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		
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		
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);`	
4.	What is the value of the expression `9 > 2 && 3 < 2 || 3 > 2` A. true B. false C. None of the above		

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);`	

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));`	

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);`	

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);`	

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 + " ");`
		`}`	

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);`	

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);`	

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);`	

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);`	

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);`	

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());`	

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);`	

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);`	

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);`
		`}`	

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 );`	

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());`
		`}`	

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("*");`
		`}`	

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);`	

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'));`	

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));`	

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);`	

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));`
		`}`	

27.	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
		`float f = 12.5f;`
		`f++;`
		`out.println(f);`	

28.	What is output by the code to the right? A. 10 B. 11 C. 12 D. 65 E. None of the above	`int n = 5;` `out.println(++n + n++);`	
29.	What is output by the code to the right? A. true B. false C. None of the above	`String s = "oh";` `out.println(s == "oh");`	

30.	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 == s3);`	

31.	What is output by the line marked `//go1`?
	
	A. carburetor
	B. injector
	C. magic
	D. None of the above
		`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`	

32.	What is output by the line marked `//go2`? A. carburetor B. injector C. magic D. None of the above		
33.	What is output by the line marked `//go3`? A. carburetor B. injector C. magic D. None of the above		

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));`	

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		
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		
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		
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. $O(N^2)$		
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		
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		