COMP 550
Algorithms and Analysis
Spring 2020
Pop Quiz 7
Tuesday, April 7, 2020
Don't forget to write your name on the quiz sheet.

1. Suppose one is using hashing by multiplication and A is .528 and the table size m is 20 and the key k is 10. Which bin will this key hash to? _____

2. Suppose one is using hashing by division (remainder) and the table size m is 53 and the key k is 217. Which bin will this key hash to? _____

3. Suppose one is doing universal hashing and the table size m is 100 and there are 1000 hash functions in all in the set H. Let x and y be two distinct keys. What is the maximum number of hash functions h in H such that $h(x) = h(y)$, according to universal hashing?

Possible answers for 4 through 10: a. Linear probing b. Quadratic probing c. Double hashing d. Binary search trees e. Height balanced binary search trees f. Treaps g. Red black trees h. Cryptographic hashing i. None of the above

4. Which hashing method suffers from secondary clustering but not primary clustering? _____

5. Which hashing method does not suffer from primary or secondary clustering? _____

6. Which hashing method suffers from primary clustering? _____

7. Which hashing method hashes arbitrarily long bit strings into fixed length bit strings, and is extremely unlikely to give the same value for two different strings? _____

8. Which data structure for sets permits the dictionary operations (search, insert, delete, max, min, predecessor, successor) to be performed in worst case logarithmic time on all inputs? _____

9. Which data structure for sets permits the dictionary operations to be performed in expected logarithmic time on all inputs but not worst case logarithmic time? _____

10. Which data structure for sets permits the dictionary operations to be performed in expected logarithmic time on random inputs but may always require linear time on bad inputs? _____