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 the following is equivalent to $41_{16} + 31_{10} + 21_8 + 11_2$?

A. $C4_{16}$ B. 116_{10} C. 1111010_2 D. 164_8 E. More than one of these

QUESTION 2

What is output by the code to the right?

A. 2 B. 274 C. 34 D. 17 E. 19

```
int i = 17;
i = i * (i - 15);
out.println(i);
```

QUESTION 3

What is output by the code to the right?

A. `d = 21.346` B. `d = 21.347`

C. `d = 21.3` D. `d = %.3d, 21.346`

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

```
double d = 21.3469;
out.printf("d = %.3d", d);
```

QUESTION 4

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

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

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

E. None of these because the output is always true

```
if((p&&q)||(p||q))
   out.println("true");
else
   out.println("false");
```

QUESTION 5

What is output by the code to the right?

A. null B. `true` C. `false` D. `""`

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

```
String s = null;
out.println(s.isEmpty());
```

QUESTION 6

Which of the following is NOT a possible output by the code to the right?

A. `5554535051` B. `5050505050` C. `5051525354`

D. `5054525153` E. `5453525450`

```
int x = 5;
int y = 50;
for(int i = 0; i < 5; i++)
{
 out.print((int)(Math.random()*x)+y);
}
```

QUESTION 7

What is output by the code to the right?

A. `36` B. `18` C. `26` D. `11` E. `21`

```
int r = 2; int s = 5; int t = 4;
r *= s + t * r;
out.println(r);
```

QUESTION 8

What is output by the code to the right?

A. `logcatat` B. `log` C. `logat`

D. `catat` E. `cataata`

```
String word = "catalogue";
if(word.charAt(2) > word.charAt(5))
   out.print(word.substring(4,7));
else
   out.print(word.substring(0,3));
   out.print(word.substring(1,3));
```

QUESTION 9

What is output by the code to the right?

A. `258111417` B. `2581114` C.`35791113`

D. `3691215` E. `36912`

```
for(int i = 2; i < 15; i = i + 3)
{
    out.println(i+1);
}
```

QUESTION 10

What is output by the code to the right?

A. `3` B. `15` C. `18` D. `4` E. `1`

```
int sum = 0;
int[] num = {0,1,2,3,4,5,6,7,8,9};
for(int i = 0; i < num.length; i++)
{
   if(num[i] % 3 == 2)
      sum++;
}
out.println(sum);
```

QUESTION 11

If the following String : `"Horde vs. Alliance!"` is entered into the program on the right, what is the output?

A. `15 n` B. `19 i`

C. `17 n` D. `19 l`

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

```
Scanner sc = new Scanner(in);
out.print("Enter a String:: ");
String s = sc.nextLine();
out.print(s.length() + " " );
out.println(s.charAt(s.length()-6));
```

QUESTION 12

What is output by the code to the right ?

A. `68.0000` B. `17.6667` C. `81.0000`

D. `70.6667` E. `18.0000`

```
int x = 23; int y = 31;
double sum = 0.0;
for(double i = x; i < y; i++)
{
   sum = sum + i/3;
}
out.printf("%.4f",sum);
```

QUESTION 13

If j = 5 and k = 6, what is output by the code to the right ?

A. `true` B. `false`

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

```
if((k-=3+2)!=0 && (j+=7*2)/(k-=3-2)>15)
{
   out.println("true");
}
else {
   out.println("false");
}
```

QUESTION 14

What is output by the code to the right ?

A. `-1` B. `1`

C. `0` D. `-0`

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

```
out.println(Integer.MAX_VALUE + Integer.MIN_VALUE);
```

QUESTION 15

What is output by the code to the right ?

A. `39575`

B. `3595`

C. `37559`

D. `3955`

E. none of these

```
ArrayList<Integer> list;
list = new ArrayList<Integer>();
list.add(3);
list.add(7);
list.add(5);
list.set(1,5);
list.add(1,9);
for(int i = 0;i < list.size(); i++)
  out.print(list.get(i));
```

QUESTION 16

How many accessor methods are shown in the class definition on the right?

A. 0

B. 1

C. 2

D. 3

E. 4

QUESTION 17

What is the output from the client code print statement **<1>**?

A. Name: Shenzu Faction: Undecided

B. Name: Shenzu Faction: undecided

C. Name: Shenzu Faction: Alliance

D. Name: Shenzu Faction: Horde

E. None of the above

QUESTION 18

What is the output from the client code print statement **<2>**?

A. Horde: 3 Alliance: 1 Undecided: 0

B. Horde: 3 Alliance: 1 Undecided: 1

C. Horde: 2 Alliance: 1 Undecided: 0

D. Horde: 2 Alliance: 1 Undecided: 1

E. None of the above

```
class MyToons {
  private String name;
  private String faction;
  private static int totalHorde;
  private static int totalAlliance;
  private static int totalUndecided;

  public MyToons(String n, String f){
     name = n;
     faction = f;
     if(of.equalsIgnoreCase("Horde"))
       totalHorde++;
     else if(of.equalsIgnoreCase("Alliance"))
         totalAlliance++;
     else if(of.equalsIgnoreCase("Undecided"))
         totalUndecided++;
  }

  public void changeFaction(String of, String nf){
     faction = nf;
     if(nf.equalsIgnoreCase("Horde"))
       totalHorde++;
     else if(nf.equalsIgnoreCase("Alliance"))
       totalAlliance++;
     else if(nf.equalsIgnoreCase("Undecided"))
       totalUndecided++;
     if(of.equalsIgnoreCase("Horde"))
       totalHorde--;
     else if(of.equalsIgnoreCase("Alliance"))
       totalAlliance--;
     else if(of.equalsIgnoreCase("Undecided"))
       totalUndecided--;
  }

  public static String getTotals(){
     return "Horde: " + totalHorde +
        "\tAlliance: " + totalAlliance +
        "\tUndecided: " +  totalUndecided;
  }

  public String toString(){
     return "Name: " + name + "\tFaction: " + faction;
  }
}

////////////// client code ////////////
MyToons a = new MyToons("Dranosh", "Horde");
MyToons b = new MyToons("Shenzu", "Horde");
MyToons c = new MyToons("Warmheart", "Alliance");
MyToons d = new MyToons("Zindalia",  "Horde");
b.changeFaction("Horde", "undecided");
out.println(b);                    //<1>
out.println(MyToon.getTotals());   //<2>
```

QUESTION 19

What is output by the code to the right ?

A. 0 B. 3 C. 6 D. 8

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

```
int[][] dray = new int[4][5]
for(int r = 1; r < 4; r++)
   for(int c = 0; c < 4)
      dray[r][c] = dray[r-1][c+1]+2;
out.println(dray[3][1]);
```

QUESTION 20

What is output by the code to the right ?

A. -2 B. -1 C. 1 D. 2

E. none of the above

```
int x = 27;  int y = -15;
x = x >> 2;
y = y >> 1;
out.println(x + y);
```

QUESTION 21

What is output for `//client code part 1` in the code to the right?

A. name Aurora

B. name null Aurora

C. name Aurora name

D. Aurora name null

E. name Aurora null

QUESTION 22

What is output for `//client code part 2` in the code to the right?

A. Maleficent Aurora null

B. Maleficent null Diaval

C. Maleficent Aurora name

D. Maleficent Aurora Diaval

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

QUESTION 23

What is output for `//client code part 3` in the code to the right?

A. Maleficent Aurora Stefan

B. Maleficent name Thistlewit

C. Maleficent Aorora Thistlewit

D. Maleficent Maleficent Thistlewit

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

QUESTION 24

What is output for `//client code part 4` in the code to the right?

A. Maleficent name Diaval

B. Flittle Aurora Diaval

C. Flittle Thistlewit null

D. Maleficent Aurora Diaval

E. There is no output due to an error.

```
class One
{
     String s;
     One() {s="name";}
     One(String n) {s=n;}
     String getName() {return this.s;}
     public String toString()
               {return s;}
}

class Two extends One
{
     String s;
     Two() {super("Aurora");}
     Two(String n) {s=n;}
     void setName(String p) {s=p;}
     public String toString()
         {return super.s+" "+s;}
}

////////////////////////////////////
//client code part 1
One a = new One();
One b = new Two();
out.println(a+" "+b);

////////////////////////////////////
//client code part 2
a = new One("Maleficent");
Two c = new Two("Stefan");
c.setName("Thistlewit");
out.println(a+" "+b.getName()+""+c.getName());

////////////////////////////////////
//client code part 3
b=a;
out.println(a+" "+b.getName()+" "+c.s);

////////////////////////////////////
//client code part 4
a=b;
b.setName("Flittle");
Two d = new Two();
d.setName("Diaval");
out.println(a.getName() + d);
```

QUESTION 25

What is output by the code to the right?

A. 18 B. 31

C. 36 D. 55

E. 134

```
int[] nums = {1,2,4,7,11,12,18,21,27,31};
int sum = 0;
for(int y : nums) {
   if(y%2==0)
      sum = nums[y/2];
}
out.println(sum);
```

QUESTION 26

What is output by the code to the right?

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

E. 5

```
Stack<Integer> stack = new Stack<Integer>();
stack.push(5);
stack.push(4);
stack.push(3);
stack.push(2);
stack.push(1);
stack.push(0);
out.println(stack.search(4));
```

QUESTION 27

What is output by the code to the right?

A. itisallamystery

B. Whythisthingsamystery

C. italldoesreallymatter

D. thisisameantest

E. Somefindthisdoesmatter

```
String[][] words = new String[5][5];
words[0]="I find it very funny".split(" ");
words[1]="What does this all mean".split(" ");
words[2]="Why is a test questionable".split(" ");
words[3]="Some things really do matter".split(" ");
words[4]="CS is filled with mystery".split(" ");
out.println(words[0][2]+words[2][1]+words[1][3]+
words[2][2]+words[4][4]);
```

QUESTION 28

What is returned by mystery(7)?

A. 1 B. 30 C. 34

D. 38 E. 42

```
public static int mystery(int x){
   if(x<1)
      return 1;
   else
      return x+ mystery(x-2)+ mystery(x-3);
}
```

QUESTION 29

What is the result of $f(7,4)$ given:

A. 21 B. 28 C. 36

D. 45 E. 55

$$f(x,y)=\begin{cases} x+f(x-1,y) & \text{if } x>y \\ x+f(y-2,x) & \text{if } x=y \\ x+y & \text{if } x<y \end{cases}$$

QUESTION 30

What is output by the code to the right?

A. 37 B. 147

C. 30 D. 13

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

```
int p = (7 & 15) + (5 ^ 3);
out.println(p);
```

QUESTION 31

Looking at the code to the right, if *x* is assigned a value greater than 1000, what is the maximum number of comparisons necessary for the binary search to determine *x* is not in the array?

A. 5 B. 10 C. 12

D. 100 E. 500

```
int x;
int[] ray = new int[1000];
for(int i=1;i<=1000;i++)
{
  ray[i-1]=i;
}
out.println(Arrays.binarySearch(ray,x));
```

QUESTION 32

What is output by the code to the right?

A. 123456789101098765432 1

B. 01234567899876543210

C. 01234567890987654321

D. 12345678909876543210

E. 98765432100123456789

```
int[] ray = new int[10];
Set mySet = new TreeSet<Integer>();
for(int i=1;i<10;i++)
{
  ray[i-1]=i;
}
for(int j=0;j<ray.length;j++)
     mySet.add(ray[j]);

Iterator<Integer> it = mySet.iterator();
while(it.hasNext())
   System.out.print(it.next());
for(int x=ray.length-1;x>=0;x--)
   System.out.print(ray[x]);
```

QUESTION 33

What is the output if **< *1 >** reads: `s.peek()`

A. 12 B. 14 C. 16
D. 15 E. 7

QUESTION 34

What is the output if **< *1 >** reads: `s`

A. [3 7 6 7 9 7 12 7 15]

B. [7 7 7 7 7 15]

C. [3 6 9 12 15]

D. [7 7 7 7]

E. [15 7 7 7 7]

```
Stack <Integer> s;
s = new Stack<Integer>();
int i, x=7;
for(i = 0; i < 16; i++){
 if(i % 3 == 0)
    s.push(i);
 else if (i % 3 == 2)
    s.push(x);
 else
    s.pop();
 }
 out.println( < *1 > );
```

QUESTION 35

What is output by the code to the right?

A. 9 B. 10 C. 11
D. 12 E. 13

```
String s = "pearl harbor dec 7 1941";
String[] t = s.split("[a-e 0-6]");
out.println(t.length);
```

QUESTION 36

Which of the following would represent a post-order traversal of the binary tree on the right?

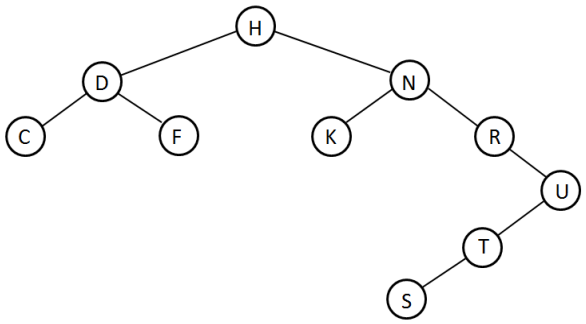
A. C D F H K N R S T U

B. H D C F N K R U T S

C. U T S R N K H F D C

D. C F D K S T U R N H

E. S T U C F K R D N H

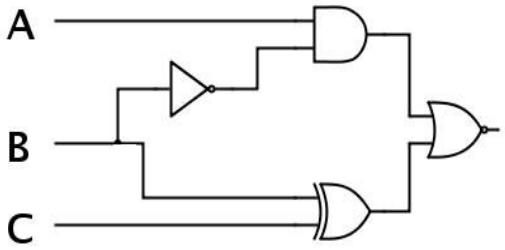


QUESTION 37

How many three-way combinations of true and false will make the digital electronics diagram to the right evaluate to true?

A. 1 B. 2 C. 3

D. 4 E. 5



QUESTION 38

What is the answer to the following prefix expression if x=2?

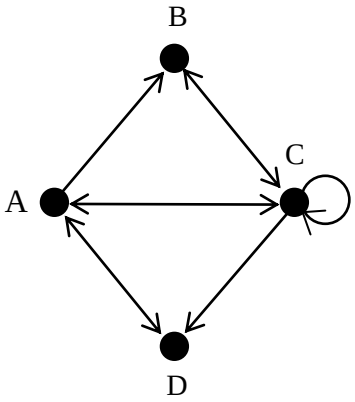
A. 27 B. 29 C. 30

D. 33 E. 42

```
+ - + ↑ X 3 * 3 ↑ X 3 * 3 X 3
```

QUESTION 39

In the graph to the right, how many regular paths of length 3 exist starting only at vertex C? (In a regular path edges can be used more than once.)



QUESTION 40

Given a binary search tree that has the following values inserted in the order listed, what is the sum of the values contained in the longest "root-to-leaf" path? (A root-to-leaf path is defined as the path from the root proceding downward to a leaf.)

12 7 9 19 22 5 2 8 4 13 14

(You may use this area to find the solution.)