Elementary Data Structures and Algorithms

Hashing and Hash Tables

Concept: *hash tables*

1. Consider chaining as a collision strategy. What are the best possible worst case behaviors for insertion and finding, respectively?

    A. linear and quadratic

    B. quadratic and linear

    C. constant and linear

    D. constant and constant

    E. constant and linear

    F. linear and linear

2. Consider open addressing as a collision strategy. What are the best possible worst case behaviors for insertion and finding, respectively?

    A. linear and linear

    B. constant and constant

    C. quadratic and linear

    D. linear and constant

    E. constant and linear

    F. linear and quadratic

3. Consider rehasing with a perfect hash as a collision strategy. What are the best possible worst case behaviors for insertion and finding, respectively? Assume finding a perfect hash takes linear time.

    A. linear and quadratic

    B. linear and constant

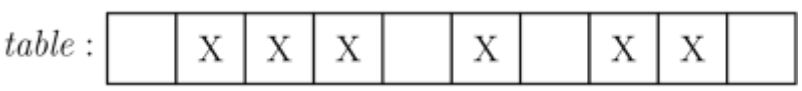
    C. constant and linear

    D. quadratic and linear

    E. linear and linear

    F. constant and constant

Consider a hash table that resolves collisions via open addressing. Suppose an array serving as a table is in the following state:



with Xs marking the filled slots. Assume the slots are numbered using zero-based

indexing, the hash function is equally likely to return any of the indices, and the direction of probing is left to right with wrap-around.

4. What is the probability that slot 0 is examined?

    A. 3 10

    B. 2 21

    C. 1 10

    D. 3 21

    E. 2 10

    F. 1 21

5. What is the probability that slot 2 is examined?

    A. 3 10

    B. 2 21

    C. 1 21

    D. 1 10

    E. 2 10

    F. 3 21

6. What is the probability that slot 6 is examined?

    A. 1 21

    B. 3 21

    C. 2 10

    D. 3 10

    E. 2 21

    F. 1 10

7. What is the probability that element to be inserted initially hashes to slot 2?

    A. 3 21

    B. 1 21

    C. 2 10

    D. 3 10

    E. 2 21

    F. 1 10

8. What is the probability that element to inserted ends up in slot 5?

    A. 0.3

    B. 0.1

    C. 0.2

    D. 0.5

    E. 0.4

    F. 0

9. What is the probability that element to inserted ends up in slot 9?

    A. 0.2

    B. 0

C. 0.4

D. 0.5

E. 0.3

F. 0.1