CODE @ TACC Invitational Written Exam, 4/21/18

All code and responses are based on Java v1.8. For all problems that use standard libraries such as **ArrayList**, assume that they have been imported. For all output statements, assume that the **System** class has been statically imported.

Answers go here ↓

1.	Which of the following has the same value as 10101001_2 A. 169_8 B. $A9_{12}$ C. 251_8 D. 251_{10} E. None of the above		C
2.	What is the value of the expression `2.5 * 2 / 2 * 2.5` A. 1 B. 1.0 C. 5.0 D. 6.25 E. None of the above		D
3.	What is output by the code to the right? A. %.2f B. 6.57 C. 6.575 D. 6.58 E. None of the above	`out.printf("%.2f", 6.575);`	D
4.	What is the value of the expression `9 > 2 && 3 < 2 || 3 > 2` A. true B. false C. None of the above		A

5.	What is output by the code to the right?
	
	A. php
	B. phphp
	C. phphphp
	D. ppp
	E. None of the above
		`String s = "php";`
		`s = s.replace("p", "php");`
		`s = s.replace("php", "p");`
		`out.println(s);`
			A

6.	What is output by the code to the right? A. 5.0 B. 5 C. 4.0 D. 4 E. None of the above	`out.println(Math.round(4.7));`	B

7.	What is output by the code to the right?
	
	A. 3
	B. 3.0
	C. 3.0f
	D. NaN
	E. None of the above
		`int n = 3;`
		`float f = n;`
		`String s = f + "";`
		`out.println(s);`
			B

8.	What is output by the code to the right?
	
	A. 4
	B. 5
	C. 6
	D. 7
	E. None of the above
		`int a = 3;`
		`switch(a) {`
		`  case 3: a++;`
		`  case 5: a++;`
		`  case 7: a++;`
		`}`
		`out.println(a);`
			C

9.	What is output by the code to the right?
	
	A. 1 5 10 15 20 25
	B. 1 5 10 15 20
	C. 1 5 25
	D. 1 5
	E. None of the above
		`for (int i = 1; i < 25; i *= 5) {`
		`  out.print(i + " ");`
		`}`
			D

10.	What is output by the code to the right?
	
	A. 5
	B. 11
	C. 15
	D. 25
	E. None of the above
		`int[] a = { 1, 4, 9, 16, 25 };`
		`int s = 0;`
		`for (int i = 0; i < a.length;  i++) {`
		`  s = (s + a[i]) / (i + 1);`
		`}`
		`out.println(s);`
			A

11.	Assuming that the file "input.txt" contains a single line of text 1 10 11 100 111, what is output by the code to the right?
	
	A. 1
	B. 5
	C. 8
	D. 10
	E. None of the above
		`Scanner scan = new Scanner(new`
		`  File("input.txt"));`
		`int count = 0;`
		`while(scan.hasNextLine()) {`
		`  if (scan.nextLine().contains("1")) {`
		`  count++;`
		`  }`
		`}`
		`out.println(count);`
			A

12.	What is output by the code to the right?
	
	A. 1
	B. 16
	C. 25
	D. 36
	E. None of the above
		`int count = 0;`
		`for (int i = 1; i < 5 * 2; i++) {`
		`  if (i % 2 == 1) {`
		`  count = count + i;`
		`  }`
		`}`
		`out.println(count);`
			C

13.	What is output by the code to the right? A. 1 B. 3 C. 5 D. 8 E. None of the above	`out.println(11 >> 2 << 2 % 3);`	D

14.	What is output by the code to the right? A. 0 B. -32767 C. -32768 D. 32767 E. None of the above	`out.println(Short.MIN_VALUE);`	C

15.	What is output by the code to the right?
	
	A. 0
	B. 3
	C. 4
	D. 6
	E. None of the above
		`ArrayList a = new ArrayList();`
		`ArrayList b = new ArrayList();`
		`for (int i = 0; i < 3; i++) {`
		`  a.add(i);`
		`  b.add(i);`
		`}`
		`a.add(b);`
		`out.println(a.size());`
			C

16.	What is output by the code to the right?
	
	A. 18
	B. 81
	C. 11
	D. 2
	E. None of the above
		`int a = 9;`
		`int b = 2;`
		`int c = a ^ b;`
		`out.println(c);`
			C

17.	What is output by the code to the right? A. 1 B. 3 C. 5 D. 8 E. None of the above	`out.println(11 >> 2 << 2 % 3);`	D

18.	What is output by a call to `seq(8);` ?
	
	A. 1248
	B. 8421
	C. 01248
	D. 84210
	E. 4444
		`void seq(int val) {`
		`  if (val > 1) {`
		`  seq(val / 2);`
		`  }`
		`  out.print(val);`
		`}`
			A

19.	What is output by the code to the right? A. -1 B. 0 C. 1 D. NaN E. None of the above	`out.println(-5 % -2 );`	A

20.	What is output by the code to the right?
	
	A. 01234
	B. 43210
	C. 23456
	D. 65432
	E. None of the above
		`Stack<Integer> s = new Stack();`
		`for (int i = 0; i < 5; i++) {`
		`  s.push(i);`
		`}`
		`for (int i = 2; i < 7; i++) {`
		`  out.println(s.pop());`
		`}`
			B

21.	What is output by the code to the right?
	
	A. *
	B. ***
	C. ****
	D. *****
	E. None of the above
		`for (int i = 1; i <= 4; i++); {`
		`  out.print("*");`
		`}`
			A

22.	What is output by the code to the right? A. 5.0 B. 5 C. 4.0 D. 4 E. None of the above	`out.println(5 / 2 * 2.0);`	C

23.	What is output by the code to the right?
	
	A. D
	B. A
	C. 4
	D. 1
	E. None of the above
		`Map<Character, Integer> m = new HashMap();`
		`for (char c = 'A'; c < 'E'; c++) {`
		`  m.put(c, (int)('E' - c));`
		`}`
		`out.println(m.get('D'));`
			D

24.	What is output by the code to the right? A. 2 B. 9 C. 10 D. 1001 E. None of the above	`String s = "1001";` `out.println(Integer.parseInt(s, 2));`	B

25.	What is output by the code to the right?
	
	A. [3, 1, 2, 5, 4, 6]
	B. [1, 3, 2, 5, 4, 6]
	C. [1, 2, 3, 4, 5, 6]
	D. [6, 5, 4, 3, 2, 1]
	E. None of the above
		`PriorityQueue<Integer> p;`
		`p = new PriorityQueue();`
		`p.add(3);`
		`p.add(1);`
		`p.add(2);`
		`p.add(5);`
		`p.add(4);`
		`p.add(6);`
		`out.println(p);`
			B

26.	What is output by a call to `odd(3);` ?
	
	A. true
	B. true3
	C. 3true
	D. False
	E. None of the above
		`boolean even(int n) {`
		`  out.print(n);`
		`  return n % 2 == 0;`
		`}`
		
		`void odd(int n) {`
		`  out.print((n % 2 == 1) && !even(n));`
		`}`
			C

<table>
<tr><td>27.</td><td>What is output by the code to the right?

A. 12.5
B. 13
C. 13.0
D. 13.5
E. None of the above</td><td><pre>float f = 12.5f;
f++;
out.println(f);</pre></td><td>D</td></tr>
<tr><td>28.</td><td>What is output by the code to the right?

A. 10
B. 11
C. 12
D. 65
E. None of the above</td><td><pre>int n = 5;
out.println(++n + n++);</pre></td><td>C</td></tr>
<tr><td>29.</td><td>What is output by the code to the right?

A. true
B. false
C. None of the above</td><td><pre>String s = "oh";
out.println(s == "oh");</pre></td><td>A</td></tr>
<tr><td>30.</td><td>What is output by the code to the right?

A. true
B. false
C. None of the above</td><td><pre>String s = "oh";
String s2 = "ohhai";
String s3 = s2.substring(0, 3);
out.println(s == s3);</pre></td><td>B</td></tr>
<tr><td>31.</td><td>What is output by the line marked //go1?

A. carburetor
B. injector
C. magic
D. None of the above</td><td rowspan="3"><pre>class Car {
  String fuel = "carburetor";
  public void accelerate() {
    out.println(fuel);
  }
}

class ModernCar extends Car {
  ModernCar() {
    fuel = "injector";
  }
}

class Tesla extends ModernCar {
  String fuel = "magic";
}

/** CLIENT CODE **/
Car c = new Tesla();
c.accelerate();   // go1
((ModernCar)c).accelerate();   // go2
((Tesla)c).accelerate();   // go3</pre></td><td>B</td></tr>
<tr><td>32.</td><td>What is output by the line marked //go2?

A. carburetor
B. injector
C. magic
D. None of the above</td><td>B</td></tr>
<tr><td>33.</td><td>What is output by the line marked //go3?

A. carburetor
B. injector
C. magic
D. None of the above</td><td>B</td></tr>
</table>

34.	What is output by the code to the right?
	
	A. true
	B. false
	C. None of the above
		`String s = "oh";`
		`String s2 = "ohhai";`
		`String s3 = s2.substring(0, 3);`
		`out.println(s.compareTo(s3));`
			C

35.	Which of the following numbers does not represent the number of leaf nodes in a full binary tree? A. 1 B. 3 C. 4 D. 8 E. None of the above		B
36.	What is the in-order traversal of the binary tree made by inserting the word BINARY using the traditional insertion method? A. IBNARY B. ABINRY C. YRNIBA D. BINARY E. None of the above		B
37.	Which of the following is equivalent to the boolean expression $A + !A + BC + C$? A. A B. B C. C D. *True* E. None of the above		C
38.	What is average case order of complexity for a binary search on an ordered list of *N* elements? A. O(1) B.O(N) C. $O(\log_2 N)$ D. $O(N \log_2 N)$ E. $O(N^2)$		C
39.	Which of the following is not a valid result for the operation N % 1024 where N is a positive integer? A. 0 B. 1 C. 1023 D. 1024 E. None of the above		D
40.	Which of the following is equivalent to the RPN (postfix) expression 4 2 + 3 * A. 12 B. 14 C. 18 D. 20 E. None of the above		C