

Q1. 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:

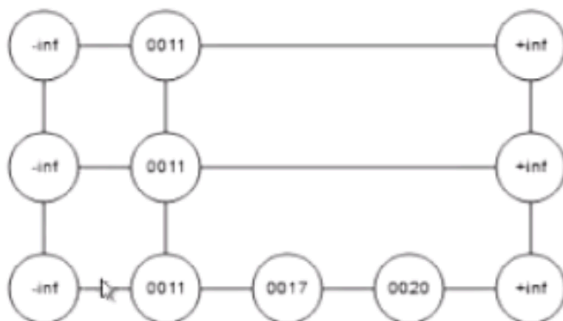
20,11,17,3,45,76,23,14

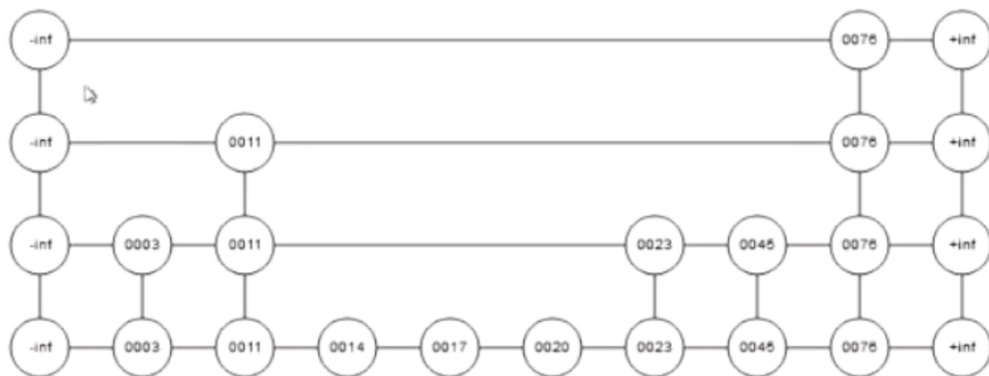
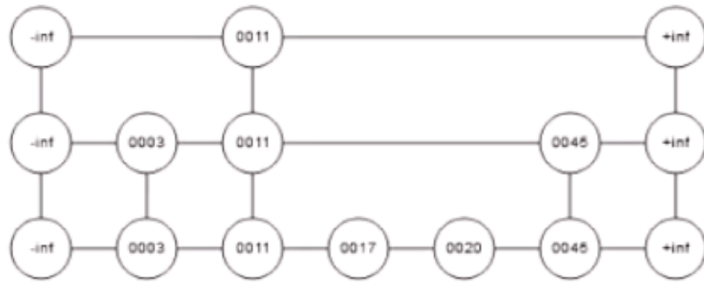
assume that the corresponding sequence of coin flips is:

HTTHHTHTHTTTHTHHTTHHHTTTTHTH

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

A1:





Q2. Derive the expression for the expected height h of an element inserted into a skiplist.

A2: Flip a coin until “head”. If h trials are needed, the height of x is h . Thus, the probability for height h is $\left(\frac{1}{2}\right)^h$ and the expected height is $\sum_{1 \leq h \leq \infty} h \cdot \left(\frac{1}{2}\right)^h = 2$