LAB 2

DSA LAB

Finding Weighted Median

A stream of online integers (along with positive weights w > 1) keeps arriving. At each instant one has to store the element and perform the following operations if requested (menu based)

1. Get weighted median
2. Delete an element

Note that an element 'e' arrives along with its weight 'w'. At that instant, one has to normalize all the weights of all the currently stored elements and recompute the weighted median. Note that when you normalize, the weights become probabilities. The weighted median is defined as follows

Maximum over all the stored elements whose cumulative probabilities until that element are less than or equal to half

Example: (10, 4), (1, 1), (3,2), (9,3), (4, 10) (Here second element in the pair is the weight)

Normalizing will give (10, 0.2), (1, 0.05), (3,0.1), (9,0.15), (4,0.5)

Sort it based on the integer values we get, (1,0.05), (3,0.1), (4,0.5), (9,0.15), (10,0.2),

Cumulative prob until 1 is 0.05 , Cumulative prob until 3 is 0.05+0.1 = 0.15

Therefore weighted median is 3

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