

Instructions

1. This is an individual assignment. You must do your own work.
2. Show all work. Incomplete solutions will **not** receive full credit

Problem 1 (8 Points)

Given two hash functions: $h_1(x) = (x + 5) \% 7$ and $h_2(x) = 3x \% 7$, compute the hashes for the values listed in the table.

x	$h_1(x)$	$h_2(x)$
5		
8		
7		
3		

Problem 2 (4 Points)

Suppose a DNS (domain name server) is using a cache to keep a table that associates a name its corresponding IP address. It uses a bloom filter with m bits (by hashing k values) to quickly determine whether the user's query is stored in its cache of n IP addresses. However, the current values of m and n have caused many false positives, increasing search time.

1. List two steps that can be taken to reduce collisions and
2. a short explanation why it would reduce collisions

Problem 3 (3 Points)

Give the pre-order traversal of the following tree.

