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

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

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

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

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5. Which of the following expressions represents the load factor for a hash table of size m containing n keys?

    A. m + n
    B. [Correct Answer] n / m
    C. m*n
    D. [Your Answer] m / n
    E. None of these is the load factor