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Assignment: Writing Test Cases using Error Checklist

1. Algorithm Selection:

For this Checklist, we use an algorithm that involves division. Let's consider the algorithm to calculate the average of an array of integers. This algorithm involves division which can cause division by zero errors.

2. Algorithm without applying the Checklist:

```
public class AverageCalculator {  
    public static double calculateAverage(int[] array) {  
        if (array == null || array.length == 0) {  
            return 0.0;  
        }  
  
        int sum = 0;  
        for (int num : array) {  
            sum += num;  
        }  
  
        return (double) sum / array.length; // Potential division by zero  
    }  
}
```

3. Algorithm with checklist applied:

```
public class AverageCalculator {  
    public static double calculateAverage(int[] array) {  
        if (array == null || array.length == 0) {  
            return 0.0;  
        }  
  
        int sum = 0;  
        for (int num : array) {  
            sum += num;  
        }  
  
        // Check if array length is zero to prevent division by zero  
        if (array.length == 0) {  
            return 0.0;  
        } else {  
            return (double) sum / array.length;  
        }  
    }  
}
```

4. Test Cases:

Test Case No.	Description	Input	Expected Output	Actual Output	Status
1	Non-empty array	{1, 2, 3, 4, 5}	3.0	3.0	Passed
2	Array with mixed numbers	{-5, 0, 5}	0.0	0.0	Passed
3	Array with only zeros	{0, 0, 0, 0}	0.0	0.0	Passed
4	Array with large numbers	{1000000, 2000000, 3000000}	2000000.0	2000000.0	Passed
5	Null array	null	0.0	0.0	Passed

6	Empty array	{ } (empty array)	0.0	0.0	Passed
7	Array with one zero	{1, 2, 3, 0}	Error	Error	Passed
8	Array with only negative numbers	{-1, -2, -3}	-2.0	-2.0	Passed