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 142_{10} - 86_{16} ?

A. 8_{16} B. 8_{8} C. 1000_{2} D. 8_{10} E. All are equivalent

QUESTION 2

What is the result of the expression to the right?

```
19 + 3 % 5 - 7
```

A. -5 B. -3

C. 10 D. 12 E. 15

QUESTION 3

What is output by the code to the right?

```
System.out.printf("%5.2f",130.563);
```

A. 30.56 B. 130.6 C. 130.56

D. 130.563 E. There is no output due to an error

QUESTION 4

What is output by the code to the right?

```
String s = " WINTERISCOMING";
s=s.replaceAll("I.","OZ");
out.println(s);
```

A. WOZTEROZCOMOZG

B. WOZNTEROZSCOMOZNG

C. WOZ.TEROZ.COMOZ.G

D. WINTERISCOMING

E. There is no output due to an error

QUESTION 5

What is output by the code to the right?

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

A. true B. false

QUESTION 6

What is output by the code to the right?

```
int x = 81;
double y = 0.25;
out.println(Math.pow(x,y));
```

A. 3.0 B. 9.0

C. 20.25 D. 27.0

E. There is no output due to an error

QUESTION 7

What is output by the code to the right?

```
int g = 10;
double d = 3.16;
g *= d;
out.printf("%d",g);
```

A. 31.6 B. 31.0 C. 31 D. 30

E. There is no output due to an error.

QUESTION 8

What is output by the code to the right?

```
int a = -15;
if(a % -3 > 0)
 out.println(a % -3);
else
 out.println(a / -3);
```

A. -5 B. 5 C. 0 D. -3

E. There is no output due to an error.

QUESTION 9

What is output by the code to the right?

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

E. There is no output due to an error.

```
int x = -100;
do{}while((x+=3)<0);
out.println(x);
```

QUESTION 10

What is output by the code to the right?

A. 2 2 -3 B. -3 2 -3 C. 2 -3 -3

D. 2 2 2 E. There is no output due to an error.

```
int list1[]={-5,-6,4,2,-3,7};
int []list2 = list1;
int list3[] = list1.clone();
list2[4]=list3[3];
out.println(list1[4]+" "+
            list2[4]+" "+list3[4]);
```

QUESTION 11

Below are values in a data file called **"stuff.dat"**.

```
3
Cat
Dog
Pig
```

What is output by the code to the right?

A. Cat-Dog-Pig-

B. 3-Cat-Dog-

C. 3-Cat-Dog-Pig-

D. 3--Cat-

E. There is no output due to an error.

```
Scanner f =
  new Scanner(new File("stuff.dat"));
out.print(f.next());
out.print("-");
out.print(f.nextLine());
out.print("-");
out.print(f.nextLine());
out.println("-");
```

QUESTION 12

What is output by the code to the right?

A. 0 1 B. 127 -128 C. 127 128

D. There is no output due to an infinite loop.

E. There is no output due to an error.

```
byte a = 0, b = 1;
do{
 a+=b;
 b*=2;
}
while(a<b);
out.println(a+" "+b);
```

QUESTION 13

To the right are three lines taken from the Java Order of Precedence chart. Which choice represents the correct order of precedence for these three lines?

A. III, I, II B. I, II, III C. I, III, II

D. III, II, I E. II, I, III

I. *expr*++ *expr*--
II. == !=
III. &&

QUESTION 14

Which of the following choices represents the storage limit of precision in decimal places for a float value?

A. 7 B. 15 C. 23 D. 32 E. 52

QUESTION 15

What is output by the code to the right?

A. 7

B. 8

C. 11

D. 15

E. There is no output due to an error.

```
int [] pList1 = {4,2,3,7,5,9,1};
ArrayList<Integer> aList1 =
   new ArrayList<Integer>();
for(int a:pList1)
  aList1.add(a);
int [] pList2 = {7,5,3,1,8,3,0,3};
ArrayList<Integer> aList2 =
  new ArrayList<Integer>();
for(int a:pList2)
  aList2.add(a);
aList1.addAll(4,aList2);
out.println(aList1.size());
```

QUESTION 16

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

```
int[]  list = {5,7,3,9,4,6};
sort(list);
outputList(list);
```

A. `3 4 5 6 7 9`

B. `9 7 6 5 4 3`

C. `5 7 3 9 4 6`

D. `6 4 9 3 7 5`

E. not possible to determine

```
public static void sort(int[] list)
{
 int n = list.length;
 int[] temp = new int[n];
sorter(list, 0, n - 1, temp);
}
private static void sorter(int[] list,
 int front, int back, int[] temp)
{
// <statement 1>
 if (front < back)
 {
//<statement 2>
 int mid = (front + back) / 2;
sorter(list, front, mid, temp);
sorter(list, mid + 1, back, temp);
doIt(list, front, mid, back, temp);
 }
}
private static void doIt(int[] list,
 int front, int mid, int back, int[] temp)
{
        int i = front;
        int j = mid + 1;
        int k = front;
// <statement 3>
        while (i <= mid && j <= back){
// <statement 4>
               if (list[i] > list[j]){
                        temp[k] = list[i];
                        i++;
               }
               else{
                       temp[k] = list[j];
                       j++;
               }
               k++;
        }
// <statement 5>
        while (i <= mid){
           temp[k] = list[i];
           k++;
           i++;
        }
       while (j <= back) {
               temp[k] = list[j];
               j++;
               k++;
        }
       for(int x=front;x<=back;x++)
               list[x]=temp[x];
}
public static void outputList(int[]list){
       for(int x=0;x<list.length;x++)
               out.print(list[x]+" ");
       out.println();
}
```

QUESTION 17

In the code to the right, which of the lines below the five indicated <statements> needs to be altered in order to reverse the order of the sort?

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

QUESTION 18

What sort is this an example of?

A. bubble sort
B. selection sort
C. merge sort
D. quick sort
E. insertion sort

QUESTION 19

What is the least restrictive running time for the best case scenario for this sort algorithm?

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

QUESTION 20

Which of the following choices represents the decimal equivalent of the two's complement binary value **10000001**?

A. -129 B. -128 C. -127 D. -126 E. -125

QUESTION 21

What is output by the code to the right?

A. `e` B. `E` C. `d` D. `D`

E. There is no output due to an error.

```
long x = 97;
char a = 32;
double d = 3.5;
out.println((char)(x-a+d));
```

QUESTION 22

Which of the following replaces each instance of **<*1>** in the code to the right to declare integer values accessible everywhere as a Mascot class constant?

A. `public static int`
B. `public final int`
C. `public static final int`
D. `static public int`
E. More than one of these

QUESTION 23

For the remaining questions, assume **<*1>** has been filled in correctly.

Which of the following builds a `Map` named `m` which can be used to map from schools to mascots?

A. `Map m = new Map();`
B. `Map m = new Map(School, Mascot);`
C. `Map m = new HashMap(Mascot, School);`
D. `Map m = new TreeMap(School->Mascot);`
E. None of these

QUESTION 24

Assume that `Map m` has been built correctly, and that the objects `School abilene` and `Mascot eagle` have been built correctly. Which of these adds to `Map m` the key `abilene` with value `eagle`?

A. `m.put(abilene.name,eagle.name);`
B. `m[abilene] = eagle;`
C. `m.put(abilene->eagle);`
D. `m.put(abilene,eagle);`
E. None of these

QUESTION 25

Which of the following can be run outside `class Mascot` to check whether the mascot associated with `School LT` in `Map m` is an animal?

A. `m.get(LT).isAnimal()`
B. `m.get(LT).type == Mascot.ANIMAL`
C. `((Mascot)m.get(LT)).isAnimal()`
D. `((Mascot)m.get(LT)).type == ANIMAL`
E. More than one of these

```
class School {

// methods and constructors not shown

  private String name;
  private boolean publicSchool;
  private int enrollment;
}

class Mascot {

  boolean isAnimal() {
    return type == ANIMAL;
  }

//other methods and constructors not
// shown

  private String name;
  private int type;

  <*1> ANIMAL = 0;
  <*1> HUMAN = 1;
  <*1> COLOR = 2;
  <*1> OTHER = 3;
}
```

QUESTION 26

What is output by the code to the right?

A. `Wed Dec - -:-:- CST -`
B. `Wed Dec -- --:--:-- CST -`
C. `-03-07-00-25-2014-`
D. `--------03-07-00-25-----2014-`
E. There is no output due to an error

```
String s;
s = "Wed Dec 03 07:00:25 CST 2014";
args=s.split("\\D+");
for(String t:args)
 out.print(t+"-");
```

QUESTION 27

Which of the segments of code on the right will produce the output shown below?

```
*****
****
***
**
*
```

A. I
B. II
C. III
D. Exactly two of these
E. All of these

I.
```
int r=4;
do{
 int c=0;
 while(c++<=r)
    out.print("*");
 out.println();
}while(r-->0);
```

II.
```
int r=4;
do{
 int c=r;
 while(c-->=0)
    out.print("*");
 out.println();
}while(r-->0);
```

III.
```
int r=0;
do{
 int c=r;
 while(c-->=0)
    out.print("*");
 out.println();
}while(r++<4);
```

QUESTION 28

Which of the following is not a subclass of `Object`?

A. `String` B. `TreeSet` C. `Comparable` D. `Integer` E. `HashMap`

QUESTION 29

What is output by the code to the right?

A. `8 r 9 x 9 y 8 z 9 x`
B. `8 r 9 x 9 y 8 z 9 e`
C. `8 r 9 x 10 o 8 z 9 x`
D. `8 z 9 x 10 o 8 z 9 x`
E. `8 z 9 x 10 o 8 z 9 e`

```
char[][]list =
{"superman".toCharArray(),
 "spiderman".toCharArray(),
 "boy wonder".toCharArray(),
  null,null};
list[3]=list[0];
list[4]=list[1].clone();
list[1][4]='x';
list[2][4]='y';
list[3][4]='z';
for(char[]a:list)
 out.print(a.length+" "+
           a[a.length/2]+" ");
```

QUESTION 30

What is output by the client code 1 to the right?

A. `36` B. `38`
C. `43` D. `48` E. `53`

QUESTION 31

What is output by the client code 2 to the right?

A. `36` B. `38`
C. `43` D. `48` E. `53`

```
static int mystNum(int a,int n)
{
  while(n<7){
     a+=n++;
  }
  do{
     a+=++n;
  }while(!(n>8));
  return a;
}
//client code 1
out.println(mystNum(0,0));
//client code 2
out.println(mystNum(5,1));
```

QUESTION 32

Using the commands listed to the right, what was the third value popped, and which item would be popped next after all the commands have been processed?

A. `2 6` B. `7 7`

C. `4 6` D. `7 5`

E. None of these

```
Push 3
Push 7
Push 6
Push 1
Pop x
Push 4
Push 5
Pop x
Push 7
Pop x
Pop x
Push 2
Pop x
```

QUESTION 33

Which ordered pairs make this boolean expression false? $\overline{B} + A * B$

I. (0,0)
II. (0,1)
III. (1,0)
IV. (1,1)

A. I only B. II only C. III and IV only D. I, III, and IV only E. I and II only

QUESTION 34

Which of the infix expressions below matches the postfix expression shown?

`T R ^ I T - - O N * +`

A. **`T ^ R - I - T + O * N`** B. **`T ^ R - (I - T) + O * N`** C. **`T ^ R - (I - T) * O + N`**

D. **`T ^ R - (I + T) - O * N`** E. None of these

QUESTION 35

What is output by the code to the right?

```
424
159
50
6
8
```

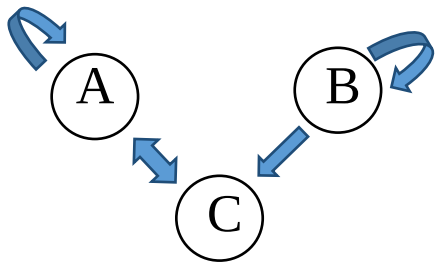
A. `6` B. `8` C. `50`

D. `159` E. `424`

```
int c = 53;
c<<=3;
out.println(c);
```

QUESTION 36

How many paths of length two or four are there from A to C in the graph shown below?



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

QUESTION 37

Which of the values shown below is **NOT** a possible outcome of the code shown to the right?

A. 45 B. 46 C. 47 D. 48 E. 49

```
Random r = new Random();
for(int x=0;x<10;x++)
 out.println(r.nextInt(4)+45);
```

QUESTION 38

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

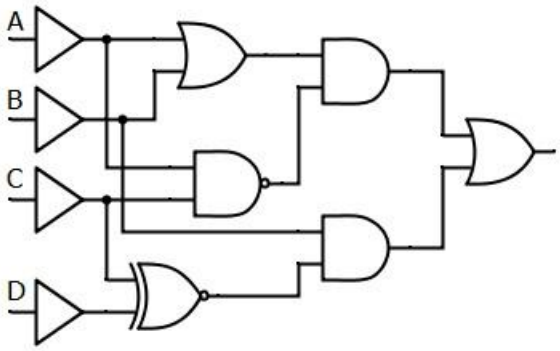
A. $A + B * \overline{A * C} + B * \overline{C \oplus D}$

B. $(A + B) * \overline{A * C} + B * \overline{C \oplus D}$

C. $(A * B) + \overline{A + C} * B + \overline{C \oplus D}$

D. $(A \oplus B) * \overline{A * C} \oplus B * \overline{C + D}$

E. None of these



QUESTION 39

What is the output of the client code shown below? _____

```
 static int x(int a, int b){
  if(a>10 || b>2)
    return x(a-4,b-2)+2;
  if (a>=2&&a<=9&&b>1){
    a-=2;b-=2;return x(a,b)+3;
  }
  if(a<2&&b<1)
    return 3;
  return x(a+3,b+1);
  }
//client code
out.println(x(9,6));
```

QUESTION 40

Simplify the Boolean Algebra expression shown below as much as possible. _____

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