Advanced Algorithms | Fall 2018
CS 5350/6350 | Professor L. Longpré

Assignment 3
Due 10/2/2018

Consider the following (very inefficient) randomized algorithm to find the median of an array of size n (where n is odd) containing distinct integers.

- Pick a random number i between 1 and n.
- Compare the number v at index i, with every other numbers in the array. If the count of the numbers that are less v is exactly $\lfloor n/2 \rfloor$, output v and exit.
- Otherwise, restart the algorithm from the beginning.

Answer the following questions. Explain your answers.

1. What is the probability that the algorithm will find the median in the first try?
2. What is the expected number of times the algorithm will restart?
3. What is the expected running time of the algorithm?