Congratulations! You passed!
TO PASS 60% or higher

Keep Learning

GRADE
66.66%

Hashing

TOTAL POINTS 3

1. What is the minimum size of an array that can be used in the direct addressing scheme to store a map from 7-digit phone numbers to names? **1 / 1 point**

- (•) 10000000
- ( ) 20000000
- ( ) 1000000

✓ **Correct**
Correct! 7-digit phone numbers correspond to integers from 0 to 9999999.

2. If it is guaranteed that the total length of all occurrences of a $Pattern$ in a $Text$ is at most L, which of the below estimates of the average running time of Rabin-Karp's algorithm to find all occurrences of the $Pattern$ in the $Text$ is the most tight out of the correct ones? **1 / 1 point**

- ( ) $O(|Text||Pattern| + L)$
- ( ) $O(|Text||Pattern|L)$
- (•) $O(|Text| + |Pattern| + L)$
- ( ) $O(|Text| + |Pattern|)$

✓ **Correct**
Correct! Estimate from the lecture is $O(|Text| + (q + 1)|Pattern|)$, where q is the number of occurrences of the $Pattern$ in the $Text$, and $L = q|Pattern|$ in this case.

3. Let us slightly change the polynomial hash function for strings and set $h(S) = (\sum_{j=0}^{|S|-1} x^{|S|-1-j} S[j]) \bmod p$. Let us fix some $Text$ and some $Pattern$. Denote by $H[i]$ the hash function of the substring $Text[i..i + |Pattern| - 1]$ of the $Text$ starting from position i and having the same length as $Pattern$ (for all appropriate positions i where the $Pattern$ can occur in the $Text$). Which of the below formulas is the correct recurrence to compute $H[i + 1]$ given $H[i]$? **0 / 1 point**

- ( ) $H[i + 1] = (xH[i] + Text[i + |Pattern| - 1] - x^{|Pattern|}Text[i]) \bmod p$
- (•) $H[i + 1] = (xH[i] + x^{|Pattern|}Text[i + |Pattern|] - Text[i]) \bmod p$
- ( ) $H[i] = (xH[i + 1] + Text[i] - x^{|Pattern|}Text[i + |Pattern|]) \bmod p$
- ( ) $H[i + 1] = (xH[i] + Text[i + |Pattern|] - x^{|Pattern|}Text[i]) \bmod p$

✗ **Incorrect**
Note that the first letter of the substring should be multiplied by the largest power of x, and the last letter of the substring should be multiplied by $x^0 = 1$ while computing the hash function for it.