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# Discrete Mathematics for Bioinformatics (P1)

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## Exercises 7

### 1. Skip lists

Compute the expected value for the height ( $h$ ), search time and space consumption if the probability  $p$  for each coin flip to produce a 1 is  $1/3$ .

### 2. "sparse" skip list

Each node in the skip list has up to two incoming directed edges pointing to other nodes in the skip list.

(a) Which edges are really necessary for a search and which can be removed?

### 3. Inverse Queens Problem

The *inverse queens problem* consists in placing  $n$  queens on a  $n \times n$  chess board, one queen per row, such that each pair is either in the same column or in the same diagonal.

(a) Model the problem as a constraint satisfaction problem.

(b) Solve the problem for  $n = 4$  by

- forward checking
- partial lookahead

assuming that the first queen is placed in column 2.