Note: Correct responses are based on Java, J2sdk v 6.0, 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 1111_2 plus 1000_2 ?

A. 45_6 B. 10111_2 C. 23_9 D. 29_{10} E. 32_6

QUESTION 2

What is output by the code to the right?

A. `10` B. `5` C. `4` D. `4.0`

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

```
double a = 1000 / 10 / 25 ;
System.out.println(a);
```

QUESTION 3

What is output by the code to the right?

A. `28` B. `0` C. `2` D. `3`

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

```
int b = 100;
b %= 7;
System.out.println(b);
```

QUESTION 4

What is output by the code to the right?

A. `56` B. `49` C. `52` D. `7` E. `8`

```
int c=0;
for(; c<8; c++)
   for(; c<7; c++){}
System.out.print(c);
```

QUESTION 5

What is output by the code to the right?

A. `radio` B. `radiotvfun`

C. `xmxmxm` D. `fun`

E. `tv`

```
String dino = "xmradioxmtvxmfun";
dino = dino.replaceAll("[^xm]","");
System.out.print(dino);
```

QUESTION 6

What is output by the code to the right?

A. `8` B. `7`

C. `24` D. `9`

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

```
short[] trex = {1,5,6,3,2,4,8};

trex[0] =  trex[2] +
                   trex[4] + trex[0];

System.out.println(trex[0]);
```

QUESTION 7

How many combinations of values for b and c could make a true?

A. 0 B. 1

C. 3 D. 2

E. 4

```
a = !(b ^ c);
```

QUESTION 8

What is output by the code to the right?

A. `2` B. `01`

C. `02` D. `012`

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

```
double t = Math.ceil(Math.sqrt(30));
if(t > 5.0)
  System.out.print(0);
else if(t < 5.0)
  System.out.print(1);
  System.out.print(2);
```

QUESTION 9

Which of the following could replace **<*1>** in the code of class `StegoSaur` to the right so that method `isBadDude()` would correctly return true if the `StegoSaur` has more than 25 teeth and more than 8 plates?

A. `return (numTeeth>25 || numPlates>8);`

B. `return (numTeeth>25 && numPlates>8);`

C. `return (getNumTeeth()>25 && getNumPlates()>8);`

D. A and B only

E. B and C only

QUESTION 10

Assuming that **<*1>** is filled correctly, what is output by the code to the right?

A. `false true`

B. `true true`

C. `false false`

D. `true false`

E. There is no output.

```
public class StegoSaur
{
  private int numPlates;
  private long numTeeth;

  public StegoSaur(int np, long nt){
    numPlates = np;
    numTeeth = nt;
  }

  public long getNumTeeth(){
    return numTeeth;
  }

  public int getNumPlates(){
    return numPlates;
  }

  public boolean isBadDude(){
    <*1>
  }
}

////////////////////////////////////////
//client code
StegoSaur b = new StegoSaur(5, 200);
out.print(b.isBadDude() + " ");
b = new StegoSaur(10, 26);
out.println(b.isBadDude());
```

QUESTION 11

What is output by the code to the right?

A. `4.0` B. `2.0` C. `5.0` D. `3.0` E. `6.0`

```
double tr = 3;
tr = (tr++ > 3) ? tr++ : tr--;
out.println( Math.floor(tr) );
```

QUESTION 12

What is output by the code to the right?

A. `-4.342` B. `(-4.341)`

C. `(-4.342)` D. `(4.342)`

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

```
System.out.printf("%(.3f",-4.34192);
```

QUESTION 13

What is output by the code to the right?

A. `long` B. `neck` C. `dinos` D. `/` E. `lnd`

```
String good = "/long/neck/dinos";
String[] bigs = good.split("[//]");
System.out.println(bigs[3]);
```

QUESTION 14

What is output by the code to the right?

A. `0`

B. `-3`

C. `5`

D. `1`

E. `-2`

```
String vals = "meateatersruleall";
int total = 0;
for(int i=0; i<vals.length(); i++){
  char ch = vals.charAt(i);
  switch( ch ){
    case 'e' : total++; break;
    case 't' : total+=2; break;
    default : total--;
  }
}
System.out.print( total );
```

QUESTION 15

What is output by the code to the right?

A. 0 B. 3 C. 1 D. 5 E. 6

```
String j = "allosaurus";
out.print(j.indexOf("a",2));
```

QUESTION 16

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

A. 6

B. 10

C. 45

D. 60

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

QUESTION 17

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

A. 6

B. 10

C. 45

D. 60

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

```
public class Raptor
{
  private int size;
  public Raptor(int s){
    size = s;
  }
  public int getIt(){
    return size * 2;
  }
  public int getThat(){
    return getIt();
  }
}

public class VeloRaptor extends Raptor
{
  private int size;
  public VeloRaptor(int s){
    super(s);
    size = s * 2;
  }
  public int getThat()
  {
    return super.getThat() + getIt();
  }
  public int getIt(){
    return size * 3;
  }
}

////////////////////////////////////
// client code
Raptor d = new Raptor(3);
System.out.println(d.getIt());     //1
d = new VeloRaptor(5);
System.out.println(d.getThat());   //2
```

QUESTION 18

What is output by the code to the right?

A. 19 B. 24 C. 35 D. 27 E. 37

```
System.out.printf("%o",23);
```

QUESTION 19

Which of the following could replace **<*1>** in the code to the right to properly sum up all values in `vars`?

A. `for(double d : vars) sum = sum + vars;`

B. `for(double d : vars) sum += d;`

C. `for(double d : vars) sum = sum + d;`

D. A and B only

E. B and C only

QUESTION 20

Assuming that **<*1>** is filled correctly, what of the following are valid calls to method `magic`?

A. `magic(4.0,5.0,6.0);`

B. `magic(new double[]{3.0,4.0,5.0,6.0});`

C. `magic(9.0);`

D. A, B, and C only

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

```
//The three dots in method magic are standard Java.
//This code does not contain any syntax errors.

public double magic(double ... vars)
{
   double sum = 0.0;

   <*1>

   return sum ;
}
```

QUESTION 21

What is output by the code to the right?

A. `13`

B. `-14`

C. `5`

D. `17`

E. `-17`

```
int bit = 5 | 12;
int wise = ~bit;
out.print( wise );
```

QUESTION 22

What is returned by the method call `diplo(10, 7.0)`?

A. `1.0`

B. `2.0`

C. `2.5`

D. `3.0`

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

```
public double diplo(long a, double b){
  a = (int)(a + b);
  a = (int)(a / b / 2);
  return a;
}
```

QUESTION 23

What is output by the client code to the right?

A. `[1, 1, 2, 3, 5]`

B. `[2, 2, 2, 3, 5]`

C. `[2, 2, 3, 3, 5]`

D. `[0, 0, 1, 0]`

E. `[2, 2, 1, 0]`

```
public void anky(int[] list){
  list[0]++;
  list[1]++;
  list = new int[4];
  list[2]++;
}

////////////////////////////////////
// client code
int[] vals = {1,1,2,3,5};
anky(vals);
out.print( Arrays.toString(vals) );
```

QUESTION 24

What is returned by the method call `brachi(7)` ?

A. `56` B. `37`

C. `16` D. `42`

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

QUESTION 25

What is returned by the method call `brachi(14)`?

A. `56` B. `37`

C. `16` D. `42`

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

QUESTION 26

What is the running time of method `brachi`? Choose the most restrictive correct answer.

A. $O(N^2)$ B. O(1)

C. O(N+N/2) D. O(NlogN)

E. O(logN)

```
public static int brachi(int amt)
{
  int cnt = 0;
  for(int i = 1; i<=amt; i++)
  {
    for(int j = i; j<=amt; j+=2)
    {
      cnt = cnt + 1;
    }
  }
  return cnt;
}
```

Use the following matrix `m` for questions 27 and 28.

5	4	3	2	1
2	2	2	2	2
3	3	3	3	3
1	2	3	4	5
2	4	6	8	10

QUESTION 27

What is returned by the method call `matasaur(m, 1, 1)` ?

A. 14 B. 16

C. 13 D. 15

E. Nothing is returned due to a runtime exception.

QUESTION 28

What is returned by the method call `matasaur(m, 3, 2)` ?

A. 14 B. 16

C. 13 D. 15

E. Nothing is returned due to a runtime exception.

```
public static int matasaur(int[][] m,
                           int r,
                           int c)
{
   Integer sum = 0;
   int rowCap = m.length;
   int colCap = m[0].length;
   do{
      sum = sum + m[r][c];
      if(m[r][c] % 2 == 0)
        r--;
      else
        c++;
   }while( r < rowCap && c < colCap);
   return sum;
}
```

QUESTION 29

What is returned by the method call `recurasaur(5)` ?

A. `47`
B. `32`
C. `15`
D. `21`
E. `66`

QUESTION 30

What is returned by the method call `recurasaur(10)` ?

A. `47`
B. `32`
C. `15`
D. `21`
E. `66`

```
public static int recurasaur(int x)
{
  if(x<=0)
    return 1;
  else
    return x + recurasaur(x-1) + 1;
}
```

QUESTION 31

Which of the following could replace **`<*1>`** in the code to the right ?

A. `double`
B. `double[]`
C. `Object[]`
D. `Double[]`
E. more than one of these

```
double[] trilobite = {7,8,9,10};
boolean tr = trilobite instanceof <*1> ;
```

QUESTION 32

What is output by the client code to the right?

A. `308`
B. `301`
C. `310`
D. `312`
E. `300`

QUESTION 33

Which of the following best describes what method `doIt` does?

A. Returns the maximum ascii value in `s`.
B. Returns the minimum ascii value in `s`.
C. Returns the sum of the ascii values of the letters in `s`.
D. Returns the first ascii value in `s`.
E. Returns the last ascii value in `s`.

```
public int doIt(String s, int spot,
                int ans)
{
  if( spot == s.length() )
    return ans;
  return doIt(s, spot + 1,
              ans + s.charAt(spot));
}

////////////////////////////////
// client code
String word = "arc";
out.print( doIt(word, 0, 0) );
```

QUESTION 34

Consider the class headers to the right. Assume all of the classes to the right have a default constructor. Which of the following statements will cause a syntax error?

I. `Dino d = new PlantEater();`

II. `Dino b = new Triceratops();`

III. `Dino b = new Dino();`

A. I only

B. II only

C. III only

D. I and II only

E. I and III only

```
public interface Dino

public class MeatEater implements Dino

public class PlantEater implements Dino

public class Triceratops extends PlantEater

public class Spinosaurus extends MeatEater
```

QUESTION 35

What is output by the client code to the right?

A. `dndn`

B. `dndndn`

C. `dndndndn`

D. `ret`

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

```
String dnsr = "dn";
String ret = dnsr + dnsr;
ret = ret + ret;
System.out.println(ret);
```

QUESTION 36

What are the contents of `list` after the method call `sort( new Integer[]{7,2,1,9,8,3}, 1, 4)`?

A. `[1, 2, 3, 7, 8, 9]`

B. `[1, 9, 7, 3, 8, 2]`

C. `[3, 2, 1, 7, 9, 8]`

D. `[1, 2, 7, 9, 8, 3]`

E. `[7, 1, 2, 8, 9, 3]`

QUESTION 37

What standard sorting algorithm is being demonstrated by method `sort()`?

A. selection sort

B. insertion sort

C. quick sort

D. merge sort

E. heap sort

```
void sort(Comparable[] list, int low, int high)
{
   if(low < high)
   {
       int p = help(list, low, high);
       sort(list, low, p);
       sort(list, p+1, high);
   }
}


int help(Comparable[] list, int low, int high)
{
   Comparable x = list[low];
   int bot = low-1;
   int top = high+1;
   while(bot<top)
   {
      while(list[--top].compareTo(x) > 0);
      while(list[++bot].compareTo(x) < 0);
      if (bot >= top){
         return top;
      }
      Comparable temp = list[bot];
      list[bot] = list[top];
      list[top] = temp;
   }
   return 0;
}
```

QUESTION 38

What is output by the code to the right?

A. `52`

B. `51`

C. `3`

D. `4`

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

```
char c = 48;
c++;
c--;
c++;
c++;
c++;
c++;
System.out.println(c);
```

QUESTION 39

What data type is being created by class `Structure`?

A. Queue

B. Set

C. Stack

D. Binary Tree

E. Map

QUESTION 40

What is the runtime of method `add()`? Choose the most restrictive answer.

A. $O(N^2)$

B. O(1)

C. O(N)

D. O(NlogN)

E. O(N+N)

```
public class Structure<E> extends Stack<E>
{
  public boolean add(E thing)
  {
    if(!contains(thing))
      return super.add(thing);
    return false;
  }
}
```