

Topics: Hash Table- Concepts-hash table, hash function, bucket, collision, probe, synonym, overflow

Id	
Question	Hashing technique which allocates fixed number of buckets is classified as
A	dynamic hashing
B	static hashing
C	external hashing
D	internal hashing
Answer	C
Marks	1
Unit	1

Id	
Question	Hashing technique which allows increase or decrease in number of buckets without a need of directory is classified as
A	global depth hashing
B	linear hashing
C	relative hashing
D	local depth hashing
Answer	B
Marks	1
Unit	1

Id	
Question	In linear hashing, formula used to calculate number of records if blocking factor, loading factor and file buckets are known is as
A	$r = 1 + bfr + N$
B	$r = 1 - bfr - N$
C	$r = 1 + bfr - N$

D	$r = 1 * bfr * N$
Answer	D
Marks	1
Unit	1

Id	
Question	The goal of hashing is to produce a search that takes
A	$O(1)$ time
B	$O(n^2)$ time
C	$O(\log n)$ time
D	$O(n \log n)$ time
Answer	A
Marks	1
Unit	1

Id	
Question	A technique for direct search is
A	Binary Search
B	Linear Search
C	Tree Search
D	Hashing
Answer	D
Marks	1
Unit	1

Id	
Question	The searching technique that takes $O(1)$ time to find a data is
A	Linear Search

B	Binary Search
C	Hashing
D	Tree Search
Answer	C
Marks	1
Unit	1
Id	
Question	Key value pairs is usually seen in
A	Hash tables
B	Heaps
C	Both a and b
D	Skip list
Answer	A
Marks	1
Unit	1
Id	
Question	In hashing a record is located using _____
A	Key
B	Function
C	index
D	None of these
Answer	B
Marks	1
Unit	1

Id	
Question	One of the most commonly used methods in building hash function is _____.
A	Addition

B	Subtraction
C	Division
D	Multiplication
Answer	C
Marks	1
Unit	1

Id	
Question	Hashing is also called as _____
A	Randomizing
B	Exponential
C	Arithmetic
D	None of these
Answer	A
Marks	1
Unit	1

Id	
Question	Collision occurs when the same hash value is obtained from _____
A	More than one different keys
B	Equal keys
C	Different hash function
D	Resizing hash tables
Answer	A
Marks	1
Unit	1

Id	
Question	Which one of the following hash functions on integers will distribute keys most uniformly over 10 buckets numbered 0 to 9 for i ranging from 0 to 2020?
A	$h(i) = i^2 \bmod 10$
B	$h(i) = i^3 \bmod 10$
C	$h(i) = (11 * i^2) \bmod 10$
D	$h(i) = (12 * i) \bmod 10$
Answer	B
Marks	1
Unit	1

Id	
	Consider a hash table of size 7 and hash function $h(k) = k \bmod 7$. Calculate the number of collisions with Linear Probing for Insertion of following keys: 29,36,16,30
A	2
B	3
C	8
D	9
Answer	B
Marks	1
Unit	1

Topics: Open hashing, closed hashing, perfect hash function

Id	
Question	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	8, _, _, _, _, _, 10
B	1, 8, 10, _, _, _, 3
C	1, _, _, _, _, _, 3
D	1, 10, 8, _, _, _, 3
Answer	B
Marks	1
Unit	1

Id	
Question	The expected time required to search for an element in a direct address hash table is
A	$O(\log n)$
B	$O(n)$
C	$O(1)$
D	None of these
Answer	C
Marks	1
Unit	1

Id	
Question	Which of the following statement(s) is TRUE? 1. A hash function takes a message of arbitrary length and generates a fixed length code. 2. A hash function takes a message of fixed length and generates a code of variable length. 3. A hash function may give the same hash value for distinct messages.
A	I only

B	II and III only
C	I and III only
D	II only
Answer	C
Marks	1
Unit	1

Id	
Question	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	5
B	6
C	7
D	10
Answer	D
Marks	1
Unit	1

Id	
Question	Which guideline is NOT suggested from empirical or theoretical studies of hash tables?
A	Hash table size should be the product of two primes.
B	Hash table size should be the upper of a pair of twin primes.
C	Hash table size should have the form $4K+3$ for some K.
D	Hash table size should not be too near a power of two.
Answer	D
Marks	1

Unit	1
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Id	
Question	What kind of initialization needs to be done for an open-address hash table?
A	The key at each array location must be initialized.
B	The head pointer of each chain must be set to NULL.
C	Both A and B must be carried out.
D	None.
Answer	A
Marks	1
Unit	1

Id	
Question	Which one of the following choices gives a possible order in which the key values could have been inserted in the table?
A	46, 42, 34, 52, 23, 33
B	34, 42, 23, 52, 33, 46
C	46, 34, 42, 23, 52, 33
D	42, 46, 33, 23, 34, 52
Answer	C
Marks	1
Unit	1

Topics: Load density, full table, load factor, rehashing, issues in hashing

Id	
Question	In linear hashing, formula of file load factor is
A	$l = r / (bfr * N)$
B	$l = r / (bfr + N)$
C	$l = r / (bfr - N)$
D	$l = r / (bfr * 2N)$
Answer	A
Marks	1
Unit	1

Id	
Question	Given a hash table T with 25 slots that stores 2000 elements, the load factor α for T is _____
A	80
B	0.0125
C	8000
D	1.25
Answer	A
Marks	1
Unit	1

Id	
Question	The average search time of hashing with linear probing will be less if load factor
A	is far less than 1
B	Equals 1
C	is far greater than 1

D	None of these
Answer	A
Marks	1
Unit	1

Id	
Question	Suppose you place m items in a hash table with an array size of s. What is the correct formula for the load factor?
A	$s + m$
B	$m - s$
C	$m * s$
D	m / s
Answer	D
Marks	1
Unit	1

Id	
Question	A binary search tree is also known as:
A	B-tree
B	binary sorted tree
C	binary ordered tree
D	B+ tree
Answer	B
Marks	1
Unit	1

Id	
Question	A tree in which the degree of each node is either 0 or 2:

A	complete binary tree
B	binary search tree
C	strictly binary tree
D	none of the above
Answer	C
Marks	1
Unit	1

Id	
Question	A hash function f defined as $f(\text{key}) = \text{key} \bmod 7$, with linear probing, insert the keys 51, 38, 16, 55, 98, 18, 56, into a table indexed from 56 will be stored in the location
A	1
B	3
C	5
D	6
Answer	A
Marks	1
Unit	1

Topics: Hash functions- properties of good hash function, division, multiplication, extraction, mid-square, folding and universal

Id	
Question	What would be the hash address for the following function by using the folding method $H_k = H(4326)$?
A	69
B	32
C	46
D	105
Answer	A
Marks	1
Unit	1

Id	
Question	Which of the following is generated by Folding method?
A	Hash function
B	Index function for a triangular matrix
C	Linking the tail node to the head node in linked list
D	Linear probing
Answer	A
Marks	1
Unit	1

Id	
Question	The most common hash functions use the _____ to compute hash address.
A	Division
B	Union
C	Subtraction
D	None of these

Answer	A
Marks	1
Unit	1

Id	
Question	What is the hash key of 954 if the number being used to divide is 3?

A	9
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B	2
---	---

C	5
---	---

D	0
---	---

Answer	D
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Marks	1
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Unit	1
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Id	
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Question	What does hashing improve?
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A	Speed
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B	Hard drive space
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C	None
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D	All
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Answer	A
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Marks	1
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Unit	1
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Id	
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Question	How a hash key is computed?
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A	Subtraction
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B	Random number generation
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C	Modulo division
---	-----------------

D	All of the above
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Answer	D
Marks	1
Unit	1

Id	
Question	There are several factors that affect the efficiency of lookup operations in a hash table. Which of the following is not one of those factors?
A	Number of elements stored in the hash table
B	Size of elements stored in the hash table
C	Number of buckets in the hash table
D	Quality of the hash function
Answer	B
Marks	1
Unit	1

Id	
Question	A good hash function must have _____
A	Minimal collisions
B	Easy and quick to compute
C	Distribute the keys evenly over the hash table
D	All of the above
Answer	D
Marks	1
Unit	1

Id	
Question	What will be the position of the number 3111 in a hash table, when the mid square method is applied? (table size is 1000)
A	11
B	121
C	783
D	786
Answer	C
Marks	2
Unit	1

Id	
Question	What will be the position of the number 2131 in a hash table, when the mid square method is applied? (table size is 500)
A	131
B	499
C	169
D	411
Answer	D
Marks	2
Unit	1

Id	
Question	What will be the position of the number 123456789 in a hash table, when the folding method is applied? (table size is 10)
A	9
B	8
C	0
D	1
Answer	B

Marks	2
Unit	1

Id	
Question	What will be the H (1234) if folding method is applied? (table size is 8)
A	4
B	5
C	6
D	7
Answer	C
Marks	2
Unit	1
Id	
Question	Which hash function maintains the record in order of hash field values?
A	Order preserving hashing
B	Indexed hashing
C	Folding
D	Double hashing
Answer	C
Marks	1
Unit	1

Id	
Question	The keys 1,5,28,19,15,20,33,12,17,10 are inserted into a hash table of size 7 in which collision resolution is done by separate chaining. If the hash function, $h(k)=k \bmod 7$. What is the length of the longest chain?

A	1
B	2
C	3
D	4
Answer	D
Marks	1
Unit	1

Topics: Collision resolution strategies- open addressing and chaining

Id																	
Question	<p>A hash table of length 10 uses open addressing with hash function $h(k)=k \bmod 10$, and linear probing. After inserting 6 values into an empty hash table, the table is as shown below.</p> <table border="1"> <tr><td>0</td><td></td></tr> <tr><td>1</td><td></td></tr> <tr><td>2</td><td>42</td></tr> <tr><td>3</td><td>23</td></tr> <tr><td>4</td><td>34</td></tr> <tr><td>5</td><td>52</td></tr> <tr><td>6</td><td>46</td></tr> <tr><td>7</td><td>33</td></tr> </table> <p>Which one of the following choices gives a possible order in which the key values could have been inserted in the table?</p>	0		1		2	42	3	23	4	34	5	52	6	46	7	33
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Question	<p>The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function $h(k) = k \bmod 10$ and linear probing. What is the resultant hash table?</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td>0</td><td></td></tr> <tr><td>1</td><td></td></tr> <tr><td>2</td><td>2</td></tr> <tr><td>3</td><td>23</td></tr> <tr><td>4</td><td></td></tr> <tr><td>5</td><td>15</td></tr> <tr><td>6</td><td></td></tr> <tr><td>7</td><td></td></tr> <tr><td>8</td><td>18</td></tr> <tr><td>9</td><td></td></tr> </table> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td>0</td><td></td></tr> <tr><td>1</td><td></td></tr> <tr><td>2</td><td>12</td></tr> <tr><td>3</td><td>13</td></tr> <tr><td>4</td><td></td></tr> <tr><td>5</td><td>5</td></tr> <tr><td>6</td><td></td></tr> <tr><td>7</td><td></td></tr> <tr><td>8</td><td>18</td></tr> <tr><td>9</td><td></td></tr> </table> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td>0</td><td></td></tr> <tr><td>1</td><td></td></tr> <tr><td>2</td><td>12</td></tr> <tr><td>3</td><td>13</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>3</td></tr> <tr><td>6</td><td>23</td></tr> <tr><td>7</td><td>5</td></tr> <tr><td>8</td><td>18</td></tr> <tr><td>9</td><td>15</td></tr> </table> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td>0</td><td></td></tr> <tr><td>1</td><td></td></tr> <tr><td>2</td><td></td></tr> <tr><td>3</td><td></td></tr> <tr><td>4</td><td></td></tr> <tr><td>5</td><td></td></tr> <tr><td>6</td><td></td></tr> <tr><td>7</td><td></td></tr> <tr><td>8</td><td></td></tr> <tr><td>9</td><td></td></tr> </table> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> (A) (B) (C) (D) </div>	0		1		2	2	3	23	4		5	15	6		7		8	18	9		0		1		2	12	3	13	4		5	5	6		7		8	18	9		0		1		2	12	3	13	4	2	5	3	6	23	7	5	8	18	9	15	0		1		2		3		4		5		6		7		8		9	
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Id	
Question	<p>If h is any hashing function and is used to hash n keys in to a table of size m, where $n \leq m$, the expected number of collisions involving a particular key x is :</p>
A	Less than 1
B	Less than n
C	Less than m
D	Less than $n/2$
Answer	A

Marks	1
Unit	1

Id	
Question	What is the best definition of a collision in a hash table?
A	Two entries are identical except for their keys
B	Two entries with different data have the exact same key.
C	Two entries with different keys have the same exact hash value.
D	Two entries with the exact same key have different hash values.
Answer	A
Marks	1
Unit	1

Id	
Question	Which of the following scenarios leads to linear running time for a random search hit in a linear-probing hash table?
A	All keys hash to same index
B	All keys hash to different indices
C	All keys hash to an even-numbered index
D	All keys hash to different even-numbered indices
Answer	A
Marks	1
Unit	1

Id	
Question	Which of the following is collision resolution method?
A	Open addressing
B	Chaining
C	Multiple hashing

D	All of the above
Answer	D
Marks	1
Unit	1

Id	
Question	Open addressing, multiple hashing and chaining are all methods used for
A	multiple hashing resolution
B	chaining resolution
C	collision resolution
D	address space resolution
Answer	C
Marks	1
Unit	1

Id	
Question	Consider a hash table with 100 slots. Collisions are resolved using chaining. Assuming simple uniform hashing, what is the probability that the first 3 slots are unfilled after the first 3 insertions?
A	$(97 \times 97 \times 97)/100^3$
B	$(99 \times 98 \times 97)/100^3$
C	$(97 \times 96 \times 95)/100^3$
D	$(97 \times 96 \times 95)/(3! \times 100^3)$
Answer	A
Marks	1
Unit	1

Id	
Question	What of the following cases is a so-called "collision"?
A	A hash function produces the same address for two different keys: $h(\text{key1}) = h(\text{key2})$ where $\text{key1} \neq \text{key2}$
B	Two different hash functions produce the same address for a given key: $h1(\text{key}) = h2(\text{key})$
C	Two different hash functions produce the same address for two different keys: $h1(\text{key1}) = h2(\text{key2})$ where $\text{key1} \neq \text{key2}$
D	A hash function produces the same address for two different keys with different lengths: $h(\text{key1}) = h(\text{key2})$ where $\text{length}(\text{key1}) \neq \text{length}(\text{key2})$
Answer	A
Marks	1
Unit	1

Id	
Question	Hashing collision resolution techniques are
A	Huffman coding, linear hashing
B	Bucket addressing, Huffman coding
C	Chaining, Huffman coding
D	Chaining, Bucket addressing
Answer	D
Marks	1
Unit	1

Id	
Question	The keys 1,5,28,19,15,20,33,12,17,25 are inserted into a hash table of size 10 in which collision resolution is done by separate chaining. If the hash function, $h(k)=k \bmod 10$. What is the length of the longest chain?
A	1

B	2
C	3
D	4
Answer	D
Marks	1
Unit	1

Topics: Hash table overflow- open addressing and chaining, extendible hashing

Id	
Question	An advantage of chained hash table over open addressing scheme is
A	Worst case complexity of search algorithm is less
B	Space used is less
C	Deletion is easier
D	None of these
Answer	C
Marks	1
Unit	1

Id	
Question	A hash function f is defined as $f(\text{key}) = \text{key} \bmod 7$, with linear probing, is used to insert keys 37, 38, 7248, 98, 11, 56 into a table indexed from 0-6. What will be the location of key 11?
A	3
B	4
C	5
D	6
Answer	C

Marks	1
Unit	1

Id	
Question	Which of the following has a desired key is searched, starting itself from hash address, sequentially in a table?
A	Quadratic probing
B	Random probing
C	Linear probing
D	Chaining
Answer	C
Marks	1
Unit	1

Id	
Question	A chained hash table has an array size of 512. What is the maximum number of entries that can be placed in the table?
A	256
B	511
C	512
D	There is no maximum.
Answer	D
Marks	1
Unit	1

Id	
Question	A hash table with 10 buckets with one slot per bucket is depicted. The symbols S1 to S7 are initially entered using a hashing function with linear probing. The maximum number of comparisons needed in searching an item that is not present is

A	4
B	5
C	6
D	3
Answer	B
Marks	1
Unit	1

Id	
Question	A text is made up of characters a, b, c, d, e each with probability 0.12, 0.4, 0.15, 0.08 and 0.25 respectively. The optimal coding will give the average length of
A	2.15
B	3.01
C	2.3
D	1.78
Answer	A
Marks	1
Unit	1
Id	
Question	The average search time of hashing, with linear probing will be less if load factor
A	Is much less than one
B	Equals one
C	Is far greater than one
D	None of the above
Answer	A
Marks	1
Unit	1

Id	
Question	A hash table can store a maximum of 10 records. Currently, there are records in locations 1, 3, 4, 7, 8, 9, 10. The probability of a new record going to location 2, with hash function resolving collision by linear probing is _____.
A	0.1
B	0.6
C	0.2
D	0.5
Answer	B
Marks	1
Unit	1

Id	
Question	Consider inserting keys 20,32,42,28,15,72,86 using Quadratic Probing technique into a hash table of length $m=11$ with hash function $h(k)=k \bmod 11$. How many probes required to search 86 in the hash table?
A	2
B	3
C	4
D	7
Answer	C
Marks	1
Unit	1

Topics: Dictionary- Dictionary as ADT, ordered dictionaries.

Id	
Question	Hash tables are ideal data structures for _____.
A	Dictionaries

B	Trees
C	Graphs
D	None
Answer	A
Marks	1
Unit	1

Id	
Question	What data structures you should use for dictionary searching and it should be capable of doing spell check also ?
A	Trees
B	Graphs
C	Hashing
D	Linked list
Answer	C
Marks	1
Unit	1

Id	
Question	The most common operations like searching, inserting and deleting elements from a set or multi-set can be efficiently implemented using ____.
A	Array
B	Dictionary
C	Linked list
D	None
Answer	B
Marks	1
Unit	1

Id	
Question	Dictionary is also called as _____.
A	Data dictionary
B	Associative arrays
C	Linked list
D	Web dictionary
Answer	B
Marks	1
Unit	1

Id	
Question	The sorted arrays and sorted chain methods of linear list representation are used in _____.
A	Hashing
B	Graphs
C	Trees
D	Dictionary
Answer	D
Marks	1
Unit	1

Id	
Question	For building the symbol table in compiler, the following data structure is used.
A	Hashing
B	Graphs
C	Dictionary
D	Trees
Answer	C

Marks	1
Unit	1

Id	
Question	Consider a hash table with 9 slots. The hash function is $h(k) = k \bmod 9$. The collisions are resolved by chaining. The following 9 keys are inserted in the order: 5, 28, 19, 15, 20, 33, 12, 17, 10. The maximum, minimum, and average chain lengths in the hash table, respectively, are
A	3,0,and 1
B	3,3,and 3
C	4,0,and 1
D	3,0,and 2
Answer	A
Marks	1
Unit	1

Topics: Skip List- representation, searching and operations- insertion, removal.

Id	
Question	A _____ is a data structure that allows fast search within an ordered sequence of elements.
A	Data list
B	Ordered list
C	Linked list
D	Skip list
Answer	D
Marks	1
Unit	1

Id	
Question	A skip list is capable of insertion and removal of values from a sorted sequence, the best-case performance is ____.
A	$O(\log n)$
B	$O(n)$
C	$O(n \log n)$
D	None
Answer	A
Marks	1
Unit	1
Id	
Question	A skip list is capable of insertion and removal of values from a sorted sequence, the worst-case performance is ____.
A	$O(\log n)$
B	$O(n)$
C	$O(n \log n)$
D	None
Answer	B
Marks	1
Unit	1
Id	
Question	A skip list provides ____ search.
A	Slow
B	Fast
C	Extremely slow
D	Average
Answer	B
Marks	1
Unit	1

Id	
Question	Skip list is a variant of _____, which is used most efficiently for searching operations.
A	Balanced trees
B	Rooted tree
C	Minimum spanning tree
D	None
Answer	A
Marks	1
Unit	1

Id	
Question	_____ is more efficient for performing search operations on a given data, compared to other techniques.
A	Dictionary
B	Skip list
C	Hashing
D	Binary search tree
Answer	B
Marks	1
Unit	1