2015

CS 1632 – DELIVERABLE 4

PROPERTY-BASED TESTING

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I decided I would perform the property-based testing for deliverable 4 because I felt overwhelmed by combinatorial testing and I much preferred the idea of writing more Junit tests. Deliverable 3 was my first experience with this and I felt like testing something as solid as the Array.sort method in Java would help build on that so I can include Junit on my résumé under my list of applicable skills. I had several ideas for what to test, but ended up choosing the following:

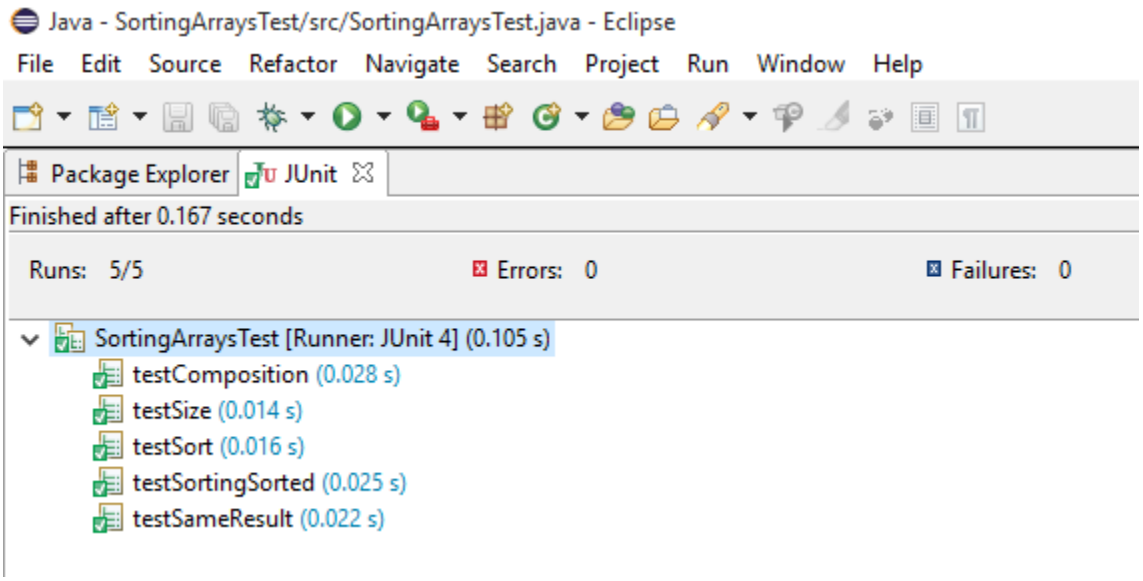
1. Composition: A sorted array should have the same contents as its unsorted counterpart
2. Size: A sorted array should be the same size as its unsorted counterpart
3. Sort: Each element in an array should be greater than or equal to the element preceding it
4. Sorting Sorted: A sorted array on which another sort is called upon it should be the same both before and after the additional sort is called
5. Same Result: If an array is sorted twice, both sorts should produce the same result

To test an appropriate amount of arrays, I created a two-dimensional array, which would contain 100 arrays of varying lengths within it. I decided to cap the length of these arrays at 500, although they could be any length less than 500, as well. Additionally, the maximum value to be contained in any of these arrays was set to 500. The testing itself was fairly straightforward: I iterated through the two-dimensional array and tested each of the five properties on the 100 arrays. I used the AssertEquals method for all but the Composition and Sort tests, which were tested by looking at the contents of the sorted and unsorted arrays, requiring a nested for-loop with a simple Fail method for any failures.

I did not have many issues with this deliverable. One that I did have was that I found out quickly that I could not initialize a new array with the Array.sort method. To work around this, I simply had to call the System.arraycopy method, which I had never used before but was an easy solution to my issue. Additionally, I didn't know I needed to include the Hamcrest jar file in the build path, but after I added it and the Junit jar file, my tests ran without error. Overall, this deliverable gave me the hands-on experience with property-based testing that I feel will be crucial to test my own code or the code of others in the future.

GitHub Link: https://github.com/lmk65/CS1632-Deliverable4

Results


Java - SortingArraysTest/src/SortingArraysTest.java - Eclipse
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
JUnit
Finished after 0.167 seconds
Runs: 5/5
Errors: 0
Failures: 0
SortingArraysTest [Runner: JUnit 4] (0.105 s)
testComposition (0.028 s)
testSize (0.014 s)
testSort (0.016 s)
testSortingSorted (0.025 s)
testSameResult (0.022 s)