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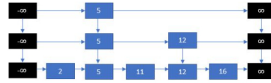
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1. Consider the following instance of a skip list data structure.

1 / 1 point



Select all the true facts about skip lists.

✔ Suppose we wish to search for the node 12 in this skip list, our search will reach this node through the path $(-\infty) \rightarrow 5 \rightarrow 5 \rightarrow 12 \rightarrow 12$.

✔ Correct
Correct.

✔ In this skip list, suppose we wish to insert a new node and flip coins with probability $1/2$ to recreate nodes in the levels above, the probability that at least one new level is created is $1/8$.

✔ Correct
Correct.

❑ In this skip list, we can reach any node from the sentinel $(-\infty)$ with a path of length 5 or smaller.
Note: length of a path is number of nodes including the sentinel itself.

❑ The bottom row of the skip lists contains all the elements we have inserted so far but not in a sorted order.

2. Consider part of the path taken through the skip list during the process of finding an element X.

1 / 1 point



We reach the level from above at node X_1 and continue at this level until we reach X_k . The nodes one level above are shown in black. They include X_1 and the node to its right in the level above X_j .

Select all the true facts about the values/nodes $[X_1, \dots, X_k]$ and X_j in relation to the key X that we wish to find.

✔ It holds that all keys $[X_1, \dots, X_k]$ are less than or equal to X .

✔ Correct
True. Otherwise, we will need to move down before X_k .

✔ $X_j > X$

✔ Correct
True. Otherwise, we would move from X_1 to X_j in the level above and not bother traversing X_1, \dots, X_k in the level below.

✔ The nodes $[X_k, \dots, X_{k+1}]$ cannot have a pointer from the level above down.

✔ Correct
True. Or else, we would have traversed to that node in the level above before moving down a level.

✔ If the probability that upon insert each node is replicated one level up is $1/2$, then the probability that $[X_2, \dots, X_k]$ do not have a pointer from the upper level and X_1 does is $1/(2^k)$.

✔ Correct
True. This is just k independent coin tosses where we have $k-1$ tails but 1 heads.

✔ The expected length of the path taken by find at any level is given by that of a geometric distribution with probability $1/2$ of success.

✔ Correct
True.