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

$404_8 - 317_8 = ?$

A. 723_8 B. 43_8 C. 63_8 D. 53_8 E. 65_8

QUESTION 2

What is output by the code to the right?

A. D B. DE C. CDEF D. CD E. runtime error

```
String s = "ABCDEFGHIJ";
out.println(
   s.substring(2,6).substring(1,2));
```

QUESTION 3

What is output by the code to the right if the contents of `in.dat` is:

```
1 2 3 4 5 6 7 8
```

A.
```
012
034
056
078
```
B.
```
123
456
780
```
C.
```
3
7
11
15
```
D.
```
6
15
16
```
E. runtime error

```
Scanner kb = new Scanner(new
                    File("in.dat"));
int x = 0, y = 0, z = 0;
while (kb.hasNext()) {
  y = kb.nextInt();
  z = kb.nextInt();
  out.println(x + y + z);
}
```

QUESTION 4

Which replaces **<*1>** so this code will compile?

A. String B. StringBuffer C. Pattern

D. Character E. more than one of these

QUESTION 5

Assume **<*1>** was replaced correctly. What is the output?

A. *1*2! B. *1_*2 !

C. *1_*2*! D. *1**2*! E. *1**2**

```
String s = "A1_B2 !";
int i;
for(i=0;i<s.length();i++)
  out.print(  <*1>.isLetter(
       s.charAt(i))?'*':s.charAt(i));
```

QUESTION 6

What is output by the code to the right?

A. 7 B. 15 C. 8 D. 10 E. 25

```
int x = 8;
x &= 15;
out.println(x);
```

QUESTION 7

What is output by the code to the right?

A. true true true B. false false true

C. false false false D. true false false

E. true false true

```
Boolean x = new Boolean("True");
Boolean y = new Boolean("yes");
Boolean z = new Boolean("true");
out.println(x + " " + y + " " + z);
```

QUESTION 8

What is returned by `ugly(4,2)`?

A. 12 B. -11 C. -7 D. 7 E. 9

QUESTION 9

What is returned by `ugly(7,3)`?

A. -29 B. 22 C. -22 D. -28 E. -39

```
public int ugly(int x,int y) {
 if(x < 0)
    return x;
 else
    return ugly(x - 1,y * 2) - x;
}
```

QUESTION 10

What is output by the code to the right?

A. 1.0 B. 1 C. 2 D. 2.0 E. 0

```
out.println(Math.pow(5,2) % 3);
```

QUESTION 11

What is the last line output by the code to the right?

A. Z B. 89 C. X D. Y E. Z

```
char i;
for (i='A';i<'Z';i+=2)
out.println(i);
```

QUESTION 12

Which of the following best characterizes the best and worst case running times the for merge sort?

	<best case>	<worst case>		<best case>	<worst case>
A.	$O(n^2)$	$O(n^2)$	B.	$O(n)$	$O(n^2)$
C.	$O(n \log_2 n)$	$O(n^2)$	D.	$O(n \log_2 n)$	$O(n \log_2 n)$
E.	$O(n \log_2 n)$	$O(n)$			

QUESTION 13

What is the value of m after this code segment is executed?

A. 000 B. 000 C. 111 D. 000 E. 120
000 012 121 012 240
000 124 224 024 000

```
int[][]m = new int [3][3];
for(int r=0; r<m.length; r++)
 for(int c=r/2; c<m[0].length; c++)
     m[r][c]=r*c;
```

QUESTION 14

What is returned by fun(10)?

A. 10 B. 9
C. 5 D. 0 E. infinite recursion

```
public static int fun(int x) {
 if(x != 0)
    return fun(x-3) + 1;
 else
    return x;
}
```

QUESTION 15

What is output by the code to the right?

A. 125 B. 123456
C. 246 D. 234567 E. runtime error

```
int[] a = {1,2,3,4,5,6};
for(int i : a)
  i++;
for(int i : a)
  out.print(i);
```

QUESTION 16

What is output by the code to the right if String s = "AT"?

A. XYZQ B. XYCQ
C. XYQ D. XQ E. X

QUESTION 17

What is output by the code to the righ if String s = "QUICK"?

A. QQQZQ B. Z
C. Q D. ZQ E. QQQZQQ

```
for(int i=0; i<s.length(); i++)
 switch(s.charAt(i))          {
    case 'A' : out.print("X");
               continue;
    case 'B' : out.print("Y");
               break;
    case 'C' : out.print("Z");
               continue;
    default  : out.print("Q");
               break;
 }
```

QUESTION 18

In the code segment to the right, z is equivalent to which of the following for all values of p and q?

A. !p B. !p && q
C. true D. !p || q
E. p && !q

```
boolean p, q, z;
z = ((p && q) || !p)
```

QUESTION 19

Which replaces **<*1>** so the value of `x` is `2006`?

A. `Integer.parseInt(s);` B. `s.intValue();`
C. `Integer.valueOf(s);` D. A and B only
E. A and C only

```
String s = "2006";
int x = <*1>
```

QUESTION 20

What is output by the code to the right?

A. `1 x`
B. `1 2 2 3 4 4 x`
C. `1 2 3 4 5 x`
D. infinite loop
E. runtime error

```
int i=0;
while(i < 5){
  out.print(i + " ");
  if(i % 2 == 1)
     continue;
  out.print(++i + " ");
}
out.println("x");
```

QUESTION 21

What is output by the code to the right?

A. `1110` B. `0110` C. `0101` D. `1010` E. `1100`

```
int x, y;
for(x=1; x>=0; x--)
  for(y=1; y>=0; y--)
     out.print(x ^ y);
```

QUESTION 22

What is output by the code to the right?

A. `7.0 3.0 0.5` B. `8.0 3.0 0.5`
C. `8.0 4.0 0.5` D. `8 3 0`
E. syntax error

```
double x, y;
x = 7.3;
y = 3.4;
out.print(Math.ceil(x) + " ");
out.print(Math.floor(y) + " ");
out.println(x % y);
```

QUESTION 23

What is the value of `fun(3)`?

A. `3` B. `109` C. `-97`
D. `103` E. `100`

```
public static int fun(int x) {
  if(x > 0) x += 100;
  else  x -= 100;
  return x;
}
```

QUESTION 24

What is output by the code to the right?

A. `x \n*y` B. `xt\n*y`
C. `x \\n*y` D. `x\t\\n*t` E. `x \ *y`

```
int x = 2, t = 3, y = 0;
out.println("x\t\\n*y");
```

QUESTION 25

Which of the following correctly computes the sum of `n` consecutive positive odd integers beginning with the integer `1`?

I.
```
int i=0, sum = 0;
do{
  i++;
  sum += i++;
}while(i<=n);
```

II.
```
int i = 0, sum = 0;
while(i<=n) {
  sum += i;
  i+=2;
}
```

III.
```
int i = 0, sum = 0;
while(i<n) {
  sum += 2*i+1;
    i++;
}
```

A. `I` only B. `II` only C. `III` only D. `I` and `III` only E. `II` and `III` only

QUESTION 26

Which number will be in the leftmost leaf when these numbers are placed in a Binary Search Tree in the order shown?

12 43 56 6 4 78 5 19 2 18

A. `5` B. `12` C. `18` D. `2` E. `4`

QUESTION 27

Assume the running time of the `println` method is constant. What is the expected running time for the code segment to the right? Choose the smallest correct answer.

A. `O(1)` B. `O(n)` C. `O(n*i)`
D. $O(n^3)$ E. $O(n^2)$

QUESTION 28

How many times will `"UIL"` be printed by the code segment to the right if `n = 4`?

A. `10` B. `12` C. `15` D. `25` E. `30`

```
int n;
for(int i = 0; i < n; i++)
  for(int j = 0; j < i; j++)
     out.println("UIL");
for(int k = 0; k < n; k++)
  out.println("UIL");
```

QUESTION 29

What is output by the code to the right?

A. `4MM` B. `5MM` C. `6TA*G`
D. `5*G` E. `16P`

```
String s = "ALPHA*BETA*GAMMA";
String t[] = s.split("A*");
out.println(t.length + t[3]);
```

QUESTION 30

What is output by the call to method `myst` in `line 1`?

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

QUESTION 31

What is output by the code in the `for` loop in `line 2`?

A. `12345` B. `25341`
C. `14352` D. `54321`
E. `25352`

```
public static void myst(int[] x) {
  int i = x.length - 1;
  while(i >= x.length / 2) {
     x[x.length-i-1] = x[i];
     i--;
  }
  out.println(i);
}
// client code
int x[] = {1,4,3,5,2};
myst(x);                          //line 1
for(int i : x)                    //line 2
  out.print(i);
```

QUESTION 32

Assume `ListQueue` implements the `Queue` interface. What are the contents of `q` after this code segment is executed? (the front of `q` is listed first)

A. `0,2,4` B. `2,2,4,4` C. `4,4,6,6`
D. `0,0,2,2` E. `q` is empty

QUESTION 33

What are the contents of `s` after this code segment is executed? (the top of `s` is listed first)

A. `3` B. `1,3` C. `1,2,4`
D. `1,3,5` E. `s` is empty

```
Queue<Integer> q = new
                   ListQueue<Integer>();
Stack<Integer> s = new Stack<Integer>();
for(int i=0; i<5; i++) {
  if(i%2==0) {
     q.enqueue(i);
     q.enqueue(i);
  }
  else  q.dequeue();
  if(i%3==0) {
     s.push(i);
     s.push(i);
  }
  else  s.pop();
}
```

QUESTION 34

What is output by the code to the right?

A. `23x23` B. `23x0x23` C. `27x17`
D. `27x0x17` E. `17x23`

```
int x = 23;
out.printf("%ox%#x", x, x);
```

QUESTION 35

What is returned by `mercy(1357, 1)`?

A. `1111` B. `11111` C. `1357` D. `7531` E. `753`

QUESTION 36

How many recursive calls, including the first, are made to mercy by the call `mercy(12345,0)`?

A. `4` B. `2` C. `3` D. `5` E. `6`

```
public static int mercy(int n, int m)
{
  int x = m;
  if(n != 0) {
     m = m*10 + m%10;
     x = mercy(n/10, m);
  }
  return x;
}
```

QUESTION 37

What is output by the code in `line 1`?

A. `1` B. `2` C. `3`

D. `4` E. `true`

QUESTION 38

What is output by the code in the `while` statement in `line 2`?

A. `54321` B. `12345` C. `135`

D. `24` E. `5`

```
Stack <Integer> stk = new
                    Stack<Integer>();
stk.push(1);
stk.push(2);
stk.push(3);
stk.push(4);
stk.push(5);
out.println(stk.search(4));// line 1
while(!stk.isEmpty()) {    // line 2
 out.print(stk.peek());
 stk.pop();
}
```

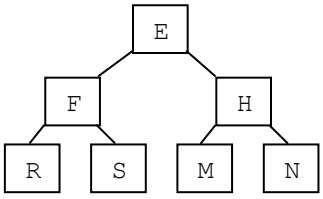
QUESTION 39

Which of the following best describes the binary tree to the right?

A. min-heap B. max-heap

C. Binary Search Tree D. tertiary tree

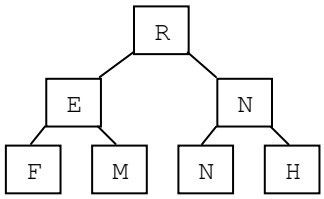
E. tree map



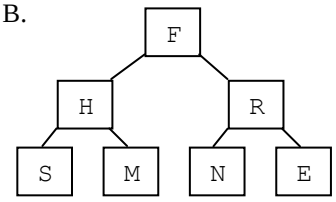
QUESTION 40

What will be the contents of the binary tree in Question 39 after it is sent to the method `myst` to the right?

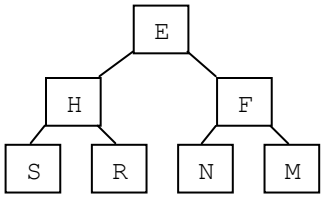
A.



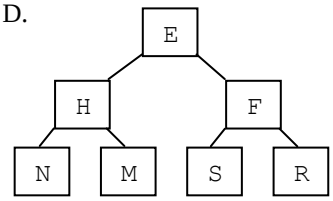
B.



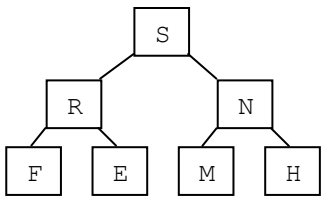
C.



D.



E.




```
public static void myst(TreeNode
                                root) {
 if(root != null) {
   TreeNode left = root.getLeft();
   TreeNode right = root.getRight();
   TreeNode t = left;
   left = right;
   right = t;
   myst(root.getLeft());
   myst(root.getRight());
 }
}
```