

AP[®] COMPUTER SCIENCE A 2019 SCORING GUIDELINES

Question 4: Light Board

Part (a)	LightBoard	4 points
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Intent: Define implementation of a constructor that initializes a 2D array of lights

- +1 Creates a new `boolean[numRows][numCols]` and assigns to instance variable `lights`
- +1 Accesses all elements in the created 2D array (*no bounds errors*)
- +1 Computes the 40% probability
- +1 Sets all values of 2D array based on computed probability

Part (b)	evaluateLight	5 points
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Intent: Evaluate the status of a light in a 2D array of lights

- +1 Accesses an element of `lights` as a `boolean` value in an expression
- +1 Traverses specified `col` of a 2D array (*no bounds errors*)
- +1 Counts the number of `true` values in the traversal
- +1 Performs an even calculation and a multiple of three calculation
- +1 Returns `true` or `false` according to all three rules

Question-Specific Penalties

- 1 (z) Constructor returns a value
- 1 (y) Destruction of persistent data

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Question 4: Scoring Notes

Part (a) <code>LightBoard</code>			4 points
Points	Rubric Criteria	Responses earn the point even if they...	Responses will not earn the point if they...
+1	Creates a new <code>boolean[numRows][numCols]</code> and assigns to instance variable <code>lights</code>		<ul style="list-style-type: none"> initialize a local variable that is never assigned to <code>lights</code> omit the keyword <code>new</code> use a type other than <code>boolean</code>
+1	Accesses all elements in the created 2D array (<i>no bounds errors</i>)	<ul style="list-style-type: none"> fail to create <code>lights</code> but assume <code>lights[numRows][numCols]</code> 	
+1	Computes the 40% probability	<ul style="list-style-type: none"> use <code>Math.random() <= .4</code> 	<ul style="list-style-type: none"> incorrectly cast to <code>int</code>
+1	Sets all values of 2D array based on computed probability	<ul style="list-style-type: none"> only assign <code>true</code> values 	<ul style="list-style-type: none"> compute a single probability but use it multiple times reverse the sense of the comparison when assigning
Part (b) <code>evaluateLight</code>			5 points
Points	Rubric Criteria	Responses earn the point even if they...	Responses will not earn the point if they...
+1	Accesses an element of <code>lights</code> as a <code>boolean</code> value in an expression		<ul style="list-style-type: none"> access <code>lights</code> as a type other than <code>boolean</code>
+1	Traverses specified <code>col</code> of a 2D array (<i>no bounds errors</i>)		
+1	Counts the number of <code>true</code> values in the traversal	<ul style="list-style-type: none"> access too many or too few items in a single column access a single row instead of a single column 	<ul style="list-style-type: none"> count an item more than once
+1	Performs an even calculation and a multiple of three calculation		<ul style="list-style-type: none"> use <code>/</code> instead of <code>%</code>
+1	Returns <code>true</code> or <code>false</code> according to all three rules	<ul style="list-style-type: none"> have an incorrect column count but use the correct logic 	<ul style="list-style-type: none"> fail to return a value in some case implement counting loop more than once with one loop that is incorrect