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 11_8 times 13_8 ?

A. 97_{10} B. 200_7 C. 1101011_2 D. 1100011_2 E. 1302_4

QUESTION 2

What is output by the code to the right?

A. 24 B. 20 C. 27 D. 22 E. 32

```
int a = 4 * 5 + 2;
System.out.println(a);
```

QUESTION 3

What is output by the code to the right?

A. 12 B. 10 C. 16 D. 8 E. 14

```
int b = 6, c = 2;
c = b + c / b + c;
System.out.println(c);
```

QUESTION 4

What is output by the code to the right?

A. cs B. ad

C. cw D. cd

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

```
String d = "candyandsweetstuff";
out.print(d.charAt(0) + "" + d.charAt(8));
```

QUESTION 5

What is output by the code to the right?

A. 12 B. 10

C. 18 D. 6

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

```
int[] hrts = {2,5,9,11,17,21};
for( int val : hrts )
  hrts[val] = hrts[val/2] + 1;
System.out.println(hrts[3]);
```

QUESTION 6

What is output by the code to the right?

A. 6 B. 6.5 C. 7 D. 7.5

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

```
int e = 3;
double f = 2.5;
e = (int)f * e;
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 = false;
boolean i = false;
boolean h = !i ^ g;
System.out.println(h);
```

QUESTION 8

How many of the conditions to the right could ever be true at the same time?

A. 0

B. 1

C. 2

D. 3

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

```
int dude = //some input value
if ( dude < 5 )
  System.out.print(0);
if ( dude > 5)
  System.out.print(1);
if ( dude == 5)
  System.out.print(2);
```

QUESTION 9

What is the minimum number of methods that class Heart could contain in order to compile without error?

A. 0

B. 1

C. 2

D. 3

E. more than 3

QUESTION 10

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

A. `System.out.println(t.getArea());`

B. `System.out.println(t.getVolume());`

C. `System.out.println(t.area);`

D. A and B only

E. A, B, and C

```
public interface Thing
{
   public double getArea();
   public double getVolume();
}

public class Heart implements Thing
{
   private double area;
   private double volume;

   public Heart(double a, double v)
   {
      area = a;
      volume = v;
   }

   //other method implementations not shown
   //assume all necessary methods are present
}

//////////////////////////////////////////
//client code
Thing t = new Heart(10, 345);
<*1>
```

QUESTION 11

What is output by the code to the right?

A. `[50.5, 99.1, 7.5]`

B. `[7.5, 99.1, 50.5]`

C. `[99.1, 7.5, 50.5]`

D. `[7.5, 50.5, 99.1]`

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

```
Collection x = new TreeSet();
x.add(99.1);
x.add(50.5);
x.add(7.5);
System.out.println( x );
```

QUESTION 12

What is output by the code to the right?

A. `0` B. `1`

C. `true` D. `false`

E. `Boolean.TRUE`

```
Boolean bb;
Boolean a = Boolean.TRUE;
Boolean b = Boolean.TRUE;
bb = a == b ? true : false;
System.out.println( bb );
```

QUESTION 13

What is output by the code to the right?

A. `[cat, dog, bug, pig]`

B. `[pig, dog, bug, cat]`

C. `[pig, bug, cat, dog]`

D. `[pig, cat, dog, bug]`

E. `[bug, cat, dog, pig]`

```
List<String> list;
list = new ArrayList<String>();
list.add("dog");
list.add(0,"pig");
list.add(1,"cat");
list.add("bug");
System.out.println(list);
```

QUESTION 14

What is output by the code to the right?

A. `1.2`
B. `9.0`
C. `5.0`
D. `61.0`
E. There is no output due to a syntax error.

```
double[] nums = {1.2, 9, 11, 5, 61};
System.out.println( nums[nums.length-1] );
```

QUESTION 15

What is output by the code to the right?

A. `h o o p s`
B. `hoops`
C. `spooh`
D. `ut`
E. There is no output due to a syntax error.

```
String s = "hoops";
s = new String(s.toCharArray());
System.out.println(s);
```

QUESTION 16

What is output by the code to the right?

A. `5.0`
B. `6.0`
C. `5.72`
D. `5.7`
E. There is no output due to a syntax error.

```
Number nb = new Double("5.72f");
out.println(nb.doubleValue());
```

QUESTION 17

What is output by the code to the right?

A. `-5`
B. `5`
C. `-7`
D. `6`
E. `-6`

```
int gug = 50;
do
{
  for(int i=0; i<15; i=i+2)
    gug -= 7;
}while(gug > 0);
System.out.println(gug);
```

QUESTION 18

Which of the following could be used in a `switch` statement?

A. `shorty` B. `List` C. `float` D. `double` E. `byte`

QUESTION 19

What is the output by the code to the right?

A. `20`
B. `31`
C. `21`
D. `33`
E. `27`

```
int junk = 1;
int[][] mat = new int[10][10];

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

QUESTION 20

What is the output by the code to the right?

A. `3`
B. `4`
C. `1`
D. `5`
E. `0`

```
String s = "99loof100airbags987";
String[] chunks = s.split("\\d+");
System.out.print(chunks.length);
```

QUESTION 21

Which of the following could replace **`<*1>`** in the client code at right so that method sort would terminate properly?

A. `m != k`
B. `m.equals(k)`
C. `m > k`
D. `m < k`
E. `m == k`

QUESTION 22

What is the output by the code to the right?

A. `13417762001`
B. `11346772001`
C. `01123467701`
D. `00111234677`
E. `14377126001`

QUESTION 23

What sorting algorithm is implemented by method `s`?

A. Merge sort
B. Quick sort
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 `s`? Choose the most restrictive correct answer.

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

```
public class Guess
{
  public static void s(int[] list, int k)
  {
    int m = 0;
    for(int i = 1; i < list.length; i++)
    {
      m++;
      if(  <*1>  )
        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;
    }
  }
}


//////////////////////////////////////////////
//client code
int[] list = {3,1,4,1,7,7,6,2,0,0,1};
Guess.s(list,9);
for(int t: list)
  System.out.print( t );
```

QUESTION 25

What is the output by the code to the right?

A. `10`

B. `9`

C. `17`

D. `6`

E. `13`

```
int count = 0;
for(int i = 1; i < 8; i++){
  for(int j = 6; j >= 1; j--){
     if(i > j)
        break;
     if( (i + j) % 2 == 0)
        continue;
     count++;
  }
}
System.out.print(count);
```

QUESTION 26

Which of the following can replace **`<*1>`** in the code to the right so that all instances of `Playah` share the same `teamPoints` variable, but only instances of `Playah` can access it?

A. `private static`

B. `private`

C. `protected static`

D. `protected`

E. `protected private static`

QUESTION 27

What is the output by the line marked `//line 1`?

A. `10`

B. `8`

C. `5`

D. `12`

E. `4`

QUESTION 28

What is the output by the line marked `//line 2`?

A. `#8 Sammy Ham has a help of 7`

B. `#9 Sammy Ham has a help of 2`

C. `#4 Sammy Ham has a help of 3`

D. `#11 Sammy Ham has a help of 1`

E. `#7 Sammy Ham has a help of 6`

```
public class Playah {
  <*1> int teamPoints;
  private String name;
  private int number;
  private int help;

  public Playah(String na, int num){
     name = na;
     number = num;
  }

  public void kill(int s){
     teamPoints += s;
     help += s;
  }

  public void helper(){
     help++;
  }

  public static int teamScore(){
     return teamPoints;
  }

  public String toString(){
     return "#" + number + " " + name
        + " has a help of " + help;
  }
}

////////////////////////////////////
//in client code
Playah p1 = new Playah("Wild Wile", 7);
Playah p2 = new Playah("Big Benny", 2);
Playah p3 = new Playah("Sammy Ham", 11);
p1.kill(2);
p1.helper();
p1.kill(3);
p2.helper();
p3.helper();
p2.kill(3);
out.println(Playah.teamScore());//line 1
out.println(p3);                //line 2
```

QUESTION 29

Which of the following constructors could be placed in class `Funny`?

A. `public Funny( Integer[] ints ) { }`

B. `public Funny( int number ) { }`

C. `public Funny( Boolean b ) { }`

D. `public Funny( Stack<Integer> st ) { }`

E. more than one of these

QUESTION 30

What is the output by the the call `new Funny( 215 )`?

A. `3`

B. `2`

C. `1`

D. there is no output due to a syntax error

E. more than one of these

QUESTION 31

What is the output by the the call
`new Funny("ka+bo+om".split("\\+"))`?

A. `3`

B. `2`

C. `1`

D. there is no output due to a syntax error

E. more than one of these

```
public class Funny
{
   public Funny( Object obj ){
     System.out.println("3");
   }

   public Funny( Double dbl ){
     System.out.println("2");
   }

   public Funny( String[] words ){
     System.out.println("1");
   }
}
```

QUESTION 32

What is returned by the method call `roses(9)`?

A. `12`

B. `20`

C. `28`

D. `37`

E. `30`

```
public static int roses(int x)
{
  if( x == 0 ) return 1;
  if( x % 2 != 0 )
     return roses( x - 1 ) + x;
  return roses( x - 2 ) + x;
}
```

QUESTION 33

What is output by the code to the right?

A. `A+`

B. `a+`

C. `A`

D. `a`

E. The code would output the memory address for trash.

```
System.out.println("a+".toUpperCase());
```

QUESTION 34

What is output by the code to the right?

A. `null`

B. `5`

C. `0`

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

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

```
Map<Integer,Integer> m;
m = new HashMap<Integer,Integer>();

m.put(null, 5);
m.put(8, 15);
m.put(11, 78);
System.out.println(m.get(null));
```

QUESTION 35

Which of the following could replace **<*1>** in the code to the right so that method `remove` will return a value and move up to the next value?

A. `front = getFront().data;`

B. `front.pt = getFront();`

C. `front = getFront() + 1;`

D. `front = getFront().pt;`

E. `front = getFront() - 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 = "whodatbigdog";

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

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

A. `dgwhowq` B. `dogbadwho`

C. `ohwdabgod` D. `dgbadww`

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.

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

public class Structure{

  private Node front;

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

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

  public String remove(){
     String obj = getFront().data;
     <*1>
     return obj;
  }

  public boolean empty(){
     return getFront() == null;
  }

  public Node getFront(){
     return front;
  }
}
```

QUESTION 38

What replaces **<*1>** in the code to the right so that an instance of TV can't be instantiated but instances of its child classes can be?

A. `interface`

B. `enum`

C. `model`

D. `package`

E. `abstract`

Assume **<*1>** is filled in correctly.

QUESTION 39

What is output by the following client code?

```
TVEpisode t = new TVEpisode();
t.getY();
```

A. `tv`

B. `instant`

C. `video`

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

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

QUESTION 40

What is output by the following client code?

```
TV t = new TVSeason();
t.getZ();
```

A. `tv`

B. `instant`

C. `video`

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

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

```
<*1> class TV
{
  public void getX()
  {
    System.out.print("tv");
  }

  public static void getZ()
  {
    System.out.print("instant");
  }
}

class TVEpisode extends TV
{
  private TV season = new TVSeason();

  public void getX()
  {
    System.out.print("episode");
  }

  public void getY()
  {
    season.getX();
  }
}

class TVSeason extends TV
{
  public void getY()
  {
    System.out.print("season");
  }

  public static void getZ()
  {
    System.out.print("video");
  }
}
```