Median-of-Median Algorithms with different Stopping Lengths

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Q1.

Since we are given m longer part of the L-length bar, it is equivalent to m samples sampled uniformly from .The smallest value in these m-longer samples are the 1st order statistics of these samples drawn from uniform distribution.

It can interpreted as that the m sticks falls on to the region, therefore, the region is dissembled into sectors, the length of the sectors should be uniformly distributed. Since it is a uniform distribution, every stick out of the m sticks’ length will have a same probability to fall into the sectors. The expected length of each sector will be the ratio of the remaining length of and the sector number . The shortest stick will be the one with the closet distance from the starting point. Therefore, the shortest stick should fall in the sector closest to the starting point of length , the sector length mean is Therefore, the mean length of the smallest of these m-many longer-pieces of candy stick is .

Q2.

From Q1, we have found that the shortest length of the worst case array length is . Therefore, we will have the following formula for the execute time if the array size is n:

Following the previous process: