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 of these is NOT equivalent to 96_{16} - 156_{8} ?

A. 40_{10} B. 60_{8} C. 28_{16} D. 101000_{2} E. All are

QUESTION 2

What is output by the code segment to the right?

A. `0.0` B. `-0.0` C. `0` D. `-0` E. None of these

```
out.println(-13.0 * -6 % 13 / -12);
```

QUESTION 3

What is output by the code segment to the right?

A. `208` B. `304` C. `100F-2` D. `2FF-2`
E. There is no output due to an error.

```
out.println('F'*2+"F"-2);
```

QUESTION 4

How many `"true"`s will be output by the code to the right?

A. 0 B. 1 C. 2 D. 3 E. 4

```
String s = "computer science";
String [] list = {"e","ce","science",
                  "rscience","er"};
for(String t:list)
    out.print(s.endsWith(t));
```

QUESTION 5

What is output by the code to the right?

A. `false` B. `true` C. There is no output due to an error.

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

QUESTION 6

What is output by the code to the right?

A. `4` B. `4.0` C. `256` D. `256.0`
E. There is no output due to an error.

```
int x = 16;
out.println(Math.sqrt(x));
```

QUESTION 7

What is output by the code to the right?

A. `0` B. `1` C. `0.8` D. `1.0`
E. There is no output due to an error.

```
float f = 5.2f;
long j = 6;
out.println(j-=f);
```

QUESTION 8

What is output by the code to the right?

A. `18` B. `21` C. `24` D. `65` E. `268`

```
String s= "an eye for an eye "+
          "a tooth for a tooth";
String [] list = s.split(" ");
int x = 0;
for(String t:list)
switch(t){
  case "a": x-=t.length();break;
  case "an": x+=t.length();break;
  case "for": x*=2;
  default:x++;
}
out.println(x);
```

QUESTION 9

Which of these values is NOT output by the code to the right?

A. `50` B. `82` C. `114` D. `184` E. `369`

```
int x = 50;
do{
 out.println(x);
 x/=2;
 out.println(x);
 x*=3;
}while(x<500);
```

QUESTION 10

What is the output of the code on the right?

A. `15 -100 6 -100` B. `15 -100 6 -3`
C. `-3 52 -100 52` D. `-3 52 -100 26`
E. There is no output due to an error.

```
int[]list1={10,12,26,-3,15};
int[]list2={-3,8,52,-100,6};
out.print(list1[3]+" "
         +list2[2]+" ");
list1=list2;
list2=list1;
out.println(list1[3]+" "
            +list2[2]);
```

QUESTION 11

Given the code below, how many code lines below (each line containing four input statements) will properly execute when substituted in place of **`<line>`**?

```
String s = "4 true that 5.6";
Scanner k = new Scanner(s);
<line>
```

I. `k.nextInt();k.nextBool();k.next();k.nextDouble();`
II. `k.nextInt();k.nextBoolean();k.next();k.nextDouble();`
III. `k.nextInt();k.next();k.next();k.next();`
IV. `k.nextInt();k.nextBoolean();k.nextLine();k.nextDouble();`

A. 0 B. 1 C. 2 D. 3 E. 4

QUESTION 12

What is output by the code to the right?

A. `-4` B. `2` C. `3` D. `8` E. `12`

```
int[]list={3,2,7,6,4,9,-2,-4,-6,1};
int t = 0;
for(int x:list)
 if(x%-3==-1)
    t+=x;
out.println(t);
```

QUESTION 13

What is output by the code to the right?

A. `20true` B. `20false` C. `21false`
D. `21true` E. `22true`

```
int a,b;
a = b = 10;
out.println((++a + b++)+""+(a++ ==
++b));
```

QUESTION 14

What is output by the code to the right?

A. `128` B. `256` C. `32678` D. `65536`
E. There is no output due to an infinite loop.

```
int c = 0;
char z = 0;
do{
     z++;c++;
}while(z!=0);
out.println(c);
```

QUESTION 15

What is the output of the code segment shown?

A. `9 3 5 7 2 1 6`
B. `9 3 7 2 4 1 6`
C. `4 1 6`
D. `9 3 5`
E. There is no output due to an error.

```
int [] list={9,3,5,7,2,4,1,6};
ArrayList<Integer> aList = new
 ArrayList<Integer>();
for(int x:list)
  aList.add(x);
aList.remove(new Integer(5));
for(Integer x:aList)
  out.print(x+" ");
```

QUESTION 16

How many ordered triples make this boolean expression true?

A. 0 B. 1 C. 3 D. 5 E. 7

$$A * B + \overline{A * B} * C$$

QUESTION 17

What is output by the code segment to the right?

A. 6 B. 6.0 C. 8 D. 8.0
E. There is no output due to an error.

```
long j = 10;
int k = 18;
double p = 7;
out.println(j-k%p);
```

QUESTION 18

What is output by the code segment to the right?

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

```
double[][]dubs={{7.3,4.0,2.7,1.4},
 {3.4,5.6},{1.0,7.3,-4.0},
 {5.0,3.0,4.9}};
int c = 0;
for(double[]d:dubs)
  for(double dd:d)
     if((int)dd==dd)
        c++;
out.println(c);
```

QUESTION 19

Which of the following choices represents the decimal equivalent of the two's complement binary value 10011001?
A. -101 B. -102 C. -103 D. -104 E. -105

QUESTION 20

What is output by the code segment shown?
A. 1.0 B. 0.5 C. 0.9 D. 1.7

```
int angle = 30;
out.printf("%.1f\n",
    Math.cos(Math.toRadians(angle)));
```

QUESTION 21

Using the code to the right, what is the output of the client code below?

```
//client code
int [] list = {8,2,4,7,6,9,4,1,0,3,5};
mystSort(list,1,9);
outputList(list);
```

A. 8 0 1 2 4 4 6 7 9 3 5
B. 8 0 1 2 3 4 4 6 7 9 5
C. 8 9 7 6 5 4 4 3 2 1 0
D. 1 2 4 4 6 7 8 9 0 3 5
E. 9 8 7 6 4 4 3 2 1 0 5

QUESTION 22

Which choice below best replaces <statement> in the client code below so that the entire list is included in the sorting process?

```
//client code
int [] list = {8,2,4,7,6,9,4,1,0,3,5};
<statement>
```

A. `mystSort(list,1,10);` B. `mystSort(list,1,11);`
C. `mystSort(list,0,10);` D. `mystSort(list,0,11);`
E. `mystSort(list,1,12);`

QUESTION 23

Which choice below best represents the line or lines in the **`mystSort`** method that need to be altered in order to reverse the sorting process?
A. 2 B. 6 C. 7 and 8 D. 9
E. All of these lines need to be altered

QUESTION 24

What is the least restrictive running time for the average case scenario for the **`mystSort`** algorithm in the code to the right?
A. O(1) B. O(log N) C. O(N)
D. O(N log N) E. O(N^2)

```
1 public static void mystSort
    (int lst[], int a, int b){
2  if (a >= b) return;
3  int c = a;
4  int d = b;
5  int j = lst[(a+b)/2];
6  while ( c < d){
7    while (lst[c] < j) c++;
8    while (j < lst[d]) d--;
9    if (c <= d){
10      stuff (lst, c, d);
11      c++;
12      d--;
     }
   }
   mystSort (lst, a, d);
   mystSort (lst, c, b);
  }
public static void stuff (int lst[],
int i, int j){
  int m = lst[i];
  lst[i] = lst[j];
  lst[j] = m;
}
public static void
outputList(int[]list){
     for(int x=0;x<list.length;x++)
          out.print(list[x]+" ");
     out.println();
}
```

QUESTION 25

What is output by the code to the right?

A. `105 50 23` B. `112 50 14`

C. `119 50 5` D. `126 50 0`

E. None of these

```
int x = 0,y=50,a=0;
for(;x<100;){
     a=y;
     while(a>0){
       a-=9;x+=7;
     }
}
out.println(x+" "+y+" "+a);
```

QUESTION 26

Which statement below matches the output of the code segment to the right?

A. `out.println(c*8);`
B. `out.println(c/8);`
C. `out.println(c*3);`
D. `out.println(c/3);`
E. There is no output in the code to the right due to an error.

```
int c = 1000;
int d = 3;
out.println(c>>>d);
```

QUESTION 27

What are the first two outputs produced by the client code below using the method to the right?

```
int [] list = {5,-7,3,9,4,8,-3, 1,-5, 0};
Arrays.sort(list);
out.println(doStuff(list,5)+" ");
```

A. `m=4 m=7`
B. `m=5 m=7`
C. `m=5 m=8`
D. `m=4 m=6`
E. None of these

```
public static int doStuff(int[] el,
                  int t){
 int f = 0;
 int r = el.length - 1;
 while (f <= r) {
  int m = (f + r) / 2;
  out.println("m="+m+" ");
   if (t < el [m]){
           r = m - 1;
   }
   else if(t>el [m]){
      f = m + 1;
   }
   else{
      return m;
   }
 }
 return -1;
}
```

QUESTION 28

Which choice below will output **`false`** when placed into **`<string>`** in the code segment to the right?

A. `"a"` B. `"ab"` C. `"aaabb"`

D. `"aaabaab"` E. `"aaaaab"`

```
Pattern p = Pattern.compile("aa*b*");
Matcher m;
m = p.matcher(<string>);
out.println(m.matches());
```

QUESTION 29

In the code segment to the right, how many outputs start with `'c'`?

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

```
int [] temp = {32,99,53,81,67,72,45};
for(int t:temp)
  out.println(t<40?"cold":t<70?"cool"
              :t<80?"warm":"hot");
```

QUESTION 30

Which choice below correctly replaces **<statement>** in the code segment to the right so that the Animal class constructor is properly included in the process?

A. `super(b)`
B. `super(back)`
C. `Animal(b)`
D. `Animal(back)`
E. None of these

QUESTION 31

Assuming **<statement>** in the code to the right has been correctly replaced, which choice should replace **<parameters>** in the client code below in order to output **"moll"** using the code segment to the right?

```
Animal one = new Class(<parameters>);
out.println(one);
```

A. `true,0` B. `false,1` C. `true,2`
D. `false,3` E. `true,4`

QUESTION 32

Again assuming the code to the right works properly, what is the mode of the output generated by the code segment to the right using the client code below?

```
boolean[]list={true,false,true,true,true,true,
        false,true,false,true,false,true,true};
int x=0;
for(boolean b:list)
  out.println(new Class(b,x++%5));
```

A. `mammal` B. `flat` C. `amph`
D. `bird` E. `proto`

```
class Animal{
     boolean back;
     Animal(boolean t){back=t;}
}
class Class extends Animal{
 String clss;
 Class(boolean b,int x){
 <statement>
 if(back)
  switch(x){
   case(0):clss="mammal";break;
   case(1):clss="fish";break;
   case(2):clss="amph";break;
   case(3):clss="rept";break;
   default:clss="bird";
  }
 else
  switch(x){
   case(0):clss="proto";break;
   case(1):clss="flat";break;
   case(2):clss="arth";break;
   case(3):clss="moll";break;
   default:clss="echino";
  }
 }
 public String toString(){
  return clss;}
}
```

QUESTION 33

How many levels *(a tree with one node has one level)* are there in a complete binary tree that contains 40 nodes?

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

QUESTION 34

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

A. `c` B. `15` C. `2a` D. `32`
E. All are

```
out.println(Integer.toHexString(12));
out.println(Integer.toHexString(21));
out.println(Integer.toHexString(42));
out.println(Integer.toHexString(50));
```

QUESTION 35

Using the generic queue pseudocode on the right (push means enqueue, pop means dequeue), what value is at the front of the queue after the push/pop sequence is completed?

A. `2` B. `5` C. `6` D. `7` E. `9`

```
Push 3,Push 9,Push 6,Push 7,Pop x,
Pop x, Push 5,Pop x, Push 2,Pop x
```

QUESTION 36

What is output by the code segment to the right?

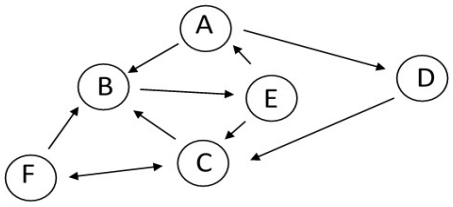
A. `nox mork slup snuff`
B. `goram mork narf snuff`
C. `b e a d`
D. There is no output due to a compile error
E. There is no output due to a runtime error

```
String[]one={"narf","goram",
          "verse","snuff","mork",
          "slup","nox"};
char[]two={'a','b','c','d','e'};
Map<Character,String> m = new
 HashMap<Character,String>();
int x=0;
for(String s:one)
 m.put(two[x++%5],s);
String s = "bead";
for(x=0;x<s.length();x++)
 out.print(m.get(s.charAt(x))+" ");
```

QUESTION 37

In the graph shown to the right, how many paths of length 2 are there?

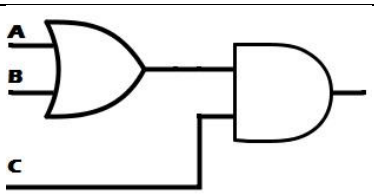
A. less than 5
B. between 5 and 9, inclusive
C. between 10 and 14, inclusive
D. between 15 and 19, inclusive
E. 20 or more



QUESTION 38

How many ordered triples of true/false signals (like `(0,0,0)` or `(1,1,1)`) will make the digital electronics diagram on the right produce a final signal that is true?

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



QUESTION 39

Free Response Question:

Find f(2) according to the recursive function definition shown on the right.

f(2) =

```
        f(x+1)+4     when 10<x<=20
f(x)=   f(2x)-1      when x<=10
        2            otherwise
```

QUESTION 40

Free Response Question:

Convert the expression below into the equivalent postfix expression.

`+ - W / * 0 R L D`