University of Waterloo
CS240 Fall 2017
Assignment 2 Post Mortem

Problem 1

Many students did not include the base case in part a

Some students simply stated, rather than showed, that the mean is equivalent to the $\frac{(n-1)}{2}$'th element in part b

In part c many students used the example of all the elements being the same, which relies on the assumption that the algorithm uses a inefficient way of dealing with duplicate elements. For full marks students should have given an example which did not rely on that assumption.

Problem 2

Some students provided examples that were not $O(n \log \log n)$. Others provided examples that achieved the desired time complexity, but did not completely sort the array (e.g. assuming that each element in a block of size $\log n$ is greater than every element in the previous block and just sorting each block separately).

Problem 3

Parts a and b were generally well done.

For part c, some students provided a recurrence relation, but did not solve it.
Some students tried to express T(n) as a $\sum_{k=1}^{\infty} f(n,k)$ where k is the depth of recursion, but did not give the recurrence relation.

Problem 4

Part a was poorly done. Many students gave the answer of $n-1$. Often, students proposed a specific algorithm and calculated a lower bound for it, or assumed that all coins have to be compared individually to another coin at least once, but did not prove why.

Parts b and c were well done, though some students did not include a runtime analysis with their algorithms.

Problem 5

Part a was well done, though some students just mentioned the need to bubble down, while if the element swapped in is larger than its new parent, we would need to bubble-up instead.

Many students did not submit code for part b. Some students submitted code that did not compile.
A common mistake in the implementation of removeMaxWins and removeMinLosses was to only remove the team from the max or min heap, respectively, instead of removing the team from both.