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1. Consider a hash table of size seven, with starting index zero, and a hash function `(3x + 4) mod 7`. Assuming the hash table is initially empty, which of the following is the contents of the table when the sequence `1, 3, 8, 10` is inserted into the table using closed hashing? Note that '_' denotes an empty location in the table.

A. `1, _, _, _, _, _,3`
B. None of the above are correct.
C. `1, 10, 8, _, _, _, 3`
D. `8, _, _, _, _, _, 10`
E. [Correct Answer] [Your Answer] `1, 8, 10, _, _, _, 3`

2. Which of the following statement(s) is FALSE?

(i) A hash function takes a message of arbitrary length and generates a fixed length code.

(ii) A hash function takes a message of fixed length and generates a code of variable length.

(iii) A hash function may give the same hash value for distinct messages.

A. i only
B. i and iii only
C. [Correct Answer] [Your Answer] ii only
D. None of the other options are correct.
E. ii and iii only

3. Given a hash table `T` that can store 80 elements and has 100 slots, the load factor `alpha` for `T` is:

A. 12.5
B. 0.125
C. [Your Answer] None of the other options are correct.
D. 8000
E. [Correct Answer] 0.8

4. A hash table of size n stores n data items. Which of the following collision resolution strategies minimizes the worst case time complexity of the find operation?

A. [Your Answer] Open addressing with double hashing
B. Separate chaining
C. Open addressing with linear probing
D. [Correct Answer] All collision resolution algorithms give the same worst case time complexity for the find operation
E. Open addressing with either linear probing or double hashing, as both are equally efficient in this case

5. The CS department wants to maintain a database of up to 1800 UINs of students who have taken CS 225 so that it can be determined very quickly whether or not a given student has taken the course. Speed of response is very important; efficient use of memory is not required. Which of the following data structures would be most appropriate for this task?

A. A sorted linked list
B. A hash table using probing with capacity 1800
C. [Your Answer] A hash table using probing with capacity 4500
D. [Correct Answer] A hash table using probing with capacity 100000
E. A sorted array with 1800 entries