j);
```

QUESTION 8

Which of the colors in the code segment to the right will be output the fewest number of times?

A. red B. green C. blue D. black

E. tie between two colors

```
for(int x=-5;x<11;x++){
if(x>0){
  if(x<9)  out.println("red");
  else     out.println("green");
}
else
  if(x<0)
  out.println("blue");
if(x==0)   out.println("black");
}
```

QUESTION 9

Which of the choices below is NOT an output value of the code segment to the right?

A. 13 B. 40 C. 121 D. 363

E. There is no output due to an error

```
for(int x=1;x<400;x*=3,x++)
  out.print(x);
```

QUESTION 10

What is the final value output by the code segment to the right?

A. 0.0 B. 1.0 C. 1.5

D. 2.0 E. 2.5

```
double [] dip = new double[5];
for(int x=1;x<5;x++)
  dip[x]=x/2;
for(double d:dip)
  out.print(d+" ");
```

QUESTION 11

What is output by the code segment to the right?

A. 168 B. 1 6 8 C. 123468910

D. 1 2 3 4 6 8 9 10

E. There is no output due to an error.

```
String s="1 2 3 4 5 6 7 8 9 10";
Scanner f = new Scanner(s);
f.useDelimiter("[57]");
while(f.hasNext()){
 Scanner g = new
    Scanner(f.next());
 out.print(g.next());
}
```

QUESTION 12

What is output by the code segment to the right?

A. ABCDE B. abcde C. EDCBA D. edcba

E. There is no output due to an error.

```
String s = "";
for(int x=65;x<70;x++)
      s=(char)x+s;
out.println(s);
```

QUESTION 13

What is output by the code segment to the right?

A. 1 B. 7 C. 20 D. 25

E. There is no output due to an error.

```
int x=2,y=5,z=7;
out.println(x|y==z?y<<x:z>>x);
```

QUESTION 14

What is the final output value in the code segment to the right?

A. 127 B. 128 C. -127 D. -128

E. There is no final output value due to an infinite loop

```
byte x = 0;
while(x>=0)
      out.println(++x);
```

QUESTION 15

What is output by the code segment to the right?

A. `true[9, 7, 4, 6]`
B. `false[9, 7, 4, 6]`
C. `true[]`
D. `false[]`
E. There is no output due to an error.

```
int [] list1={9,5,7,4,6};
int [] list2={5,2,1};
ArrayList<Integer> List1 = new
ArrayList<Integer>();
for(int x:list1) List1.add(x);
ArrayList<Integer> List2 = new
ArrayList<Integer>();
for(int x:list2) List2.add(x);
out.print(List1.removeAll(List2));
out.println(List1);
```

QUESTION 16

The method to the right calculates interest compounded annually. What is output by the client code shown?

A. 1000.0 B. 1100.0 C. 1210.0
D. 1331.0 E. 1464.1

```
static double mystS15(int x,int y,
int z){
      double w = x;
      for(int a=1;a<=z;a++)
            w+=w*y/100;
      return w;
}
//client code
out.println(mystS15(1000,10,2));
```

QUESTION 17

Which of the loop structures below correctly replaces the bolded portion of the method to the right in order to compound monthly with the same effective annual interest rate?

A.
```
for(int a=1;a<=z*12;a++)
w+=w*y/100/12;
```
B.
```
for(int a=1;a<=z;a++)
w+=w*y/100/12;
```
C.
```
for(int a=1;a<=z*12;a++)
w+=w*y/100;
```
D.
```
for(int a=1;a<=z/12;a++)
w+=w*y/100/12;
```
E.
```
for(int a=1;a<=z*12;a++)
w+=w*y/100*12;
```

QUESTION 18

How many multiples of 3 are output by the code segment to the right?

A. 6
B. 7
C. 8
D. 9
E. There is no output due to an error.

```
int [][] list = new int[4][0];
for(int r=0;r<list.length;r++){
   list[r] = new int[(r+1)*2];
   for(int c=0;c<list[r].length;c++)
      list[r][c]=(r+1)*(c+1);
}
for(int [] nums:list)
   for(int d:nums)
      out.print(d+" ");
```

QUESTION 19

Which of the ordered triples listed below makes the Boolean expression on the right true?

A. 000
B. 001
C. 010
D. 100
E. 110

$$\left(\overline{\bar{A} \oplus \bar{B}}\right) * C$$

QUESTION 20

See Reference Page #1 for Questions 20-23 at the end of this test.

Using the code on Reference Page #1, which choice below, if necessary, is a correct replacement for <code> in line 1?

A. No code is necessary here B. `extends Comparable` C. `extends Comparator`
D. `implements Comparable` E. `implements Comparator`

QUESTION 21

Assuming the issue in Question 20 is resolved correctly according to the given choices, what is the correct replacement for <className> in line 11 of the code?

A. `Object` B. `Team` C. `ArrayList` D. `ClassTeam`

QUESTION 22

In lines 1-10 of the code, which line, if any contains an issue contrary to the specification of this process as indicated in the problem description?

A. 7 B. 8 C. 9 D. 10 E. There is no issue in this section of code

QUESTION 23

Assuming any issues in the code have been resolved so that the code behaves as described, what is the output of the client code shown?

A.
```
three 9:0 2 3 4
four 9:0 3 3 3
one 9:1 2 3 4
two 9:1 2 3 4
seven 9:2 2 3 4
six 10:0 2 3 5
five 10:1 2 3 5
```

B.
```
five 10:1 2 3 5
six 10:0 2 3 5
seven 9:2 2 3 4
one 9:1 2 3 4
two 9:1 2 3 4
three 9:0 2 3 4
four 9:0 3 3 3
```

C.
```
five 10:1 2 3 5
six 10:0 2 3 5
seven 9:2 2 3 4
two 9:1 2 3 4
one 9:1 2 3 4
four 9:0 3 3 3
three 9:0 2 3 4
```

D.
```
five 10:1 2 3 5
six 10:0 2 3 5
seven 9:2 2 3 4
two 9:1 2 3 4
one 9:1 2 3 4
three 9:0 2 3 4
four 9:0 3 3 3
```

QUESTION 24

An algorithm with a least restrictive running time of $O(N\log_2 N)$ processes 1024 data elements in 5 seconds. How many data elements can be processed by the same algorithm in 24 seconds?

A. 2048 B. 4096 C. 4915 D. 5120 E. 49152

QUESTION 25

What is the output of the code to the right?

A. 1 B. 25 C. 57 D. 58

E. There is no output due to an error

```
int x = 33;
int y = 25;
int z = x&y;
out.println(z);
```

QUESTION 26

What is output by the code segment to the right?

A. 15 B. 19 C. 20

D. 21 E. 25

```
String s="";
for(int x=-2;x<=2;x++){
      int y=x;
      while(y<7){
            s+="*";
            y+=2;
}}
out.println(s.length());
```

QUESTION 27

See Reference Page #2 at the end of this test packet for the code that relates to Questions 27 and 28.

Below are the first few lines of output by the client code on Reference Page #2. What will be the next line of output?

```
MergeSortHelper 1
MergeSortHelper 2
MergeSortHelper 3
MergeSortHelper 4
MergeSortHelper 5
merge:0 1
MergeSortHelper 6
```

A. `MergeSortHelper 7` B. `merge:0 2` C. `merge:1 2` D. `merge:0 3`

E. Not possible to determine

QUESTION 28

What value follows the last output of this code that begins with "**`MergeSortHelper `**"?

A. 9 B. 10 C. 11 D. 12 E. Not possible to determine

QUESTION 29

Given a dictionary with 2000 pages containing words and definitions, using the binary search process, what is the most number of search steps it would take to **find the page** on which any given word and its definition is located, or that it is not found in the dictionary at all?

For example, the first search step would be to look on page 1000, then proceed with the standard binary search process from there.

A. 10 B. 11 C. 12 D. 13 E. Cannot be determined

QUESTION 30

Using standard math operator order (with ^ being the exponent operator), which of the expressions below are equivalent to this expression?

A D V ^ - A N ^ C * E D ^ / +

I. A - D ^ V + A ^ N * C / E ^ D
II. - + A ^ D V / * ^ A N C ^ E D
III. A + D ^ V - A ^ N * C / E ^ D
IV. + - A ^ D V / * ^ A N C ^ E D

A. I and II B. III and IV C. II and III D. I and IV

QUESTION 31

What is output by the code to the right?

A. -5

B. -20

C. 180

D. 200

E. 220

```
public static int f(int x){
  if(x>50)return f(x/2)+2*x;
  if(x>0)return f(x-10)-3;
  return -5;
}
//client code
out.print(f(100));
```

QUESTION 32

What is output by the code to the right?

A. 1911 B. 19.011 C. 910.11

D. 91011 E. 20.0

```
int m = 9;
double n = 10;
String p = "11";
out.println(m+n+p);
```

QUESTION 33

What is the 5th value output by the code to the right?

A. 1 B. 2 C. 3

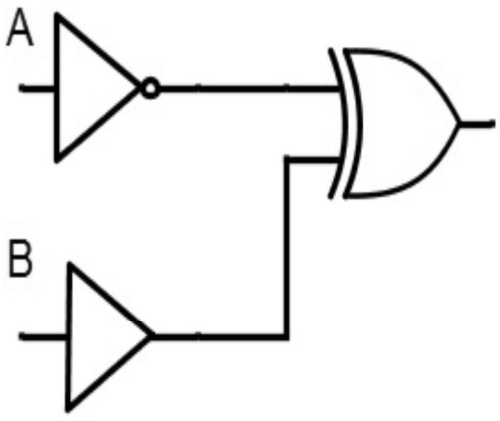
D. 5 E. 7

```
int [] list = {2,7,5,1,3,7,0};
PriorityQueue<Integer> p = new
PriorityQueue<Integer>();
for(int x:list)
      p.add(x);
while(!p.isEmpty())
      out.println(p.remove());
```

QUESTION 34

Which expression below represents the diagram on the right?

A. $\bar{A} \oplus B$
B. $A \oplus B$
C. $\bar{A} + B$
D. $A + B$
E. $\bar{A} * B$



QUESTION 35

Using the code to the right, if the following pairs of values were each assigned to x and y, respectively, how many would result in the output "CS"?

`3 2  1 7  5 3  4 -3  4 5  -6 5`

A. 2 B. 3 C. 4 D. 5 E. 6

```
int x=<value>,y=<value>;
String s =
y%x==1?"UIL":x%y==1?"CS":"STATE";
out.println(s);
```

QUESTION 36

What is output by the code to the right?

A. xtr B. rd C. e D. ao

E. A blank is output due to an empty string in that position.

```
String p = "[aeiou]+";
String s = "extraordinary";
out.println(s.split(p)[1]);
```

QUESTION 37

Which choice below represents the simplest form of the expression shown to the right?

A. $\bar{A}$ B. B

C. $\bar{B}$ D. $A * \bar{B}$

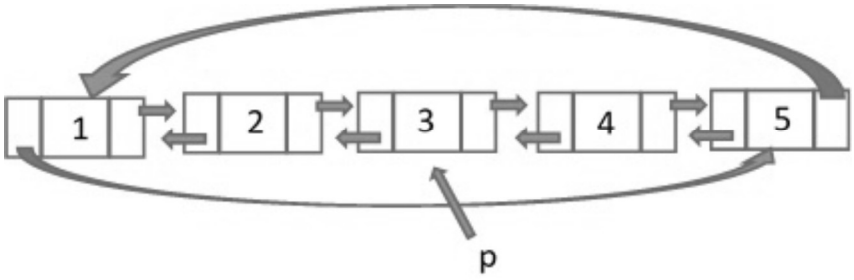
E. $A * \bar{B} + \bar{B} + \bar{A} * \bar{B}$

$$\overline{\bar{A} * B} * (\bar{B} + \bar{A})$$

QUESTION 38

Consider the diagram of the doubly linked list shown below, each node with one integer data field and two pointers, **next** pointing right and **back** pointing left, as in the class definition shown, and assuming that sufficient code has produced the list in the diagram with DLLNode object p referencing the list as indicated. What is the output of the client code shown?

```
class DLLNode{
      public int data;
      public DLLNode next, back;
}
//client code
out.println(p.next.next.data + p.back.back.back.data);
```



A. 2 B. 4 C. 5 D. 7 E. 10

QUESTION 39

Free Response Question:

What is the decimal equivalent for the 8-bit binary value 10101001?

QUESTION 40

Free Response Question:

In the graph shown below, there are seven paths of length 1: WX, WY, XZ, ZX, YY, YZ, and ZW.

How many different paths of length <u>THREE</u> are there?

For example, WXZW, XZWX and WYYY are all different paths of length 3.