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CS 472

CS 472 Final Project Proposal

We plan to verify complex searching and sorting algorithms which are radix sort, bucket sort and counting sort. We will be using Dafny to verify those programs because of its simplicity to write, simplicity of readability and debugging code. We think that the top-level theorem is as for example an input array "arr" that has length "n" of at least 0, we can apply a sorting algorithm such as "bucket_sort(a)", then return a new array "arr' that's verified with the conditions that it is sorted in ascending order, the length of arr' is equal to n, every element in arr is also in arr' and every number frequency from arr is the same as in arr'". We can represent all of this as "If the precondition is an array, after sorting the array we do if or if-else statements to check for the conditions and after verifying all conditions are met, then return the new array". We were interested in this topic because we wanted to try new languages and frameworks we haven't heard of before and we wanted to also understand the particular reasons why certain languages and frameworks are used and if they are popular and what their capabilities are when applying those libraries, languages and frameworks.