

FYS 102: Bioinformatics
Homework 2
Due Monday, September 17

1. Write a python function that returns the largest and smallest items in a list of numbers. (After finding the largest and smallest items, put them into a list, and then return the list.) Consider the number of comparisons between items that your algorithm performs. Can you write an algorithm that requires only $3n/2$ comparisons, where n is the length of the list?
2. Suppose you are given an unsorted list of $n - 1$ distinct integers from the range 1 to n . Write a python function that finds the missing integer between 1 and n .
3. We saw in class that the greedy change making algorithm was incorrect for the set of denominations (25, 20, 10, 5, 1). Add a new denomination to this list such that the greedy algorithm will return the *correct* change combination for any value of M .
4. Implement the greedy change making algorithm (for U.S. change only) as a python function. Your function just needs to return the total number of coins. Then design another function that computes the average number of coins returned by the change making function as M varies between 1 and 100.

Start early and have fun!