CSC 212: Data Structures and Abstractions
Spring 2018
University of Rhode Island

Weekly Problem Set #7

Due Thursday 3/8 before class. Please turn in neat, and organized, answers hand-written on standard-sized paper **without any fringe**. At the top of each sheet you hand in, please write your name, and ID. The only library you're allowed to use in your answers is `iostream`.

1. Write a recursive function that performs binary search on an array of positive integers. Your function must match the prototype: `int bin_search(const int target, const int* arr, int n);`. If you find a match, return that value, otherwise return -1.
2. List each recursive call to your function given the following starting point:

   `bin_search(2, [1,2,3,4,5,6,7,8], 8);` (you should end up with a list of calls that end when the target value is found)
3. Again, list each recursive call from the following starting point: `bin_search(10, [5, 7, 8, 9], 4);`
4. Modify your binary search to return the number closest in value to the target (also known as ápproximate search)́.
5. Without looking at your previously written code, write a recursive mergesort function.
6. Why is mergesort preferable to insertion sort on large datasets?
7. Why is insertion sort preferable on smaller datasets?
8. Is mergesort stable? Why?

The following is considered optional.

1. Describe the mechanism behind binary interpolation search, and modify your search to use the approximation technique described. A link about interpolation search