

Lab W2D2

Question 1. Skip List

Create a Skip list starting with no values and inserting each value one at a time. Result of the coin toss after inserting is also shown below. Based on this information, draw a skip list. How will you characterize the skip list produced?

Insert(10)	T
Insert(20)	HT
Insert(30)	T
Insert(40)	HHT
Insert(50)	T
Insert(60)	HT
Insert(70)	T
Insert(80)	HHHT

Question 2. Experimenting with lower bound

Devise an algorithm to sort 4 elements using exactly 5 comparisons in the worst case. Does this violate the theoretical lower bound? Justify your answer.

Question 3. Exploring new ideas: Forward and backward sorted array (FBS array)

Definition

An array is said to be a FBS array if it satisfies the following three conditions.

- (1) Elements in the odd locations are sorted in the ascending order.
- (2) Elements in the even locations are sorted in the descending order.
- (3) Every element in the even locations are \leq every element in the odd locations.

Example {7, 20, 10, 19, 10, 17, 14, 15, 15}

Devise an algorithm to FBSort (that will make an array a FBS array). What is the asymptotic running time of your algorithm? What is the fastest possible asymptotic running time for such an algorithm? Justify your answer.