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Assignment 3 -CMPT 276

Two Algorithms for testing - n long (n)

1) Quick sorting algorithm : it divides and conquers that selects the pivot point from the array and its partitions the other elements into two sub-arrays. The sub-array then gets sorted with recursion.
2) Shell sorting algorithm : in place comparison sort.

Coverage result after functional test

Functional testing does not consider the internal structure but it focuses on testing the functionality of the software according to the requirements.

1) QuickSort
    a) Coverage - functional testing covered where sorting arrays of different sizes like empty, single-elements as well as large arrays. Also checked in reverse order and arrays that are already sorted.
    b) Result - testing went through and validated. All strings and integers was correct but since the functional tests are based on specifications and not internal logic, some edge cases and error handling were not explicitly tested.
2) ShellSort
    a) Coverage - Similar to the quicksort, all the tests include empty arrays, single element array, reverse order.
    b) Result - functional tests went through and validated. Like quicksort it does sort all the arrays and do all functional requirements but potential edge cases and specific internal behaviours were not explicitly tested.

Coverage result after adding structural tests

Structural testing is testing the software's internal structures or workings which covers code paths, branches, loops, and also conditions.

1) QuickSort
    a) Coverage improvement - adding the structural test, I was able to explore more internally with the decision points like choice of pivot point and efficiency of the partitioning.
    b) Result - it improved in code coverage, verifying the handling of edge cases.
2) ShellSort
    a) Coverage improvement - focused on variation of gap size and the impact on sorting efficiency.
    b) Result = deeper understanding of the shell sort algo behaviour under different conditions leading to full coverage.

From this assignment, applying functional tests helps for the correctness and successful sorting array algorithms under the general conditions. The addition of the structural tests increased the coverage significantly.