Note: Correct responses are based on Java, J2sdk v 5.0, 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.

QUESTION 1

What is 23_8 plus 36_8 ?

A. 48_{10} B. 110001_2 C. 110011_2 D. 101110_2 E. 302_4

QUESTION 2

What is output by the code to the right?

A. 12 B. 11 C. 36 D. 1 E. 30

```
int a = 5 * 6;
System.out.println(a);
```

QUESTION 3

What is output by the code to the right?

A. 5 B. 7 C. 4 D. 6 E. 0

```
int b = 5;
int c = b++;
System.out.println(c);
```

QUESTION 4

What is output by the code to the right?

A. fund B. nfun

C. funn D. dfun

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

```
String d = "fun";
char let = d.charAt(2);
System.out.print(let + d);
```

QUESTION 5

What is output by the code to the right?

A. 5 B. 4 C. 7 D. 2 E. 9

```
int[] array = {2, 4, 3, 1, 5};
System.out.print(array[3] + 4);
```

QUESTION 6

What is output by the code to the right?

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

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

```
int e = 3;
double f = 1.5;
e -= f;
System.out.print( (int)e );
```

QUESTION 7

What is output by the code to the right?

A. true

B. 1

C. false

D. 0

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

```
boolean g = true;
boolean i = false;
boolean h = g && (!i || !g);
System.out.println(h);
```

QUESTION 8

What is output by the code to the right?

A. 013

B. 03

C. 012

D. 3

E. 12

```
int k = 4;
int m = 5;
if ( k * m < 20 )
  System.out.print(0);
if ( k * 7 > m * 5)
  System.out.print(1);
System.out.print(2);
```

QUESTION 9

Which of the following could replace **<*1>** in the client code at right?

A. `new Trophy();`

B. `new Trophy(3,"rd");`

C. `new Trophy(1);`

D. A and B only

E. A, B, and C

QUESTION 10

What type of method is method `toString()`?

A. modifier

B. fixerupper

C. accessor

D. A and B only

E. A, B, and C

```
public class Trophy
{
   private String suffix;
   private int place;

   public Trophy(int p, String s)
   {
      place = p;
      suffix = s;
   }

   public String toString()
   {
      return place + suffix;
   }
}

//////////////////////////////////////////
//client code
Trophy t = <*1>
```

QUESTION 11

What is output by the code to the right?

A. `TH\\\\AT`

B. `THAT`

C. `TH\AT`

D. `TH    AT`

E. `TH\\AT`

```
System.out.print("TH\\\\AT");
```

QUESTION 12

What is output by the code to the right?

A. `0`

B. `-4`

C. `-3`

D. `3`

E. `4`

```
int shift = -15;
System.out.print(shift>>2);
```

QUESTION 13

What is output by the client code to the right?

A. `-1`

B. `0`

C. `2`

D. There is no output due to a syntax error in the code.

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

```
public static String su(String a)
{
  return a + "abc";
}

//////////////////////////////////////////
//client code
String first = "dog";
String second = su(first);
System.out.print(first.indexOf(second));
```

QUESTION 14

What is output by the line marked `//1` in the client code to the right?

A. `1`

B. `0`

C. `-1`

D. `2`

E. `-2`

```
public static int doIt(String word)
{
  int end = word.length()-1;
  return word.charAt(0)-word.charAt(end);
}

////////////////////////////////////////
//client code
out.println(doIt("applepub"));    //1
```

QUESTION 15

What is output by the code to the right?

A. `0`

B. `3`

C. `5`

D. `8`

E. `7`

```
String j = "valentinesday";
System.out.print(j.lastIndexOf("e"));
```

QUESTION 16

What is output by the code to the right?

A. `6`

B. `4`

C. `0`

D. `3`

E. `8`

```
int bug = 3;
switch(bug){
  case 2 : bug = bug + 2;
  case 3 : bug = bug / 2;
  case 4 : bug = bug * 2;
  case 5 : bug = bug - 2;
}
System.out.println(bug);
```

QUESTION 17

What is output by the code to the right?

A. `-2`

B. `0`

C. `-1`

D. `1`

E. `-3`

```
int trap = 28;
do
{
  trap = trap - 3;
}while(trap > 0);
System.out.println(trap);
```

QUESTION 18

Which of the following can NOT be used in a `switch` statement?

A. `short` B. `Integer` C. `byte` D. `double` E. `char`

QUESTION 19

What is the output by the code to the right?

A. `9101215`

B. `3102136`

C. `791113`

D. `13141619`

E. `0000`

```
int xx = 3;
int[][] mat = new int[4][4];
for(int r = 0; r < mat.length; r++)
  for(int c = 0; c < mat[0].length; c++){
     mat[r][c] = xx;
     xx += r + c;
  }
for(int c = 0; c < mat.length; c++){
  System.out.print(mat[1][c]);
}
```

QUESTION 20

What is the output by the code to the right?

A. `5@()`
B. `4P55Wrded`
C. `3P55Wrded`
D. `1P@55W()rded`
E. `6PWrded`

```
String b4 = "P@55W()rded";
String[] broken = b4.split("\\W");
System.out.print(broken.length);
for(String s: broken)
  System.out.print(s);
```

QUESTION 21

Why can the method `sort` sort the array passed from the method `clientCode` without reassigning the array to a returned value?

A. `clientCode` is in the same file as `sort`.
B. `list` in `clientCode` shares the same name as in `sort`.
C. Arrays are passed by value.
D. Arrays are passed by reference.
E. This is a logic error, as the array is not actually sorted.

QUESTION 22

What is the output by the code to the right when method `clientCode` is called?

A. `122474578`
B. `278474521`
C. `244521778`
D. `827474521`
E. `122445778`

QUESTION 23

What sorting algorithm is implemented by method `sort`?

A. Mergesort
B. Quicksort
C. Bubble sort
D. Insertion sort
E. Selection sort

QUESTION 24

If the value of parameter `k` is greater than the length of `list`, and an array of integers in random order is passed in, what is the expected running time of method `sort`? Choose the most restrictive correct answer.

A. O(NlogN)
B. O(N)
C. $O(N^3)$
D. O(1)
E. $O(N^2)$

```
public static void sort(int[] list, int k){
  int m = 0;
  for(int i = 1; i < list.length; i++)
  {
     m++;
     if(m == k)
        return;
     int q = list[i];
     int j = i - 1;
     for(; j >= 0 && q < list[j]; j--)
        list[j+1] = list[j];
     list[j+1] = q;
  }
}

public static void clientCode(){
  int[] list = {8,2,7,4,7,4,5,2,1};
  sort(list,3);
  for(int t: list){
     System.out.print( t );}
}
```

QUESTION 25

What is the output by the method call `whoot(5,6)`?

A. `10`

B. `12`

C. `14`

D. `16`

E. `18`

```
public static int whoot(int a, int b){
  if(b <= 0)
     return 1;
  if(a % 2 == 0)
     return whoot(a - 1, b) + b;
  else
     return whoot(a - 1, b - 1) - a;
}
```

QUESTION 26

Which of the following could replace **`<*1>`** in the code to the right so that `names` and `it` could only refer to `String` objects?

A. `<String>`

B. `(String)`

C. `[String]`

D. `{String}`

E. `-String-`

Assume question 26 was filled correctly.

QUESTION 27

What is output by the line marked `//1` in the code to the right?

A. `[Duck, Birdy, Turkey, Raven, It]`

B. `[Turkey, Birdy, Raven, Duck, It]`

C. `[Duck, Turkey, Raven, Birdy, It]`

D. `[Duck, Turkey, Birdy, Raven, It]`

E. `[Duck, Raven, Birdy, Turkey, It]`

QUESTION 28

What is output by the line marked `//2` in the code to the right?

A. `RavenTurkeyDuckIt`

B. `BirdyRavenTurkeyDuckIt`

C. `TurkeyRavenBirdyItDuck`

D. `RavenTurkeyDuckItBirdy`

E. `RavenItTurkeyDuck`

```
LinkedList<*1> names;
names = new LinkedList<*1> ();

names.addFirst("Turkey");
names.addFirst("Birdy");
names.addLast("Raven");
names.addLast(names.removeFirst());
names.addLast("It");
names.addFirst("Duck");

System.out.println(names);        //1

for(int i = 0; i < names.size(); i++){
  int temp = names.get(i).length() % 5;
  names.add(temp, names.remove(i));
}

ListIterator<*1> it = names.listIterator();

if(it.next().equals( "It" ))
  System.out.print( "Found" );

while(it.hasNext())
  System.out.print(it.next());    //2
```

QUESTION 29

What is the output by the the call `jc()`?

A. `QDEFD`

B. `ABCDEF`

C. `QDBEFD`

D. `QBDQFD`

E. `QBDEFD`

QUESTION 30

What is the output by the the call `nu()`?

A. `EATMET`

B. `EATQEATE`

C. `MEATEEAT`

D. `MQEATEEAT`

E. `QEATEEAT`

QUESTION 31

What is the output by the the call `fa()`?

A. `LQEIEEI`

B. `LQQEIEEI`

C. `QQEIEEI`

D. `EIQQEIE`

E. `LEIQQEI`

```
public static String wx(String a, String b){
   a = a.substring(0, a.length() - 1);
   b += b.charAt(0);
   String c = a.replaceAll("[AEI]","Q") + b;

   return c;
}

public static String dn(String a, String b){
   a = a.substring(a.indexOf("E"));
   String d = b.substring(1);
   b = wx(b, a);

   if(a.compareTo(b) > 0)
      return a + b;

   return b + a;
}

public static void jc(){
   System.out.print( wx("ABC","DEF") );
}

public static void nu(){
   System.out.print( dn("EAT","MET") );
}

public static void fa(){
   String c = wx("UNIV","INTE");
   c = dn(c, "LEAG");
   System.out.print(c);
}
```

QUESTION 32

What is output by the code to the right?

A. `true false true`

B. `true true true`

C. `false true true`

D. `false false true`

E. `false false false`

```
Double d1 = 1.0;
Double d2 = 1.0;
Double d3 = d1;

System.out.print(d1.equals(d2) + " ");
System.out.print( (d1 == d2) + " ");
System.out.print( (d1 == d3) + " ");
```

QUESTION 33

What is output by the code to the right?

A. `1.2`

B. `1.0`

C. `1`

D. There is no output due to a syntax error in the code.

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

```
float num1 = 4.0;
double num2 = 5.0;
double num3 = num2 / num1;
System.out.print( num3 );
```

QUESTION 34

What is output by the code to the right?

A. `TwoFour`

B. `OneFour`

C. `TwoThreeFour`

D. `TwoThree`

E. `ThreeFour`

```
try{
   int t1 = 5;
   int t2 = 0;
   int t3 = 5 / 0;
   System.out.print("One");
}
catch(ArithmeticException e){
   System.out.print("Two");
}
catch(Exception e){
   System.out.print("Three");
}
finally{
   System.out.print("Four");
}
```

QUESTION 35

Which of the following could replace **`<*1>`** in the code to the right so that method `empty` will determine if `tm` references an instantiated object?

A. `tm == null`

B. `tm.equals("")`

C. `tm == ""`

D. `tm instanceof null`

E. `tm.exists()`

```
public class Node{
   public Node pt;
   public String data;
}

public class Structure{

   private Node tm;

   public void add(String s){
      Node rs = new Node();
      rs.data = s;
      rs.pt = tm;
      tm = rs;
   }

   public String look(){
      return tm.data;
   }

   public String get(){
      String yu = tm.data;
      tm = tm.pt;
      return yu;
   }

   public boolean empty(){
      return <*1>;
   }
}
```

Assume Question 35 was filled correctly.

QUESTION 36

What is output by the following code?

```
Structure s1 = new Structure();
Structure s2 = new Structure();
String term = "abcdefghi";

for(int i = 0; i < term.length(); i++){
  if(i % 4 == 1)
    s2.add(s1.look());
  if(i % 3 == 1)
    s2.add(s1.get());
  s1.add(term.substring(i,i+1));
}

while(!s2.empty()){
  System.out.print(s2.get());
}
```

A. `ihgfedcba`

B. `gedaa`

C. `defghiaabcc`

D. `abcdefghiaaaaa`

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

QUESTION 37

What type of data structure does the `Structure` class implement?

A. A queue.

B. A stack.

C. A linked list.

D. A priority queue.

E. A max heap.

QUESTION 38

What is output by the code to the right?

A. `-4 3`

B. `-4 2`

C. `-4 -2`

D. `-5 2`

E. `-5 -3`

```
int x = -5;
int y = 7 % x++;
System.out.println(x + " " + y);
```

QUESTION 39

What is output by the code to the right?

A. `5CUIL State`

B. `HUIL State`

C. `UIL State`

D. `72UIL State`

E. There is no output due to a syntax error in the code.

```
int x1 = 5;
char c1 = 'C';
String word = "UIL State";
word = x1 + c1 + word;
System.out.print( word );
```

QUESTION 40

What is output by the code to the right?

A. `0`

B. `1`

C. `2`

D. `3`

E. `4`

```
int[] array = {2, 1, 3, 1, 2};
for(int i = 0; i < array.length; i++)
  array[ array[i] ]++;
System.out.print(array[3]);
```