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. 13.0 D. 11.0

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

```
double a = 3 + 20 / (2 + 5) * 4;
System.out.println(a);
```

QUESTION 3

What is output by the code to the right?

A. 4 B. 0 C. 2 D. 3

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

```
int b = 60;
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. rLar B. reLeaer

C. rdLadr D. Leader

E. redgreenbluepurplepinkLeader

```
String redL = "redLeader";
redL = redL.replaceAll("[ed]","");
System.out.print(redL);
```

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. true B. no

C. maybe D. yes

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. -1 B. 0

C. 2 D. 1

E. -2

```
String e = "DOG";
String f = "FAT";
System.out.print( e.compareTo(f) );
```

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 only the instance variables of class `Novel`?

A. `return numChapters + numWords + numNovels;`

B. `return getNumChapters() + numWords + numNovels;`

C. `return numChapters + getNumWords() + numNovels;`

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. `5`

B. `3`

C. `0`

D. `1`

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

```
public class Novel{
  static{
   numNovels = 0;
  }
  private int numChapters;
  private long numWords;
  private static int numNovels;

  public Novel(int nc, long nw){
    numChapters = nc;
    numWords = nw;
    numNovels++;
  }

  public long getNumWords(){
    return numWords;
  }

  public int getNumChapters(){
    return numChapters;
  }

  public static int numNovels(){
    return numNovels;
  }

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

//client code
new Novel(5, 500);
out.println(Novel.numNovels());   //1
new Novel(3, 100);
```

QUESTION 11

What is output by the code to the right?

A. `16.0` B. `12.0` C. `8.0` D. `10.0` E. `9.0`

```
int g = 5;
int h = 3;
double i = g * h + g / h;
System.out.print( i );
```

QUESTION 12

What is output by the code to the right?

A. `(2.345)`

B. `2.346`

C. `(-2.345)`

D. `2.345`

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

```
System.out.printf("%(.3f", 2.34532);
```

QUESTION 13

What is output by the code to the right?

A. `split`

B. `*split`

C. `split*`

D. `*/`

E. `/*`

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

QUESTION 14

What is output by the code to the right?

A. 88 B. 45 C. 94 D. 72 E. 100

```
int iSum=0;
for(int i=2; i<40; i=i+5){
   if(i%2==0)
      iSum -= i;
   iSum += i;
}
System.out.println(iSum);
```

QUESTION 15

What is output by the code to the right?

A. 24

B. 23

C. 22

D. 20

E. 21

```
int f = 12;
System.out.println(f-- + f--);
```

QUESTION 16

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

A. 4

B. 5

C. 8

D. 12

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. 4

B. 5

C. 8

D. 12

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

```
public class MopFred
{
  private int stuff;
  public MopFred(int s){
    setStuff(s);
  }
  public void setStuff(int s){
    stuff = s;
  }
  public int getStuff(){
    return stuff;
  }
}

public class MopFredJr extends MopFred
{
  private int stuff;
  public MopFredJr(int s){
    super(s);
    stuff = s/3;
  }
}

////////////////////////////////////
// client code
MopFred d = new MopFred(8);
System.out.println(d.getStuff());   //1
d = new MopFredJr(12);
System.out.println(d.getStuff());   //2
```

QUESTION 18

What is output by the code to the right?

A. yu

B. 'b', 'e', 'a', 'r'

C. [b, e, a, r]

D. bear

E. A memory address will be displayed.

```
char[] yu = {'b', 'e', 'a', 'r'};
System.out.println( yu );
```

QUESTION 19

Which of the following could replace **<*1>** in the code to the right to properly start a switch that will examine parameter `num`?

A. `switch( ans )`
B. `switch( 0 )`
C. `switch( num )`
D. A and B only
E. A, B, and C

QUESTION 20

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

A. `12`
B. `14`
C. `8`
D. `24`
E. There is no output due to a syntax error.

```
public int fun(int num)
{
  <*1> {
    case 1:
    case 3:
    case 5:
    case 7:  num = num * 2; break;
    case 2:
    case 4:
    case 6:
    case 8:  num = num * 3; break;
    default: num = num / 2;
  }
  return num;
}

// client code
System.out.print( fun(fun(fun(16))) );
```

QUESTION 21

What replaces **<*1>** in the code to the right so that the code segment compiles without error?

A. `(Character)`
B. `(Object)`
C. `(char)`
D. `(String)`
E. More than one of these is correct.

```
Object thing = "Willie Moe Pena";
char first = (<*1> thing).charAt(0);
```

QUESTION 22

What is the run time for adding a new item to the middle 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 has a best case run time of O(N) when used on sorted data?

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

QUESTION 24

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

A. `22`
B. `25`
C. `19`
D. `23`
E. There is no output due to a syntax error.

QUESTION 25

What is returned by the method call `willyMo(37)`?

A. `71`
B. `67`
C. `70`
D. `73`
E. There is no output due to a syntax error.

QUESTION 26

What is the running time of method `willyMo`? 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 willyMo(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 the output?

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]`

```
List <Integer> intList;
intList = new ArrayList<Integer>();

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

intList.remove(0);
intList.remove(intList.size()-1);

out.println(intList);
```

QUESTION 29

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

A. `9`
B. `19`
C. `36`
D. `45`
E. `65`

QUESTION 30

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

A. `531`
B. `452`
C. `321`
D. `1425`
E. `872`

```
public static int goofy(int num)
{
  if( num <= 0 )
    return 1;
  else
    return num + goofy(num-1)
             + num + goofy(num-2);
}
```

QUESTION 31

What is output by the code to the right?

A. `9`
B. `7`
C. `11`
D. `28`
E. `5`

```
System.out.println(04 + 0x11 - 17 + 03);
```

QUESTION 32

What is output by the code to the right?

A. `23`
B. `22`
C. `24`
D. `26`
E. `20`

```
public static int whoot( int x )
{
  return x + x++;
}

// client code
int g = 5;
System.out.print( whoot(whoot(g++)) + g );
```

QUESTION 33

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

A. `m` B. `o` C. `s` D. `p` E. `X`

QUESTION 34

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

A. `m` B. `o` C. `s` D. `p` E. `x`

QUESTION 35

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

A. `[c, o, q, p, s, c, i]`

B. `[c, x, m, q, s, c, i]`

C. `[c, o, m, p, s, c, i]`

D. `[c, o, x, q, s, c, i]`

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

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

q.add("c");
q.add("o");
q.add("m");
q.add("p");
q.add("s");
q.add("c");
q.add("i");

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

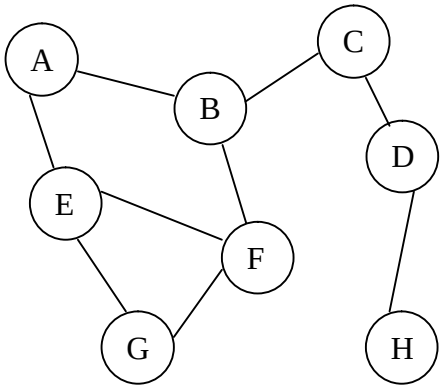
QUESTION 36

Given the graph at right, how many edges are present?

A. `8` B. `10`

C. `9` D. `11`

E. `12`



QUESTION 37

Given the graph at right and only visiting a node once, what is the minimum number of edges that could be visited in order to travel from A to H?

A. `4` B. `5`

C. `6` D. `7`

E. `8`

QUESTION 38

Given the graph at right and only visiting a node once, what is the maximum number of edges that could be visited in order to travel from A to H?

A. `4` B. `5`

C. `6` D. `7`

E. `8`

QUESTION 39

Consider the Structure class to the right. What is output by the following client code?

```
Structure s = new Structure();
s.add("pig");
s.add("cat");
s.add("pog");
s.add("pug");
s.add("dug");
s.add("dun");
s.add("pup");
s.printAll();
```

A. `cat pug dug pog dun pig pup`
B. `cat pog dug pug dun pig pup`
C. `cat pug dug pig dun pog pup`
D. `cat pig dug pog dun pug pup`
E. `cat pog dun pug pig dug pup`

QUESTION 40

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

A. A binary search tree
B. A hash table
C. A stack
D. A heap
E. A queue

```
public class Structure
{
  private ArrayList[] stuff;

  public Structure(){
    stuff = new ArrayList[100];
    for(int i = 0; i < stuff.length; i++)
      stuff[i] = new ArrayList();
  }

  public void add(String it){
    int val = getValue(it);
    if( !doesExist(it) )
      stuff[val].add(it);
  }

  public boolean doesExist(String it){
    int val = getValue(it);
    return stuff[val].contains(it);
  }

  public boolean remove(String it){
    int val = getValue(it);
    return stuff[val].remove(it);
  }

  public void printAll(){
    for( ArrayList<String> row : stuff )
      for( String st : row )
        System.out.print( st + " " );
  }

  private int getValue(String st){
    int val = 0;
    st = st.toLowerCase();
    for(char ch : st.toCharArray()){
      if( ch >= 97 && ch <=122 )
        val += ch - 'a';
    }
    return val % stuff.length;
  }
}
```