

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

2. Consider a hash table of size seven, with starting index zero, and a hash function $(3x + 4) \bmod 7$. 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

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

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

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