Tutorial 5: Skip-Lists and Hashtables

General Instructions

You do not need to submit your solution. We will discuss the questions during the tutorial sessions in week 10.

Exercise 1 *Skip Lists*

1. Recall from lectures that the height of a list at the insertion of an element into a skip-list is h where h is the number of flips of a coin that it takes until a *head* is achieved.

   Given the information above, draw the development of a skip-list resulting from the insertion of the elements:

   $$20, 11, 17, 3, 45, 76, 23, 14$$

   assume that the corresponding sequence of coin flips is:

   $$HTTHHTHTHTTTHTHHTTHHHTTTTHTH$$

   where H stands for heads and T stands for tails. Show the skip-list after each insertion.

Exercise 2 *Hash Tables*

1. Insert the key sequence 7, 18, 2, 3, 14, 25, 1, 11, 12, 1332 with hashing by chaining in a hash table with size 11. Please show the final table by using the hash function h(k) = k mod 11.
2. Please show the final table if we use linear probing instead.
3. Investigate by yourself what is "quadratic probing" and "double hashing". Both can be considered improved versions of linear probing. Please find out where they improve upon linear probing.

End of Questions