

AMCAT Hash Tables Questions

Question 1

What is a hash function? a)

- A. A function has allocated memory to keys
- B. A function that computes the location of the key in the array
- C. A function that creates an array
- D. None of the mentioned

Answer: Option B

Explanation: In a hash table, there are fewer array positions than the keys, so the position of the key in the array has to be computed, this is done using the hash function.

Question 2

What is the search complexity in direct addressing?

- A. $O(n)$
- B. $O(\log n)$
- C. $O(n \log n)$
- D. $O(1)$

Answer: Option D

Explanation: Since every key has a unique array position, searching takes a constant time

Question 3

What is the best that can be the techniques to avoid collision?

- A. Make the hash function appear random
- B. Use the chaining method
- C. Use uniform hashing
- D. All of the mentioned

Answer: Option B

Explanation: Making the hash function random is not really a good choice, although it is considered one of the techniques to avoid collisions along with chaining and simple uniform hashing. Chaining is the best

Question 4

If several elements are competing for the same bucket in the hash table, what is it called?

- A. Diffusion
- B. Replication
- C. Collision
- D. None of the mentioned

Answer: Option C

Explanation: By definition

Question 5

What is a hash table?

- A. A structure that maps values to keys
- B. A structure that maps keys to values
- C. A structure used for storage
- D. A structure used to implement stack and queue

Answer: Option B

Explanation: A hash table is used to implement associative arrays which has a key-value pair, so the hash table maps keys to values.

Question 6

What is direct addressing?

- A. Distinct array position for every possible key
- B. Fewer array positions than keys
- C. Fewer keys than array positions
- D. None of the mentioned

Answer: Option A

Explanation: Direct addressing is possible only when we can afford to allocate an array that has one position for every possible key.

Question 7

What can be the techniques to avoid collision?

- A. Make the hash function appear random
- B. Use the chaining method
- C. Use uniform hashing
- D. All of the mentioned

Answer: Option D

Explanation: Making the hash function random is not really a good choice, although it is considered one of the techniques to avoid collisions along with chaining and simple uniform hashing.

Question 8

What is the load factor?

- A. Average array size
- B. Average key size
- C. Average chain length
- D. None of the mentioned

Answer: Option C

Explanation: In simple chaining, load factor is the average number of elements stored in a chain, and is given by the ratio of number of elements stored to the number of slots in the array.

Question 9

In simple chaining, what data structure is appropriate?

- A. Singly linked list
- B. Doubly linked list
- C. Circular linked list
- D. Binary trees

Answer: Option B

Explanation: Deletion becomes easier with doubly linked list, hence it is appropriate.

Question 10

Consider a hash function that distributes keys uniformly. The hash table size is 20. After hashing of how many keys will the probability that any new key hashed collides with an existing one exceed 0.5?

- A. 40
- B. 2

- C. 5
- D. 10

Answer: Option D

Explanation: For each entry probability of collision is $1/20$ {as possible total spaces =20, and an entry will go into only 1 place} Say after inserting x values probability becomes $\frac{1}{2} (1/20).x = \frac{1}{2} X=10$