

★ ANSWER KEY – CONFIDENTIAL ★

UIL COMPUTER SCIENCE – 2018 INVITATIONAL A

Questions (+6 points for each correct answer, -2 points for each incorrect answer)

- | | | | |
|------------------|------------------|------------------|--------------------------|
| 1) <u> D </u> | 11) <u> B </u> | 21) <u> D </u> | 31) <u> C </u> |
| 2) <u> C </u> | 12) <u> A </u> | 22) <u> B </u> | 32) <u> A </u> |
| 3) <u> E </u> | 13) <u> C </u> | 23) <u> E </u> | 33) <u> B </u> |
| 4) <u> A </u> | 14) <u> A </u> | 24) <u> D </u> | 34) <u> B </u> |
| 5) <u> A </u> | 15) <u> D </u> | 25) <u> A </u> | 35) <u> E </u> |
| 6) <u> B </u> | 16) <u> B </u> | 26) <u> D </u> | 36) <u> B </u> |
| 7) <u> E </u> | 17) <u> E </u> | 27) <u> E </u> | 37) <u> A </u> |
| 8) <u> C </u> | 18) <u> C </u> | 28) <u> B </u> | 38) <u> C </u> |
| 9) <u> E </u> | 19) <u> C </u> | 29) <u> C </u> | *39) <u> -23 </u> |
| 10) <u> D </u> | 20) <u> A </u> | 30) <u> D </u> | *40) <u> 11001110 </u> |

* See "Explanation" section below for alternate, acceptable answers.

Note: Correct responses are based on **Java SE Development Kit 8 (JDK 8)** from Sun Microsystems, Inc. All provided code segments are intended to be syntactically correct, unless otherwise stated (e.g., "error" is an answer choice) and any necessary Java SE 8 Standard Packages have been imported. Ignore any typographical errors and assume any undefined variables are defined as used.

Explanations:

1.	D	128+64+32+16+8+4+2+1=255																				
2.	C	6*4*3+7-14/5 = 72+7-2 = 79-2 = 77																				
3.	E	println and \n both produce a new line.																				
4.	A	The trim method removes whitespace from either end of a string.																				
5.	A	!true ^ !false = false ^ true = true. Exclusive or (^) is true if one but not both of the operands are true.																				
6.	B	4 + 1.0 = 5.0																				
7.	E	5 - 4.75 + 5 = 0.25 + 5 = 5.25																				
8.	C	1.8 = 1.8 and 1.81 > 1.8																				
9.	E	<table><tr><td>Value of x</td><td>Number of hash tags</td></tr><tr><td>0</td><td>#</td></tr><tr><td>1</td><td>##</td></tr><tr><td>2</td><td>###</td></tr><tr><td>3</td><td>####</td></tr><tr><td>4</td><td>#####</td></tr><tr><td>5</td><td>#####</td></tr></table>	Value of x	Number of hash tags	0	#	1	##	2	###	3	####	4	#####	5	#####						
Value of x	Number of hash tags																					
0	#																					
1	##																					
2	###																					
3	####																					
4	#####																					
5	#####																					
10.	D	<table><tr><td colspan="5">Default value of a String variable is null.</td></tr><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Null</td><td>One</td><td>Two</td><td>Three</td><td>Four</td></tr></table>	Default value of a String variable is null.					0	1	2	3	4	Null	One	Two	Three	Four					
Default value of a String variable is null.																						
0	1	2	3	4																		
Null	One	Two	Three	Four																		
11.	B	The File class does not contain a hasNext method. The next method within the Scanner class returns a String, not a boolean.																				
12.	A	Since the initial value of x is zero, the value of t becomes and stays zero throughout the loop because of multiplication by zero. The value of x reaches 5, which ends the loop."																				
13.	C	++5 + (-8) * (int) 3.5 = 6 + (-8) * 3 = 6 + (-24) = -18. Casting a double to an int truncates 3.5 to be just 3.																				
14.	A	Range of values for the byte data type is -128 to 127.																				
15.	D	<table><tr><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>lamb</td><td></td><td></td><td></td></tr><tr><td>lamb</td><td>kid</td><td></td><td></td></tr><tr><td>pig</td><td>lamb</td><td>kid</td><td></td></tr><tr><td>pig</td><td>lamb</td><td>kid</td><td>calf</td></tr></table>	0	1	2	3	lamb				lamb	kid			pig	lamb	kid		pig	lamb	kid	calf
0	1	2	3																			
lamb																						
lamb	kid																					
pig	lamb	kid																				
pig	lamb	kid	calf																			
16.	B	[^aeiou] is a set that includes any character that is <u>not</u> a vowel. Therefore, the code prints true if a letter is a consonant and false if it is a vowel.																				
17.	E	The call stack is popped as follows 1+10+8+6+4+2+0, which equals 31.																				
18.	C	TreeSet stores elements in sorted order with no duplicates. The remove method returns false if the element to be removed is not in the set.																				
19.	C	nextInt(x) returns a random whole number from 0 inclusive to x exclusive. Therefore, (9 + 10) * 2 = 38 is the largest possible value.																				
20.	A	Any value or object may be stored as an Object data type. null is the default value for an unassigned object within an array.																				
21.	D	Field and instance variable have the same meaning. They are variables that contained within and belong to each instance of the class (every object that is instantiate from that class). A class variable is a static variable. There is only one class variable regardless of how many objects are instantiated from the class.																				
22.	B	The reserved word this designates the variable as an instance variable and not a local variable.																				
23.	E	Cannot access the field c from outside the class because it has been designated as private.																				
24.	D	The instance variable b was never assigned. Default value is 0.																				
25.	A	The ASCII value of S is 83 and s is 115. 83 – 115 = -32.																				
26.	D	A two-dimensional array is an array of arrays. So, the length is how many arrays are in the array. In this case 3. 0 + 2 + 8 + 6 = 16																				
27.	E	s = 18/(++17+(-5)--)= 18/(18-6) = 18/12 = 1. r is incremented by one and t is decremented by 1. So, r=18, s=1 and t=-6.																				
28.	B	A increments i, thus moving the wrong direction. C returns 0 if the character is not present in the string. D finds the first occurrence. E never returns anything.																				

29.	C	A is missing the multiplication operator. B uses integer division. 5/9=0.																					
30.	D	These are the values for each variable at the beginning of each iteration of the loop and the final line is the values after the loop has stopped execution. 10.0 5.0 8.0 13.0 9.0 5.0 14.0 13.0 12.0 25.0 17.0 9.0 26.0 21.0 16.0 37.0 25.0 13.0 38.0 29.0 20.0 49.0 33.0 17.0 50.0 37.0 24.0																					
31.	C	continue skips the remainder of the loop body. break stops loop execution. The loop executes until it encounters a character greater than or equal to n. Prior to that if the character is a vowel it is skipped. If it is a consonant, that characters ASCII value is added to sum. 109 + 103 + 100 = 312.																					
32.	A	<table><tr><td>i</td><td></td><td></td><td></td><td></td></tr><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>1 0</td></tr><tr><td>2</td><td>2</td><td>3</td><td>4</td><td>1 0</td></tr><tr><td>3</td><td>1</td><td>2</td><td>3</td><td>4 0</td></tr></table>	i					1	2	3	4	1 0	2	2	3	4	1 0	3	1	2	3	4 0	
i																							
1	2	3	4	1 0																			
2	2	3	4	1 0																			
3	1	2	3	4 0																			
33.	B	An insertion sort works by choosing the next element in the array and then placing it into its proper location within the already sorted portion of the array. A common analogy is picking up playing cards from a table and placing them in order in your hand.																					
34.	B	Best Case O(n), Average Case O(n²), Worst Case O(n²)																					
35.	E	The first value is the root. After inserting the root, in this case 1, each value is inserted to the right if it is greater than the root or to the left if it is less than the root. After moving to the left or right of the root, the next node is considered the root and the process is repeated until there is no longer another node to compare to.																					
36.	B	Weighted means each edge has a value. Directed means you can only travel one direction along an edge. This graph is not complete because not every pair of vertices are connected.																					
37.	A	!((true&&false)^false) = !(false ^ false) = !false = true																					
38.	C	Elements within a linked list must be traversed from the first node and progressing one node at a time. The element to be accessed might be the last element in the list.																					
39.	-23	19 4 5 + -5 - 3 * - = 19 9 -5 - 3 * - = 19 14 3 * - = 19 42 - = -23																					
40.	11001110	Binary value of 50 is 00110010. Find the complement (flip the bits) to get 11001101, which represents the value -51 (complement is opposite, minus 1). Add 1 to get 11001110.																					