

COP 3502 Suggested Program Edits: Dynamic Memory Allocation (Week 1 Programs)

- 1) Edit the file `dynarrayfunc.c` so that you add a function that takes in an integer array, its length, and the maximum value stored in the array (assume the minimum is 0), and returns a dynamically allocated frequency array, where `array[i]` stores how many times the value `i` occurred in the original array. Then, print out the contents of this frequency array to make sure that your code work. Test with small numbers.
- 2) Continue editing `dynarrayfunc.c` so that another function takes in a frequency array and prints a bar graph. Test this function with small values as well.
- 3) To either `arrayallocation.c` or `arrayallocation2.c`, add a function that takes in the dictionary of words, the number of words in the dictionary, and returns the length of the longest word in the list.
- 4) To either `arrayallocation.c` or `arrayallocation2.c`, add a function that takes in the dictionary of words, and a word, and prints out all the words in the dictionary that are anagrams of the input word. (An anagram is a rearrangement of the letters in a word. So "CARE" is an anagram of "RACE".)
- 5) To either `arrayallocation.c` or `arrayallocation2.c`, add a function that takes in the dictionary of words, and a string, which represents the letters available to use to make a sign. This string may have repeats. The function should return the number of words in the dictionary that can be formed with the letters in the input string. For example, if the second string is "THERART", then words such as "THREAT", "ART" and "RATHER" should be counted, but "HAH" should not. (Note that there is only one 'H' in "THERART" but "HAH" has 2 H's. For the other three words, there are enough copies of each letter in the string "THERART" to form the word.) Note that the solution to this problem should be a relatively small edit to the solution to problem #1.
- 6) To the file `dynarrayofpointers.c`, add a function that takes in pointers to two struct points and returns the Manhattan distance between the two points. Write another function which takes in a pointer to a struct point and a double pointer to a struct point (storing an array of points) and returns the longest Manhattan distance between the first point and any of the points in the array. Test your function with a small set of points.
- 7) Add a function to `dynarrayofstruct.c` which takes in an array of struct, its length, a boolean value (set to 0 to represent x, and set to 1 to represent y), and an integer and returns how many points in the array have either an x or y coordinate equal to the last integer. Here is the function prototype:

```
// Returns the number of points in array that have the appropriate coordinate
// equal to target. If isY == 1, then the # of points where the y coordinate
// is equal to target is return. If isY == 0, then the # of points where the
// x coordinate is equal to target is returned.
int numPtsOnLine(struct point array[], int size, int isY, int target);
```

Test your function appropriately.