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 33_5 plus 13_7 ?

A. 120_4 B. 103_5 C. 33_8 D. 29_{10} E. 43_6

QUESTION 2

What is output by the code to the right?

A. 14   B. 11   C. 14.0   D. 11.0

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

```
double a = 3 + 4 * 2;
System.out.println(a);
```

QUESTION 3

What is output by the code to the right?

A. 30   B. 0   C. 2   D. 3

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

```
int b = 30;
b %= 7;
System.out.println(b);
```

QUESTION 4

What is output by the code to the right?

A. 12   B. 02612   C. 139   D. 026   E. 20

```
int c=0;
for(c=0; c<20; c++)
   for(; c<10; c=c+2){}
 System.out.print(c);
```

QUESTION 5

What is output by the code to the right?

A. howdyhowdy   B. hoyhoy

C. howdy   D. wdwd

E. d

```
String d = "howdyhowdy";
d = d.replaceAll("[wd]","");
System.out.print(d);
```

QUESTION 6

What is output by the code to the right?

A. 8   B. 40

C. 20   D. 4

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

```
short[] ray = {1,5,6,3,2,4,8};
ray[0] =
   (byte)(ray[1]*ray[ray.length-1]);
System.out.println(ray[0]);
```

QUESTION 7

What is output by the code to the right?

A. yes   B. no

C. maybe   D. true

E. false

```
boolean a = false;
boolean b = true;
boolean c = false;
b = !a && b ^ c;
c = b && (c || (!a || b));
System.out.println(c);
```

QUESTION 8

What is output by the code to the right?

A. 2   B. 1

C. 0   D. 012

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

```
float gs = Math.ceil(Math.sqrt(10));
if(gs > 4.0)
  System.out.print(0);
else if(gs < 4.0)
  System.out.print(1);
  System.out.print(2);
```

QUESTION 9

Which of the following could replace **<*1>** in the code of class `Book` to the right so that method `toString()` would correctly return the properties of class `Book`?

A. `return numChapters + numWords;`

B. `return getNumChapters() + numWords;`

C. `return numChapters + getNumWords();`

D. `return getNumChapters() + "" + getNumWords();`

E. more than one of these

QUESTION 10

Assuming that **<*1>** is filled correctly, what is output by the line marked `//1` in the code to the right?

A. `200 5`

B. `5 200`

C. `5.0 200`

D. `200.0 5`

E. There is no output.

```
public class Book
{
  private int numChapters;
  private long numWords;

  public Book(int nc, long nw){
    numChapters = nc;
    numWords = nw;
  }

  public long getNumWords(){
    return numWords;
  }

  public int getNumChapters(){
    return numChapters;
  }

  public String toString(){
    <*1>
  }
}

/////////////////////////////////////////////
//client code
Book b = new Book(5, 200);
System.out.println(b);    //1
```

QUESTION 11

What is output by the code to the right?

A. `4.0`　　B. `6.0`　　C. `5.0`　　D. `7.0`　　E. `8.0`

```
double ter = 4.5;
ter = (ter++ > 3) ? ter++ : ter--;
out.println( Math.floor(ter) );
```

QUESTION 12

What is output by the code to the right?

A. `-4.345`　　　　　　B. `4.345`

C. `(-4.345)`　　　　　D. `(4.345)`

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

```
System.out.printf("%(.3f",-4.34532);
```

QUESTION 13

What is output by the code to the right?

A. `code`　　B. `*code`　C. `code*`　D. `*/`　　E. `/*`

```
String good = "/*code*//*code/*";
String[] gList = good.split("[//]");
System.out.println(gList[3]);
```

QUESTION 14

What is output by the code to the right?

A. `11`

B. `-13`

C. `15`

D. `12`

E. `-12`

```
String vals = "turkeyanddressing";
int total = 0;
for(int i=0; i<vals.length(); i++)
{
  char ch = vals.charAt(i);
  switch( ch ){
    case 'd' : total--; break;
    case 's' : total++; break;
    case 'n' : total-=2; break;
    case 'g' : total+=2;
    default : total--;
  }
}
System.out.print( total );
```

QUESTION 15

What is output by the code to the right?

A. 13   B. 3   C. 11   D. 10   E. 12

```
String j = "catchmeifyoucan";
out.print(j.indexOf("c",7));
```

QUESTION 16

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

A. 4

B. 5

C. 8

D. 10

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

```
public class Dude{
  private int size;
  public Dude(int s){
    setSize(s);
  }
  public void setSize(int s){
    size = s;
  }
  public int getSize(){
    return size;
  }
}

public class LittleDude extends Dude{
  private int size;
  public LittleDude(int s){
    super(s);
    size = s/2;
  }
}

///////////////////////////////////
// client code
Dude d = new Dude(8);
System.out.println(d.getSize());   //1
d = new LittleDude(10);
System.out.println(d.getSize());   //2
```

QUESTION 17

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

A. 4

B. 5

C. 8

D. 10

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

QUESTION 18

What is output by the code to the right?

A. 19   B. 2D   C. 35   D. 2d   E. 100

```
System.out.printf("%x",45);
```

QUESTION 19

Which of the following could replace **<*1>** in the code to the right to properly place an object as a value into the map?

A. new ArrayList<String>()

B. new List<String>()

C. new TreeSet<String>()

D. A and B only

E. A, B, and C

```
Map<String, List<String>> map;
map = new TreeMap<String, List<String>>();

map.put("friends", <*1>  );
map.put("family", <*1>  );
map.put("celebs", <*1>  );
map.get("friends").add("Bobby");
map.get("friends").add("Sally");
map.get("family").add("Mom");
map.get("celebs").add("Yao Ming");
map.remove("friends");
System.out.println(map.get("friends"));
```

QUESTION 20

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

A. [friends, Bobby, Sally]   B. [Bobby, Sally]

C. [Mom]   D. null

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

QUESTION 21

What is output by the code to the right?

A. 5   B. 4

C. 3   D. 6

E. 2

```
int bit = 34 | 21;
int wise = bit >>> 2 ^ 15;
out.print( wise );
```

QUESTION 22

What is the run time for adding a new item to the end of an array or ArrayList? Choose the most restrictive correct answer.

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

QUESTION 23

Which of the following algorithms is considered the best all around sort for very large amounts of any type of data that could be totally unsorted, partially sorted, or almost sorted?

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

---

QUESTION 24

What is returned by the method call `gitter(6)` ?

A. 22   B. 26

C. 18   D. 10

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

QUESTION 25

What is returned by the method call `gitter(12)`?

A. 22   B. 26

C. 18   D. 10

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

QUESTION 26

What is the running time of method `gitter`? 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 gitter(int val)
{
  int amt = 0;
  for(int i = 1; i<=val; i++)
  {
    for(int j = i; j<=val; j*=2)
    {
      amt = amt + 1;
    }
  }
  return amt;
}
```

QUESTION 27

Which of the following could replace **<*1>** in the code to the right so each of the loop values would be added to the front of `intList`?

A. `addFirst(i);`   B. `addFirst(0,i);`

C. `add(0,i);`   D. A and B only

E. A and C only

QUESTION 28

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

A. `[3, 6, 9]`   B. `[0, 3, 6, 9, 12]`

C. `[9, 6, 3]`   D. `[12, 9, 6, 13]`

E. `[1, 4, 7, 10, 13]`

```
LinkedList <Integer> intList;
intList = new LinkedList<Integer>();

for(int i=0; i<15; i+=3)
   intList.  <*1>

intList.removeLast();
intList.removeFirst();

out.println(intList);
```

QUESTION 29	
What is returned by the method call `wow(5)` ?	
A. 1 B. 6	
C. 12 D. 24	
E. 120	

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

QUESTION 30

What is returned by the method call `wow(4)` ?

A. 1   B. 6

C. 12   D. 24

E. 120

QUESTION 31

What is output by the code to the right?

A. 36   B. 48   C. 44   D. 76   E. 32

```
System.out.println(10 + 0x6 + 20);
```

QUESTION 32

What is output by the code to the right?

A. [1, 2, 3, 4, 5, 6]

B. [1, 2, 5, 6]

C. [3, 4]

D. [5, 6]

E. There is no output due to a null pointer exception.

```
Integer[] s1 = {1,2,3,4};
Integer[] s2 = {3,4,5,6};
Set<Integer> hs;
hs = new HashSet<Integer>();

for(Integer i : s1)
  hs.add( i );
for(Integer i : s2)
  hs.add( i );

Set<Integer> ts;
ts = new TreeSet<Integer>();
for(Integer i : s1)
  ts.add( i );

hs.removeAll(ts);
System.out.println(hs);
```

QUESTION 33

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

A. a   B. x   C. j   D. p   E. b

```
ArrayList<String> q;
q = new ArrayList<String>();

q.add("x");
q.add("a");
q.add("b");
q.add("e");
q.add("j");
q.add("p");
```

QUESTION 34

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

A. a   B. x   C. j   D. p   E. b

QUESTION 35

What is output by the line marked `//3` in the code to the right?

A. [x, a, b, e, j, p]

B. [x, a, w, e, b, j]

C. [x, u, w, e, j, p]

D. [x, u, b, e, j, p]

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

```
ListIterator<String> it;
it = q.listIterator();
it.next();
it.next();
out.println(it.previous());        //1
it.set("u");
it.next();
out.println(it.next());            //2
it.set("w");
out.println(q);                    //3
```

QUESTION 36

What are the contents of `list` after the
method call `sort(`
`            new Integer[]{7,2,1,9,8,3}, 0, 5)` ?

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

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

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

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

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

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

QUESTION 38

What is output by the code to the right?

A. 97

B. 4

C. 5

D. 48

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

```java
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;
}
```

```java
byte[] stuff = {'a',
                3,
                '0',
                Math.round(9/2),
                8};

stuff[0] = stuff[3];
stuff[1] = stuff[0];
stuff[0] = stuff[2];
stuff[3] = stuff[0];

System.out.println(stuff[3]);
```

QUESTION 39

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

A. Queue

B. PriorityQueue

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)

```java
public class Structure<E>
{
  private E[] vals;
  private int size;


  public Structure(){
    size = 0;
    resize(10);
  }


  public void add(E obj){
    if(size() == top())
      resize(size() + 10);

    int j = size();
    if(j!=0){
      Comparable aCmp = (Comparable)obj;
      Comparable bCmp;
      bCmp = (Comparable)vals[j-1];

      while(j>0 && aCmp.compareTo(bCmp)<0)
      {
        vals[j] = vals[j-1];
        j--;
        if(j!=0)
          bCmp = (Comparable)vals[j-1];
      }
    }
    vals[j]=obj;
    size++;
  }


  public E remove(){
    E ret = vals[--size];
    if(size()-10 == top())
      resize(size()-10);
    return ret;
  }


  public int size(){
    return size;
  }


  public int top(){
    return vals.length;
  }


  private void resize(int len){
    E[] temp;
    temp = (E[])(new Object[len]);
    for(int i = 0; i < size(); i++)
      temp[i] = vals[i];
    vals = temp;
  }
}
```