The ratio of items of present in a hash table to the total size is called ....

A. Balance Factor

B. Load Factor

C. Item Factor

D. Weight Factor

ANSWER: B

The linear probing technique for collision resolution can lead to

A. Primary Clusturing

B. Secondary Clusturing

C. Overflow

D. Effiecent Storage Utilization

ANSWER: A

A height balance binary search tree is a binary tree in which the height of two sub tress of every node never differ by more than

A. 3

B. 2

C. 1

D. 4

ANSWER: C

Which of the following is not related to Hashing

A. Synonyms

B. Collision

C. Balance Factor

D. Load Factor

ANSWER: C

In which collision processing method, it is not required to detect a given list position, if it is occupied or not ?

A. Quadratic

B. Linked

C. Rehashing

D. None of the above

ANSWER: B

Which of the following is not requirement of good hashing function

A. Avoid Collision

B. Reduce the Storage Space

C. Make Faster Retrieval

D. None of the above

ANSWER: D

What is the inequality that holds in tree rotation ?

A. Rectangular Inequality

B. Triangular Inequlaity

C. Co-linear Inequality

D. All of these

ANSWER: B

Balance Factor set for AVL tree is

A. 1,0,2

B. 0,3,-1

C. 1,0,-1

D. 0,1,-2

ANSWER: C

Which of the following probing method eliminates primary clusturing but suffers from secondary clusturing

A. Linear Probing

B. Quadratic Probing

C. Linear and Qudratic Probing

D. None of the above

ANSWER: B

What is the best defination of a collision in a hash table ?

A. Two entries are identical except their keys

B. Two entries with different data have the exact same key

C. Two entries with different keys have the same exact hash key

D. Two entries with different keys have the different hash key

ANSWER: C

Which of the following is a collision reolution technique that puts all the elements that hash to the same slot in a linked list

A. Chaining

B. Open addressing

C. Closed addressing

D. None of the above

ANSWER: A

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. s-m

C. s*m

D. m/s

ANSWER: D

Perferct hashing is also called

A. Dynamic Hashing

B. Optimcal Hashing

C. Dynamic and Optimal Hashing

D. None of the above

ANSWER: B

A hash table that uses a perfect hash has

A. One Collision

B. Multiple Collision

C. NO Collision

D. None of the above

ANSWER: C

A conceptual method of open addressing for a hash table is called

A. Universal Hashing

B. Uniform Hashing

C. Optimal Hashing

D. None of the above

Answer: B

A hash table that grows to handle more items is called

A. Optimal Hashing

B. Dynamic Hashing

C. Minimal Perfect Hashing

D. None of the above

ANSWER: B

A hash table in which the hash function is the last few bits of the key and the table refers to buckets is called

A. Optimal Hashing

B. Dynamic Hashing

C. Miinimal Perfect Hashing

D. Extendibel Hashing

ANSWER: D

Given hash table T with 25 slots that stores 2000 elements, the load factor T is

A. 8000

B. 0.8

C. 80

D. 800

ANSWER: C

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

Division hashing function is .

A. f(k)=f(k+1)%size of table.

B. f(k)=f(key)+f(k).

C. f(k)=k%size of table.

D. f(k)=f(k)/size of table.

ANSWER: C

how many main forms of hashing are there?

A. 1.

B. 2.

C. 3.

D. 4.

ANSWER: B

what should be size of table in a open Hashing technique?

A. greater than total number of keys.

B. greater than or equal to total number of keys.

C. equal to total number of key.

D. less than total number of keys.

ANSWER: B

which method gives best cache performance ?

A. open addressing.

B. chaining .

C. both of them.

D. none of them.

ANSWER: A

The problem of wastage of space occurs in ....

A. open addressing.

B. chaining .

C. both of them.

D. none of them.

ANSWER: B

m = Number of slots in hash table

n = Number of keys to be inserted in has table .

Then the open addressing load factor(ά) is?

A. ά=n/m.

B. ά=m/n.

C. ά=m*n.

D. ά=m+n.

ANSWER: A

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

a hash function that maps each item into a unique slot is referred to as a

A. perfect hash function.

B. simple hash function.

C. special hash function.

D. quadractic hash function.

ANSWER: A

When two items hash to the same slot, we must have a systematic method for placing the second item in the hash table. This process is called ....

A. collision problem.

B. collision function.

C. collision resolution.

D. none of above

ANSWER: C

------------ allows many items to exist at the same location in the hash table.

A. open addressing.

B. chaining .

C. both of them.

D. none of them.

ANSWER: B

In a hash table of size 13 which index positions would the following two keys map to? 27, 130

A. 1, 10

B. 13, 0

C. 1, 0

D. 2, 3

ANSWER: C

Suppose you are given the following set of keys to insert into a hash table that holds exactly 11 values: 113 , 117 , 97 , 100 , 114 , 108 , 116 , 105 , 99 Which of the following best demonstrates the contents of the has table after all the keys have been inserted using linear probing?

A. 100, __, __, 113, 114, 105, 116, 117, 97, 108, 99

B. 99, 100, __, 113, 114, __, 116, 117, 105, 97, 108

C. 100, 113, 117, 97, 14, 108, 116, 105, 99, __, __

D. 117, 114, 108, 116, 105, 99, __, __, 97, 100, 113

ANSWER: B

In hashing ----------- is considered a unit of storage.

A. cell

B. bucket.

C. memory location.

D. key

ANSWER: B

------------ maps all the set of search-keys K to the address where actual records are

placed.

A. collision function.

B. Hash function.

C. searching function.

D. all of above.

ANSWER: B

When buckets are full, a new bucket is allocated for the same hash result and is linked after the previous one. This mechanism is called ---------.

A. open hashing.

B. collision.

C. Closed Hashing.

D. none of them.

ANSWER: C

---------- hashing provides a mechanism in which data buckets are added and removed on- demand.

A. static

B. collision free.

C. dynamic

D. none of above

ANSWER: C

Dynamic hashing is also known as -------------.

A. collision

B. extended

C. run time collision

D. none of above

ANSWER: B

The prefix of an entire hash value is taken as a....

A. hash value

B. hash index

C. hash function

D. hash key

ANSWER: B

----------table does not have an empty location to store new record.

A. full

B. hash

C. overloaded

D. all of above

ANSWER: A

load factor is also called as-----------.

A. load volume

B. load density

C. load efficiency

D. load value

ANSWER: B

Which of the following hashing techinque allows records to be strored in unlimited space?

A. Table hashing

B. Open hashing

C. Close hashing

D. Internal hashing

ANSWER: B

The mapping defined by a hash functtion is going to be .... mapping.

A. one-to-one

B. one-to-many

C. many-to-one

D. many-to-many

ANSWER: C

A perfecr Hash function is.......................function

A. subjective

B. injective

C. bijective

D. none of the above

ANSWER: B

The load density or the load factor of a hash table is the ratio.,............. where n= number of keys

T=size of hash table

A. n*T

B. n+T

C. n/T

D. n-T

ANSWER: C

Consider a hash table of size seven, with starting index zero, and a hash function (3x + 4)mod7. 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,_,_,_,10

C. 1,_,_,_,_,_3

D. 1,10,8,_,_,_3

ANSWER: B

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

What is collision resolution with open addressing?

A. When collision happens, we create a new memory location outside of the existing table, and use a chain to link to the new memory location

B. When collision happens, we enlarge the hash table

C. When collision happens, we look for an unoccupied memory location in the existing table

D. We use an extra table to collect all collided data

ANSWER: C

The method or process in which the location of an element is calculated by division is

A. Mid square method

B. Folding method

C. Division method

D. None of these

ANSWER: C

The method in which the number of digits to form an address are taken from the middle

position of a squared value is called as

A. Folding method

B. Division method

C. Mid square method

D. Mid square division method

ANSWER: C

The hashing method in which the given key is partitioned into subparts k1,k2,k3....kn is known as

A. Mid square method

B. Division method

C. Partition method

D. Folding method

ANSWER: D

The types of folding method are

A. fold shift

B. fold boundary

C. both

D. none of these

ANSWER: C

In which of the following, the left and right numbers are reversed on except the center number

A. Division method

B. fold boundary

C. fold shift

D. folding method

ANSWER: B

If the number is 164257408 and table size is 100 then the location where number will get store by fold shift mehod is

A. 6

B. 3

C. 56

D. 63

ANSWER: D

If the number is 123456789 and table size is 1000 then address where number will get store by fold shift method is

A. 8

B. 136

C. 368

D. either b or c

ANSWER: D

If number is 15547012 and table size is 100 then address of number by fold boundary method is

A. 1

B. 51

C. 96

D. 6

ANSWER: C

The disadvantage of mid square method is

A. more complex

B. size of key

C. time consuming

D. all

ANSWER: B

m= 10000 , k= 123456, and c=(√5−1) /2= 0.618033 then h(k) is equal to

A. 50

B. 41

C. 30

D. 4

ANSWER: B

In multiplicative hashing, value of hash function h(k) is

A. 0<=h(k)<m

B. h(k)>=m

C. 0<h(k)<m

D. 0<h(k)<=m

ANSWER: A

________is to select the hash function at random and at run time from a carefully designed collection of hash function

A. Digit analysis

B. Algebric coding

C. Multiplicative hashing

D. Universal hashing

ANSWER: D

Let H be a finite collection of hash functions that map a given universe U of keys into the range {0, 1, 2,..., m – 1}.

H is called universal if for each pair of distinct keys x, y belongs to U, the number of hash functions h belongs to H for which h(x) = h(y) is precisely equal to

A. |H|/m

B. h/m

C. 1

D. none

ANSWER: A

Given the following input

4322, 1334, 1471, 9679, 1989, 6171, 6173, 4199 .

The hash function is x mod 10.

Which of the following statements are true?

i. 9679, 1989, 4199 have the same hash value

ii. 1471, 6171 has to the same hash value

iii. All elements hash to the same value

iv. Each element hashes to a different value

A. i only

B. ii only

C. i and ii only

D.iii or iv

ANSWER: C

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

A. 9

B. 2

C. 5

D. 0

ANSWER: D

Which of the following are not the examples of the dictionary

A. Binary Search Tree

B. CBST

C. Sets

D. None of these

Answer: D

Which of the following is not true

A. AVL tree is a dictionary

B. B-tree is not a dictionary.

C. Sets are the dictionary

D. CBST is a dictionary

Answer:B

Which is not a valid of the operation supported by a Dictionary

A. Insert

B. Delete

C. Search

D. None of these

Answer: D

In the Skip list every 2ith node can have a pointer to the node______ ahead of it

A. 2i

B. 2i+1

C. 2i-1

D. 2.2i

Answer:A

Skip list requires ________ comparisons to search an element.

A. Log N

B. N log N

C. N

D. N log N2

Answer: A

AVL trees have LL, LR, RR, RL rotations to balance the tree to maintain the balance factor (LR : Insert node in Right sub tree of Left sub tree of node A, etc). Among rotations the following are single and double rotations

A. LL, RL and LR, RR

B. LL, RR and LR, RL

C. LR, RR and LL, RL

D. LR, RL and LR, RL

Answer: B

What is the maximum height of any AVL-tree with 7 nodes? Assume that the height of a tree with a single node is 0.

A. 2

B. 3

C. 4

D. 5

Answer: B

The average time-complexity for insertion, deletion, and search in a ______is O(logn)

A. binary search tree

B. AVL tree

C. binary heap

D. none of these

Answer: B

What is the maximum height of any AVL-tree with 7 nodes? Assume that the height of a tree with a single node is 0.

A. 2

B. 3

C. 4

D. 5

Answer: B

The time complexity for insertion, deletion, and search is O(logn) for a ___________.

A. binary tree

B. binary search tree

C. AVL tree

D. binary heap

Answer: C

In a _________, the element just inserted is always at the leaf.

A. binary search tree

B. AVL tree

C. binary heap

D. None of these

Answer: A

AVL trees have LL, LR, RR, RL rotations to balance the tree to maintain the balance factor (LR : Insert node in Right sub tree of Left sub tree of node A, etc). Among rotations the following are single and double rotations

A. LL, RL and LR, RR

B. LL, RR and LR, RL

C. LR, RR and LL, RL

D. LR, RL and LR, RL

Answer: B

In ______, the difference between the height of the left sub tree and height of the right tree, for each node, is almost one.

A. Binary search tree

B. AVL - tree

C. Complete tree

D. Threaded binary tree

Answer: B

The hieght of AVL Tree with n nodes is

A. O(log n)

B. O(n2)

C. O(nlon)

D. O(n)

Answer: A

what is the size of the smallest AVL tree of height 8

A. 8

B. 16

C. 24

D. 32

Answer: C

Insert following numbers in an empty AVL tree in the sequence 1,2,3,4,8,7,6..find the root node

A. 3

B. 4

C. 8

D. none of the above

Answer: B

if after insertion of new data in an AVL tree the balance factor of the node, its left and right chold are -2,-1,1 repectively.find the type of rotation

A. RR

B. LL

C. LR

D. RL

Answer:D

In an AVL tree, the balance factor of every node must be

A. <2

B. >2

C. >-1

D. <2 and >-2

Answer: D

LR rotation requires

A. first left rotation and then right rotation

B. First right rotation anf then left rotation

C. one left rotation

D. one right rotation

Answer: A

Insert following numbers in an empty AVL tree in the sequence 1,2,3,4,8,7,6 Perform inorder traversal

A. 1234678

B. 2143768

C. 3124768

D. None of these

Answer: A

If the balance factor of any node is -1 then

A. The height of the left subtree is one more than the right subtree

B. The height of the left subtree is one less than the right subtree

C. The height of the left and right subtrees are equal

D. None of the abve

Answer: B

If the balance factor of any node is +1 then

A. The height of the left subtree is one more than the right subtree

B. The height of the left subtree is one less than the right subtree

C. The height of the left and right subtrees are equal

D. None of the abve

Answer: A

```
node *temp(node *T)

{

T = rotateleft(T);

return (T);

}
```

Above is the function for

A. LL

B. LR

C. RL

D. RR

Answer: D

```
node *temp(node *T)
{
T = rotateright(T);
return (T);
}
```

Above is the function for

A. LL

B. LR

C. RL

D. RR

Answer: A

```
int data(node *T)
{
Int lth,rth;
If(T->left == NULL)
lh=0;
else
lh=1+T->left->height;
if(T->right==NULL)
rh=0;
else
rh=1+T->right->height;
```

```
if(lh>rh)

return lh;

return rh;

}
```

Above if the C++ function for

A. Height of the AVL tree

B. Rotate right

C. Rotate left

D. Creation of an AVL tree

Answer: A

AVL trees have a faster ________________

A. Insertion

B. Deletion

C. Updation

D. Retrival

Answer: D

Which of the following is AVL Tree?

A.

```
      100
    /     \
   50      200
  /          \
 10           300
```

B.

```
           100
       /        \
    50         200
   /         /     \
 10        150     300
/
5
```

C.

```
            100
       /           \
    50             200
   /  \          /     \
 10    60        150     300
/                  \        \
5                  180       400
```

A. Only A

B. A and C

C. A, B and C

D. Only B

Answer: B

Consider the following AVL tree.

```
     60
   /    \
 20      100
        /  \
      80    120
```

Which of the following is updated AVL tree after insertion of 70

A.

```
     70
   /   \
 60      100
 /      /   \
20      80    120
```

B.

```
     100
   /   \
 60      120
 / \     /
20  70  80
```

C.

```
     80
   /   \
```

```
    60     100
   / \       \
 20  70     120
```

D.

```
        80
       /  \
    60     100
   /      /  \
 20      70   120
```

A. A

B. B

C. C

D. D

Answer: C

Which of the following is TRUE?

A. The cost of searching an AVL tree is ? (log n) but that of a binary search tree is O(n)

B. The cost of searching an AVL tree is ? (log n) but that of a complete binary tree is ? (n log n)

C. The cost of searching a binary search tree is O (log n) but that of an AVL tree is ?(n)

D. The cost of searching an AVL tree is ? (n log n) but that of a binary search tree is O(n)

Answer: A

<table>
<tr><td>Id</td><td>1</td></tr>
<tr><td>Question</td><td>A hash table of length 10 uses open addressing with hash function h(k)=k mod 10, and linear probing. After inserting 6 values into an empty hash table, the table is as shown
<table>
<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>
<tr><td>8</td><td></td></tr>
<tr><td>9</td><td></td></tr>
</table>
below.
Which one of the following choices gives a possible order in which the key values could have been inserted in the table?</td></tr>
<tr><td>A</td><td>46, 42, 34, 52, 23, 33</td></tr>
<tr><td>B</td><td>34, 42, 23, 52, 33, 46</td></tr>
<tr><td>C</td><td>46, 34, 42, 23, 52, 33</td></tr>
<tr><td>D</td><td>42, 46, 33, 23, 34, 52</td></tr>
<tr><td>Answer</td><td>C</td></tr>
<tr><td>Marks</td><td>2</td></tr>
<tr><td>Unit</td><td>3</td></tr>
</table>

Id	2
Question	How many different insertion sequences of the key values using the same hash function and linear probing will result in the hash table shown above?
A	10
B	20
C	30
D	40
Answer	C
Marks	1
Unit	3
Id	2

Id	2
Question	Given the following input (4322, 1334, 1471, 9679, 1989, 6171, 6173, 4199) and the hash function x mod 10, which of the following statements are true? i. 9679, 1989, 4199 hash to the same value ii. 1471, 6171 has to the same value iii. All elements hash to the same value iv. Each element hashes to a different value
A	i only
B	ii only
C	i and ii only
D	iii or iv
Answer	C
Marks	2
Unit	3
Id	2

Id	4
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	3

Id	5
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	A
Marks	1
Unit	3

Id	6
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	3

Id	7
Question	A hash table has space for 100 records , what is the probability of collision before the table is 10% full?
A	0.45
B	0.5
C	0.3
D	0.34
Answer	A
Marks	1
Unit	3

Id	8
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	3

Id	9
Question	Which of the following is true?
A	The cost of searching an AVL tree is O(logn) but that of a BST is O(n).
B	The cost of searching an AVL tree is O(logn) but that of a complete Binary tree O(nlogn).
C	The cost of searching a BST is O(logn) but that of an AVL tree is O(n).
D	The cost of searching an AVL tree is O(logn) but that of a BST is O(logn).
Answer	A
Marks	1
Unit	4

Id	10
Question	The OBST is an example of
A	Static symbol table
B	Dynamic symbol table
C	All of above
D	None of above
Answer	A
Marks	1
Unit	4

Id	11
Question	What will be the time complexity for insering a node into an AVL tree?
A	O(n)
B	O(logn)
C	n
D	n^2
Answer	B

Marks	1
Unit	4

Id	12
Question	What is the time complexity of OBST?
A	O($n^{3)}$
B	O(nlogn)
C	O(logn)
D	O($n^{2)}$
Answer	A
Marks	1
Unit	4

Id	13
Question	The OBST is an example of
A	Static symbol table
B	Dynamic symbol table
C	All of above
D	None of above
Answer	A
Marks	1
Unit	4

Id	14

Question	The worst case height of an AVL tree with n nodes is
A	1.44log(n+2)
B	2.44log(n+2)
C	3.44log(n+2)
D	4.44log(n+2)
Answer	A
Marks	1
Unit	4

1. The balance factor for an AVL tree is either
(A) 0,1 or –1 (B) –2,–1 or 0
(C) 0,1 or 2 (D) All the above
Ans: (A)

2. In ______, the difference between the height of the left sub tree and height of the right tree, for each node, is almost one.
(A) Binary search tree (B) AVL - tree
(C) Complete tree (D) Threaded binary tree
Ans: (B)
3. AVL trees have a faster ________________
A. Insertion
B. Deletion
C. Updation
D. Retrival

Right Answer: D
4. An AVL Tree is constructed by inserting the elements in the following order 5,4,2,3,7,6 the elements which are in the leaf node are *

4. 2,7,6
5. 5,7
6. 3,6
7. 5,3,7

5. Which of the following is/are true
a)AVL Tree was the first self-balancing BST to be invented
b)The insertion of an element in an AVL tree takes O(log n) time in average case and O(nlogn) in worst case
c)The insertion of an element in an AVL tree takes O(log n) time in both average and worst case
d)The insertion of an element in AVL tree takes O(nlog n) time in both average and worst case *

Only a is correct

Only d is correct

both a and b are correct

both a and c are correct

6. The following insertions are made to an initially empty AVL Tree : 3,2,1,4,7,5,6 then the root of the right subtree of the AVL Tree is *

- 7

- 6
- 4
- 2

7. The maximum number of nodes with height h in an AVL Tree is given by (here N(h) represents the number of nodes in AVL tree with height h) *

- N(h)=N(h-1)+N(h-1)+1
- N(h)=N(h-1)+N(h-2)+1
- N(h)=N(h-1)+N(h-3)+1
- Cannot be determined

8..What is the approximate height of an AVL tree having 30 nodes *

- 8
- 10
- 7
- 6

9. The following steps were followed during the creation of particular AVL Tree, then what is the balance factor of the root node after the process -elements are inserted in the order 8,6,15,3,19,29 -The element 19 is removed -Then the element 6 is removed *

- 1
- -1
- 0
- 2

10. An AVL Tree is constructed by insertion of the following elements in the given order 10,7,8,5,3,4 then how many double rotations and single rotations were involved in the creation of this tree *

- 1,1

- 2,1
- 1,2
- No rotations were involved

11.Which of the following are true for an AVL Tree
a)All AVL Trees are Binary search trees(BST) but all BST's are not AVL Trees
b)All BST are AVL trees but all AVL Trees are not BST's
c)The minimum number of nodes in an AVL Tree of height h is N(h)=N(h-1)+N(h-2)+1
d)The relation h=O(log n) where h=height and n=number of nodes in an AVL tree is true *

- a and c are correct
- b and c are correct
- a and d are correct
- all a,c and d are correct

12.The balance factor of a node A was 0 and a node was inserted to the left of the node A then *

- then it is required to balance Node A
- then it is required to balance Parent of node A
- then it is required to balance Right child of A
- Balancing may or may not be required for A

13
Consider the following AVL tree.

```
         60
      /      \
    20       100
            /   \
          80    120
```

Which of the following is updated AVL tree after insertion of 70

A

```
        70
      /    \
    60       100
   /        /    \
 20        80    120
```

B

```
        100
      /    \
    60       120
```

```
    /  \      /
 20   70   80
```

C

```
        80
      /    \
    60      100
   /  \       \
 20   70      120
```

D

```
        80
      /    \
    60      100
   /       /   \
 20      70    120
```

A

B

C

D

A

B

C

D

1> A hash table of length 10 uses open addressing with hash function h(k)=k mod 10, and linear probing. After inserting 6 values into an empty hash table, the table is as shown below. 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

ans c

2> How many different insertion sequences of the key values using the same hash function and linear probing will result in the hash table shown above?
a> 10
b> 20
c> 30
d> 40

ans c

4> Consider a hash table of size seven, with starting index zero, and a hash function (3x + 4)mod7. 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

ans b

5> Given the following input (4322, 1334, 1471, 9679, 1989, 6171, 6173, 4199) and the hash function x mod 10, which of the following statements are true? i. 9679, 1989, 4199 hash to the same value ii. 1471, 6171 has to the same value iii. All elements hash to the same value iv. Each element hashes to a different value

a> i only

b> ii only

c> i and ii only

d> iii or iv

ans c

6> 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>$(97 \times 96 \times 95)/(3! \times 100^3)$

ans a

7> 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) =i2 mod 10

b> h(i) =i3 mod 10

c> h(i) = (12 ∗ i) mod 10

d>h(i) = (11 ∗ i2) mod 10

ans b

8> 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

ans a

9>Which of the following statement(s) is TRUE?

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> ii and iii only

c> i and iii only

d> ii only

ans c

12 AVL Tree is a _________
a> binary tree
b> binary search tree
c> expression tree
d>complete binary tree
ANS b

13> Construct the AVL tree for 65,85,95,30,6,71,23,99,44,21.When do we require RR rotation

a> After insertion 65

b> After insertion of 85

c> After insertion of 95

d>None of these

ANS c

14> Construct teh AVL tree for 25,38,15,22,10,24 . When do we require LR rotation?

a> After insertion of 22

b> After insertion of 24

c> After insertion of 38

d>None of these

ANS b

15>Following is called single rotation
I) LL
II) LR
III) RR
IV) RL

a> ii and iv only

b> i and ii only

c> i and iii only

d> iv only

ans c

Id	
Question	The balance factor of a node A was 0 and a node was inserted to the left of the node A then
A	Then it is required to balance Node A
B	Then it is required to balance Parent of node A
C	Then it is required to balance Right child of A
D	Balancing may or may not be required for A
Answer	B
Marks	1
Unit	4

Id	
Question	The balance factor of a node A was 0 and a node was inserted to the left of the node A then
A	Then it is required to balance Node A
B	Then it is required to balance Parent of node A
C	Then it is required to balance Right child of A
D	Balancing may or may not be required for A
Answer	B
Marks	1
Unit	4

Id	
Question	A AVL is traversed in the following order recursively: Right, root, left The output sequence will be in
A	Ascending order
B	Descending order
C	Level-wise order
D	No specific order
Answer	B
Marks	1
Unit	4

Id	
Question	In which of the following tree, parent nodes has a key greater than or equal to its both children?
A	Max Heap
B	Binary Search Tree
C	Threaded Binary Tree
D	Complete Binary Tree
Answer	B
Marks	1
Unit	4

Id	
Question	An AVL tree is a
A	Binary Search Tree
B	Complete Binary Tree
C	Threaded Tree
D	Both I and II
Answer	D
Marks	1
Unit	4

Id	
Question	Rotation of the binary search tree preserves
A	The order of nodes in an inorder traversal
B	Number of levels in the tree
C	Balance factor of its nodes
D	Height of the tree
Answer	A
Marks	1
Unit	4

Id	
Question	A binary search tree whose left subtree and right subtree differ in height by at most 1 unit is called ……
A	Red-Black Tree
B	Heap Tree
C	Game Tree
D	AVL Tree
Answer	D
Marks	1
Unit	4

Id	
Question	Balance factor of AVL tree should be ___________
A	1 or 2 or 3
B	0 or 1 or 2
C	-1 or 1 or 0
D	0 or 1
Answer	C
Marks	1
Unit	4

Id	

Question	An ______________ is a BST which has minimal expected cost.
A	AVL Tree
B	Red Black Tree
C	Optimal Binary Search Tree
D	Heap Tree
Answer	C
Marks	1
Unit	4

Id	
Question	Insertion in AVL tree takes place at
A	At nay place in tree
B	At the root node of the tree
C	At leaf nodes
D	At the intermediate levels
Answer	C
Marks	1
Unit	4

Id	
Question	If a Binary search is completely left associated as we want to treat as AVL we will classify into . . . . and apply . . . . rotation on it
A	Right of Right and apply Right rotation
B	Right of left and apply left rotation
C	Left of Left and apply Right rotation
D	Left of Right and apply Right rotation
Answer	C
Marks	1
Unit	4

Id	
Question	If any insertion operation carried is carried out on AVL and it creates a imbalance and that imbalance leads left subtree high because of right of left is high we will chose to apply rotation operations on a node were imbalance is
A	First Right and second Left rotation operation
B	Both right and left operation simultaneously
C	First left and second Right operation
D	Two times right rotation operations
Answer	C
Marks	1
Unit	4

Id	
Question	If any insertion operation carried is out on AVL and it creates a imbalance and that imbalance leads right subtree high because of left of right is high we will chose to apply

	rotation operations on a node were imbalance is
A	First Right and second Left rotation operation
B	Both right and left operation simultaneously
C	Both right and left operation simultaneously
D	First right and second left operation
Answer	D
Marks	1
Unit	4

Id	
Question	The OBST makes use of ____ for computing cost.
A	Height of tree
B	Balance factor
C	Leaf nodes
D	Probability of searches
Answer	D
Marks	1
Unit	4

Id	
Question	If LR rotation occurs then, it means the balance factor of unbalanced node is __.
A	+1
B	-1
C	+2
D	-2
Answer	C
Marks	1
Unit	4

Id	
Question	If RL rotation occurs then, it means the balance factor of unbalanced node is __.
A	+1
B	-1
C	+2
D	-2
Answer	D
Marks	1
Unit	4

Id	
Question	Time complexity of searching node in AVL tree is:
A	O(n)
B	O(log n)
C	O(n*n)
D	O(1)
Answer	B
Marks	1
Unit	4

Id	
Question	AVL trees have a faster-
A	Insertion
B	Deletion
C	updation
D	Retrieval
Answer	D
Marks	1
Unit	4

Id	
Question	Following are Single rotations A LL B RR C LR D RL
A	A and B
B	A and C
C	B and D
D	B and C
Answer	A
Marks	1
Unit	4

Id	
Question	Following are Double rotations A LL B RR C LR D RL
A	A and B
B	A and C
C	B and D
D	C and D
Answer	D
Marks	1
Unit	4

Id	
Question	When balance factor is +2 then A.LL rotation applied B.LR rotation applied C.RR rotation applied D.RL rotation applied
A	A and B
B	A and C
C	C and D
D	B and C
Answer	D
Marks	1
Unit	4

Id	
Question	When balance factor is -2 then A.LL rotation applied B.LR rotation applied C.RR rotation applied D.RL rotation applied
A	A and B
B	A and C
C	C and D
D	B and C
Answer	A
Marks	1

Unit	4

Id	
Question	LR stands for
A	Node is inserted in Left subtree of right child
B	Node is inserted in Right subtree of Left child
C	Node is inserted in Left subtree of Left child
D	Node is inserted in right subtree of right child
Answer	A
Marks	1
Unit	4

Id	
Question	RL stands for
A	Node is inserted in Left subtree of right child
B	Node is inserted in Right subtree of Left child
C	Node is inserted in Left subtree of Left child
D	Node is inserted in right subtree of right child
Answer	B
Marks	1
Unit	4

Id	
Question	When LL rotation occurs then BF of unbalanced node is
A	Plus 1
B	Plus 2
C	Minus 2
D	Minus 1
Answer	C
Marks	1
Unit	4

Id	

Question	When RR rotation occurs then BF of unbalanced node is
A	Plus 1
B	Plus 2
C	Minus 2
D	Minus 1
Answer	B
Marks	1
Unit	4

Id	
Question	Construct AVL tree for B,I,N,A,R,Y What will be root of Final AVL tree is
A	B
B	I
C	N
D	Y
Answer	B
Marks	1
Unit	4

Id	
Question	Construct AVL tree for B,I,N,A,R,Y What will be first rotation ?
A	LL
B	RR
C	LR
D	RL
Answer	A
Marks	1
Unit	4

Id	
Question	Construct AVL tree for B,I,N,A,R,Y What will be last rotation
A	LL
B	RR
C	LR

D	RL
Answer	B
Marks	1
Unit	4

Id	
Question	Construct AVL tree for B,I,N,A,R,Y For inserting which element there is need to rebalance above tree
A	A
B	N
C	Y
D	None of above
Answer	B
Marks	1
Unit	4

Id	
Question	The balance factor in height balanced tree is
A	$\lvert hL-hR \rvert <=0$
B	$\lvert hL-hR \rvert >=0$
C	$\lvert hL-hR \rvert <=1$
D	$\lvert hR-hL \rvert <=1$
Answer	C
Marks	1
Unit	4

Id	
Question	The balance factor in height balanced tree is either
A	-1,0,+1
B	-2,-1,0
C	0,1,2
D	All of above
Answer	A
Marks	1
Unit	4

Id	
Question	If after insertion of new data in an AVL tree, the BF of node,its left child are -2,+1 respectively. Find type of rotation
A	LL
B	RR
C	LR
D	RL
Answer	D
Marks	1
Unit	4

Id	
Question	If after insertion of new data in an AVL tree, the BF of node,its left child are 2,-1 respectively. Find type of rotation
A	LL
B	RR
C	LR
D	RL
Answer	C
Marks	1
Unit	4

Id	
Question	Insert the number 1 2 3 4 8 7 6 in an empty AVL tree. Now perform inorder traversal on the tree
A	1 2 3 4 6 7 8
B	2 1 4 3 7 6 8
C	3 1 2 4 7 6 8
D	1 3 2 4 6 7 8
Answer	A
Marks	1
Unit	4

Id	
Question	Insert the number 1 2 3 4 8 7 6 in an empty AVL tree. Now what will be the node at root
A	4
B	3
C	6
D	7

Answer	A
Marks	1
Unit	4

Id	
Question	In an AVL tree the BF of every node must be
A	<2
B	>2
C	>-1
D	<2 and >-2
Answer	D
Marks	1
Unit	4

Id	
Question	What is the maximum height of any AVL-tree with 7 nodes ? Assume that the height of a tree with a single node is 0.
A	2
B	3
C	4
D	5
Answer	B
Marks	2
Unit	4

Id	
Question	An AVL Tree is constructed by inserting the elements in the following order 5,4,2,3,7,6 the elements which are in the leaf node are
A	2,7,6
B	5,7
C	5,3,7
D	3,6
Answer	C
Marks	2
Unit	4

Id	
Question	The following insertions are made to an initially empty AVL Tree : 3,2,1,4,7,5,6 then the root of the right subtree of the AVL Tree is
A	7
B	6
C	4
D	2
Answer	A
Marks	2
Unit	4

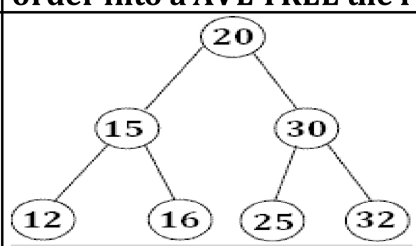
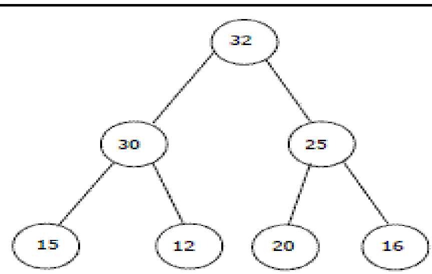
Id	
Question	An AVL Tree is constructed by insertion of the following elements in the given order 10,7,8,5,3,4 then how many double rotations and single rotations were involved in the creation of this tree
A	1,1
B	2,1
C	1,2
D	2,2
Answer	B
Marks	1
Unit	4

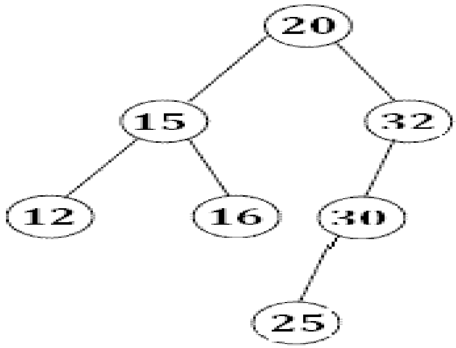
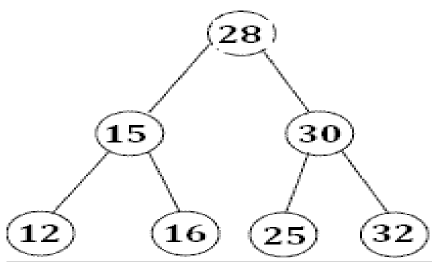
Id	
Question	Consider a hash table of size seven, with starting index zero, and a hash function (3x + 4)mod7. Assuming the hash table is initially empty, which of the following is the contents of the table when the sequence 1, 3, 8, 10 is inserted into the table using closed hashing? Note that '_' denotes 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	2
Unit	4

Id	
Question	Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty AVL. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree?
A	7 5 1 0 3 2 4 6 8 9

B	0 2 4 3 1 6 5 9 8 7
C	0 1 2 3 4 5 6 7 8 9
D	9 8 6 4 2 3 0 1 5 7
Answer	C
Marks	2
Unit	4

Id	
Question	Which rotation is required to make right sub tree balance after insertion of node 7 in following tree?
A	RR
B	LL
C	RL
D	LR
Answer	B
Marks	2
Unit	4

Id	
Question	**The elements 32, 15, 20, 30, 12, 25, 16 are inserted one by one in the given order into a AVL TREE the resulting tree is**
A	
B	

C	
D	
Answer	A
Marks	2
Unit	4

Id	
Question	What is the approximate height of an AVL tree having 30 nodes?
A	8
B	10
C	7
D	5
Answer	D
Marks	2
Unit	4

Id	
Question	Insert the following numbers in an empty AVL tree in the sequence 1, 2, 3, 4, 8, 7, 6. Find the root node
A	4
B	3
C	6
D	7
Answer	A
Marks	2
Unit	4

Id	
Question	Insert the following numbers in an empty AVL tree in the sequence 1, 2, 3, 4, 8, 7, 6. Give the left child and right child respectively of the root node.
A	3,6
B	2,7
C	2,8
D	3,8
Answer	B
Marks	2
Unit	4

Id	
Question	Suppose there is a AVL tree with n nodes in which k insertions are carried out. Then what is the running time purely for balancing the tree in worst case
A	Requires k rotations
B	Requires 2k rotations
C	Requires 3k rotations
D	Requires n+k rotations
Answer	B
Marks	2
Unit	4

Id	
Question	There is a AVL Tree whose preorder traversal is 70, 60, 50, 45, 65, 80, 75 if node with a key 70 is deleted then identify at which node key the balance is required in a AVL Tree
A	at 60 it is required
B	at 50 it is required
C	at 65 it is required
D	at 80 it is required
Answer	A
Marks	2
Unit	4

Id	
Question	If we create a AVL tree with the sequence 7, 10, 14, 23, 33, 56, 66, 70, 80 how many left rotations are required?
A	4
B	5
C	6
D	8
Answer	C
Marks	2
Unit	4

Id	
Question	If we create a AVL tree with the sequence 80, 70, 66, 56, 33, 23, 14, 10, 7 how many right rotations are required and at which addition of element in AVL tree that happens
A	4
B	5
C	6
D	8
Answer	B
Marks	2
Unit	4

Id	
Question	In OBST, the number of comparisons are required to search an element at depth d, with success are:
A	d

B	d+1
C	d-1
D	d*d
Answer	A
Marks	2
Unit	4

Id	
Question	Insert 30,31,32,23,22,28,24,29,26,27,34,36 in the AVL tree. How many total rotations required?
A	7
B	6
C	5
D	9
Answer	A
Marks	2
Unit	4

Id	
Question	Insert following keywords in the empty AVL tree. cout, cin, break, std, main Which rotations are required?
A	First LL and then RR
B	First RL and then RR
C	RL
D	LL
Answer	Correct option: A.
Marks	2
Unit	4

Id	
Question	Insert following in the empty AVL tree. DEC,JAN,APR,MAR,JUL Which symbol will rotate first?
A	DEC
B	JAN
C	MAR
D	JUL
Answer	C
Marks	2
Unit	4

Id	
Question	Construct AVL tree for following: 78,21,11,97. If 85 is inserted, which node is unbalance?
A	97
B	21
C	85
D	78
Answer	D
Marks	2
Unit	4

Id	

Question	Following code is for which rotation
	`node * avl::Rotation(node* root)`
	`{`
	`node *temp;`
	`temp=root->right;`
	`root->right=temp->left;`
	`temp->left=root;`

	`temp->h=height(temp);`
	`root->h=height(root);`
	`return temp;`
	`}`

A	LL
B	RR
C	RL
D	LR
Answer	B
Marks	2
Unit	4

Id	

Question	Following code is for which rotation
	`node * avl::Rotation(node* root)`
	`{`
	`node *temp;`
	`temp=root->left;`
	`root->left=temp->right;`
	`temp->right=root;`
	`temp->h=height(temp);`
	`root->h=height(root);`
	`return temp;`
	`}`

A	LL
B	RR
C	RL
D	LR
Answer	A
Marks	2
Unit	4

Id	

Question	Following code is for which rotation
	`node * avl::rotation(node* root)`
	`{`
	`node *temp;`
	`root->left=RR(root->left);`

	``
	        root=LL(root);
	        return root;
	    }
	``

A	LL
B	RR
C	RL
D	LR
Answer	D
Marks	2
Unit	4

Id	
Question	The worst case time complexity of AVL tree for Insert Operations is
A	O(log n)
B	O(n log n)
C	O(n)
D	None of these
Answer	A
Marks	2
Unit	4

Id	
Question	Number of comparisons required to search a balanced binary search tree of N nodes is
A	O(N)
B	O(N log N)
C	O(log2 N)
D	None of these
Answer	C
Marks	2
Unit	4

Id	
Question	Construct AVL tree for 25,38,15,22,10,24. When do you require LR rotation?

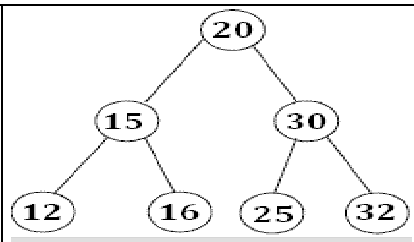
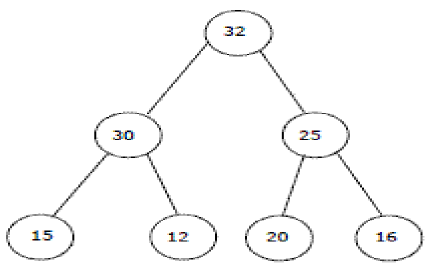
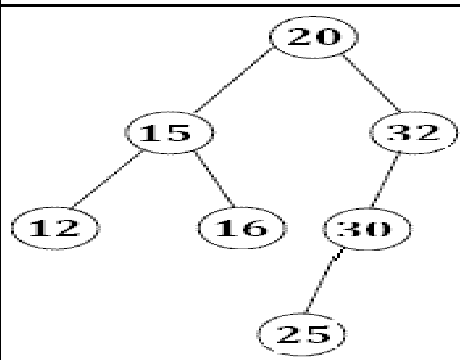
A	After insertion of 22
B	After insertion of 24
C	After insertion of 38
D	After insertion of 10
Answer	B
Marks	2
Unit	4

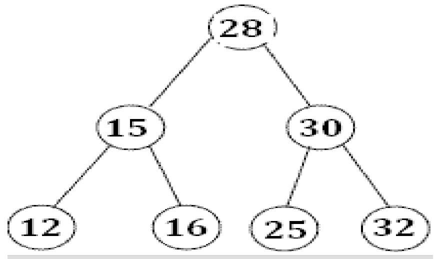
Id	
Question	An AVL Tree is constructed by insertion of the following elements in the given order 10,7,8,5,3,4 then how many double rotations and single rotations were involved in the creation of this tree
A	1,1
B	2,1
C	1,2
D	2,2
Answer	B
Marks	2
Unit	4

Id	
Question	Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty AVL. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree?
A	7 5 1 0 3 2 4 6 8 9
B	0 2 4 3 1 6 5 9 8 7
C	0 1 2 3 4 5 6 7 8 9
D	9 8 6 4 2 3 0 1 5 7
Answer	C
Marks	2
Unit	4

Id	
Question	Which rotation is required to make right sub tree balance after insertion of node 7 in following tree?
A	RR
B	LL
C	RL
D	LR
Answer	B
Marks	2
Unit	4

Id	
Question	The elements 32, 15, 20, 30, 12, 25, 16 are inserted one by one in the given order into a AVL TREE the resulting tree is

A	
B	
C	

D	
Answer	A
Marks	2
Unit	4

Id	
Question	What is the approximate height of an AVL tree having 30 nodes?
A	8
B	10
C	7
D	5
Answer	D
Marks	2
Unit	4

Id	
Question	Insert the following numbers in an empty AVL tree in the sequence 1, 2, 3, 4, 8, 7, 6. Find the root node
A	4
B	3
C	6
D	7
Answer	A
Marks	2
Unit	4

Id	
Question	Insert the following numbers in an empty AVL tree in the sequence 1, 2, 3, 4, 8, 7, 6. Give the left child and right child respectively of the root node.
A	3,6
B	2,7

C	2,8
D	3,8
Answer	B
Marks	2
Unit	4

Id	
Question	Suppose there is a AVL tree with n nodes in which k insertions are carried out. Then what is the running time purely for balancing the tree in worst case
A	Requires k rotations
B	Requires 2k rotations
C	Requires 3k rotations
D	Requires n+k rotations
Answer	B
Marks	2
Unit	4

Id	
Question	There is a AVL Tree whose preorder traversal is 70, 60, 50, 45, 65, 80, 75 if node with a key 70 is deleted then identify at which node key the balance is required in a AVL Tree
A	at 60 it is required
B	at 50 it is required
C	at 65 it is required
D	at 80 it is required
Answer	A
Marks	2
Unit	4

Id	
Question	If we create a AVL tree with the sequence 7, 10, 14, 23, 33, 56, 66, 70, 80 how many left rotations are required?
A	4
B	5
C	6
D	8
Answer	C
Marks	2
Unit	4

Id	
Question	If we create a AVL tree with the sequence 80, 70, 66, 56, 33, 23, 14, 10, 7 how many right rotations are required and at which addition of element in AVL tree that happens
A	4
B	5
C	6

D	8
Answer	B
Marks	2
Unit	4

Id	
Question	In OBST, the number of comparisons are required to search an element at depth d, with success are:
A	d
B	d+1
C	d-1
D	d*d
Answer	A
Marks	2
Unit	4

Id	
Question	Insert 30,31,32,23,22,28,24,29,26,27,34,36 in the AVL tree. How many total rotations required?
A	7
B	6
C	5
D	9
Answer	A
Marks	2
Unit	4

Id	
Question	Insert following keywords in the empty AVL tree. cout, cin, break, std, main Which rotations are required?
A	First LL and then RR

B	First RL and then RR
C	RL
D	LL
Answer	Correct option: A.
Marks	2
Unit	4

Id	
Question	Insert following in the empty AVL tree. DEC,JAN,APR,MAR,JUL Which symbol will rotate first?
A	DEC
B	JAN
C	MAR
D	JUL
Answer	C
Marks	2
Unit	4

Id	
Question	Construct AVL tree for following: 78,21,11,97. If 85 is inserted, which node is unbalance?
A	97
B	21
C	85
D	78
Answer	D
Marks	2
Unit	4

Id	

Question	Following code is for which rotation
	`node * avl::Rotation(node* root)`
	`{`
	`node *temp;`
	`temp=root->right;`
	`root->right=temp->left;`
	`temp->left=root;`
	`temp->h=height(temp);`
	`root->h=height(root);`
	`return temp;`
	`}`

A	LL
B	RR
C	RL
D	LR
Answer	B
Marks	2
Unit	4

Id	

Question	Following code is for which rotation
	`node * avl::Rotation(node* root)`
	`{`
	`node *temp;`
	`temp=root->left;`
	`root->left=temp->right;`
	`temp->right=root;`
	`temp->h=height(temp);`
	`root->h=height(root);`
	`return temp;`
	`}`

A	LL
B	RR
C	RL
D	LR
Answer	A
Marks	2
Unit	4

Id	

Question	Following code is for which rotation
	`node * avl::rotation(node* root)`
	`{`
	`node *temp;`
	`root->left=RR(root->left);`
	
	`root=LL(root);`
	`return root;`
	`}`

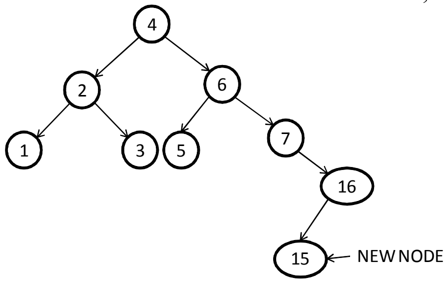
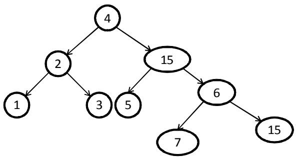
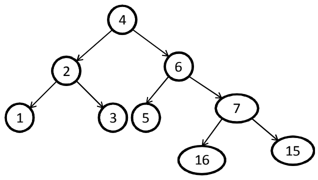
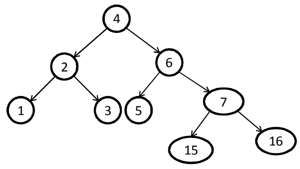
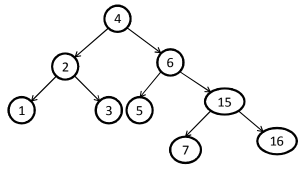
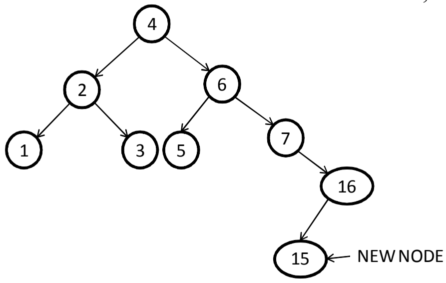
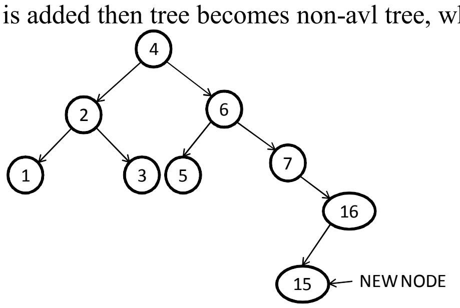
A	LL
B	RR
C	RL
D	LR
Answer	D
Marks	2
Unit	4

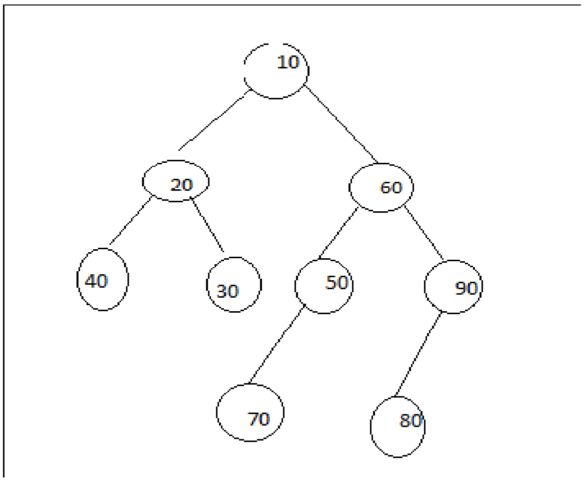
Id	
Question	The worst case time complexity of AVL tree for Insert Operations is
A	O(log n)
B	O(n log n)
C	O(n)
D	None of these
Answer	A
Marks	2
Unit	4

Id	
Question	Construct AVL tree for 25,38,15,22,10,24. When do you require LR rotation?
A	After insertion of 22
B	After insertion of 24
C	After insertion of 38
D	After insertion of 10
Answer	B
Marks	2
Unit	4

SR . NO	QUESTIONS								A
1	0/1 knapsack is based on ____________method								
	A	greedy method	B	branch and bound	C	dynamic programming	D	divide and conquer	
2	A binary search tree is formed from the sequence 6, 9, 1, 2, 7, 14, 12, 3, 8,... The minimum number of nodes required to be added in to this tree to form an extended binary tree is?								
	A	3	B	6	C	8	D	11	
3	Find the odd one out.								
	A	Merge Sort	B	TVSP Problem	C	Knapsack Problem	D	OBST Problem	
4	From the following algorithm design techniques which one is used to find all the pairs of shortest distances in a graph?								
	A	Backtracking	B	Greedy	C	Dynamic Programming	D	Divide	
5	Given a binary search trees for a set of n=5 keys : i 0 1 2 3 4 5 keys with the following probabilities :p 0.15 0.10 0.05 0.10 0.20, qi 0.05 0.10 0.05 0.05 0.05 0.10. The expected optimal cost of the search is?								
	A	2.65	B	2.7	C	2.75	D	2.8	
6	If a node having two children is to be deleted from binary search tree, it is replaced by its?								
	A	In-order predecessor	B	In-order successor	C	Pre-order predecessor	D	None	
7	If all c(i, j)'s and r(i, j)'s are calculated, then OBST algorithm in worst case takes one of the following time.								
	A	O(nlogn)	B	O(n3)	C	O(n2)	D	O(log n)	
8	If n elements are sorted in a binary search tree. What would be the asymptotic complexity to search a key in the tree?								
	A	O(1)	B	O(logn)	C	O(n)	D	O(nlogn)	
9	If n numbers are to be sorted in ascending order in O(nlogn) time, which of the following tree can be used?								
	A	Binary tree	B	Binary search tree	C	Max-heap	D	Min-heap	
10	In a full binary tree, every internal node has exactly two children. A full binary tree with 2n+1 nodes contains?								
	A	n leaf node	B	n internal nodes	C	n-1 leaf nodes	D	n-1 internal nodes	
11	In full binary search tree every internal node has exactly two children. If there are 100 leaf nodes in the tree, how many internal nodes are there in the tree?								
	A	25	B	49	C	99	D	101	
12	In the case of sub problems share sub problems ,which method is suitable								
	A	greedy method	B	branch and bound	C	dynamic programming	D	divide and conquer	
13	In which tree, for every node the height of its left subtree and right subtree differ almost by one ?								
	A	Binary search tree	B	AVL tree	C	Threaded Binary Tree	D	Complete Binary Tree	
14	Suppose a binary tree is constructed with n nodes, such that each node has exactly either zero or two children. The maximum height of the tree will be?								
	A	n+1)/2	B	(n-1)/2	C	n/2 -1	D	(n+1)/2 -1	
15	Suppose a complete binary tree has height h>0. The minimum no of leaf nodes possible in term of h is?								
	A	2h -1	B	2h -1 + 1	C	2h -1	D	2h +1	
16	Suppose we have numbers between 1 and 1000 in a binary search tree and want to search for the number 363. Which of the following sequence could not be the sequence of the node examined?								

	A	2, 252, 401, 398, 330, 344, 397, 363	B	924, 220, 911, 244, 898, 258, 362, 363	C	925, 202, 911, 240, 912, 245, 258, 363	D	2, 399, 387, 219, 266, 382, 381, 278, 363	
17	The difference between the external path length and the internal path length of a binary tree with N internal nodes is?								
	A	1	B	N	C	N+1	D	2N	
18	The height of a BST is given as h. Consider the height of the tree as the no. of edges in the longest path from root to the leaf. The maximum no. of nodes possible in the tree is?								
	A	2^(h-1) -1	B	2^(h+1) -1	C	2^(h-1)	D	2^(h-1) +1	
19	The method will choosing when sub problems share sub problems								
	A	Divide and conquer	B	Greedy method	C	Dynamic programming	D	Back tracking	
20	The no of external nodes in a full binary tree with N internal nodes is?{								
	A	N	B	N+1	C	2N	D	2N+1	
21	The symbol table implementation is based on the property of locality of reference is.								
	A	linear list	B	search tree	C	hash table	D	self-organization list	
22	the total running time of optimal binary search tree of n nodes								
	A	O(n^2)	B	O(n)	C	O(n^3)	D	O(n log n)	
23	The worst case time complexity of AVL tree is better in comparison to binary search tree for								
	A	Search and Insert Operations	B	Search and Delete Operations	C	Insert and Delete Operations	D	Search, Insert and Delete Operations	
24	To a problem can be viewed as the result of a sequence of decisions								
	A	Dynamic programming	B	Backtracking	C	Branch and bound	D	Greedy method	
25	When a binary tree is converted in to an extended binary tree, all the nodes of a binary tree becomes?								
	A	Internal nodes	B	External nodes	C	Root nodes	D	None	
26	Which of the following concepts means determining at runtime what method to invoke?								
	A	Data hiding	B	Dynamic Typing	C	Dynamic binding	D	Dynamic loading	
27	Which of the following statement about binary tree is CORRECT?								
	A	Every binary tree is either complete or full	B	Every complete binary tree is also a full binary tree	C	Every full binary tree is also a complete binary tree	D	A binary tree cannot be both complete and full	
28	Which of the following statement is true ?								
	A	Optimal binary search tree construction can be performed efficiently using dynamic programming.	B	Breath first search cannot be used to find converted components of a graph.	C	Given the prefix and post fix walks over a binary tree. The binary tree cannot be uniquely construct	D	Depth first search can be used to find connected components of a graph.	
29	Which type of traversal of binary search tree outputs the value in sorted order?								
	A	Pre-order	B	In-order	C	Post-order	D	None	
30	If a complete binary tree Tn has n=1000 nodes then its height is?								
	A	21	B	10	C	11	D	12	
31	In full binary search tree every internal node has exactly two children. If there are 100 leaf nodes in the tree, how many internal nodes are there in the tree?								
	A	25	B	49	C	99	D	100	

32	Let T be a binary search tree with 14 nodes and 60 as external path length. Then The internal path length is_________.							
	A	50	B	11	C	32	D	28
33	The difference between the external path length and the internal path length of a binary tree with n internal nodes is?							
	A	1	B	n	C	n+1	D	2n
34	Let T Be binary search tree with 10 nodes and 30 as internal path length. Then the external path length is______.							
	A	50	B	11	C	32	D	28
35	The average number of comparisons required for a successful search in a binary search tree with n nodes is______.							
	A	(I+n)/n	B	(I+2n)	C	I/n	D	$E/(I+n)^2$
36	The average number of comparisons required for unsuccessful search in a binary search tree with n nodes is______.							
	A	(E+n)/n	B	(E+2n)	C	E/n	D	E/(n+1)
37	Construct a BST for the elements 5,3,7,2,4,8. The average number of comparisons required for a successful search in binary search tree with these nodes is_____.							
	A	20	B	1.33	C	2.33	D	32.66
38	In the Following tree when new node 15 is added then tree becomes non-avl tree, what will be the resultant tree after rotation 							
	A		B		C		D	
39	In the Following tree when new node 15 is added then tree becomes non-avl tree, what will be the type of problem 							
	A	RR	B	LL	C	RL	D	LR
40	In the Following tree when new node 15 is added then tree becomes non-avl tree, what will be the rotations 							

<table>
<tr><td></td><td>A</td><td>Right Rotation</td><td>B</td><td>Left Rotation</td><td>C</td><td>Right-Left Rotation</td><td>D</td><td>Left-Right Rotation</td></tr>
<tr><td>41</td><td colspan="8">How to calculate the balance factor of Tree</td></tr>
<tr><td></td><td>A</td><td>HL-HR</td><td>B</td><td>HR-HL</td><td>C</td><td>HL-HL</td><td>D</td><td>HR-HR</td></tr>
<tr><td>42</td><td colspan="8">A Tree is called AVL tree if its balance factor is in the</td></tr>
<tr><td></td><td>A</td><td>(0,-1,1)</td><td>B</td><td>(0,-2,1)</td><td>C</td><td>(-2,1,1)</td><td>D</td><td>(0,-2,1)</td></tr>
<tr><td>43</td><td colspan="8">Given the following table of data what are the minimum expected no. of comparisons required for an Optimal
<table>
<tr><td>i</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>Pi</td><td></td><td>3/16</td><td>3/16</td><td>1/16</td><td>1/16</td></tr>
<tr><td>Qi</td><td>2/16</td><td>3/16</td><td>1/16</td><td>1/16</td><td>1/16</td></tr>
</table>
BST that can be constructed with the given data</td></tr>
<tr><td></td><td>A</td><td>2</td><td>B</td><td>3</td><td>C</td><td>4</td><td>D</td><td>1</td></tr>
<tr><td>44</td><td colspan="8">In which order the following numbers 12,3,2,4,6,7,5,1 should be inserted in binary search An empty binary search tree of height 5.</td></tr>
<tr><td></td><td>A</td><td>1,2,3,5,12,6,7,4</td><td>B</td><td>1,2,3,6,5,7,12,4</td><td>C</td><td>1,2,3,4,6,7,12,5</td><td>D</td><td>None of these</td></tr>
<tr><td>45</td><td colspan="8">In tree creation which is the most suitable data structure?</td></tr>
<tr><td></td><td>A</td><td>Array</td><td>B</td><td>Stack</td><td>C</td><td>Queue</td><td>D</td><td>Linked List</td></tr>
<tr><td>46</td><td colspan="8">Construct BST for 10,08,15,12,13,07,09,17,20,18,04,05 what will be the Node of node 17?</td></tr>
<tr><td></td><td>A</td><td>9</td><td>B</td><td>20</td><td>C</td><td>10</td><td>D</td><td>15</td></tr>
<tr><td>47</td><td colspan="8">The number of nodes in null binary tree are</td></tr>
<tr><td></td><td>A</td><td>1</td><td>B</td><td>2</td><td>C</td><td>0</td><td>D</td><td>Null tree is invalid tree</td></tr>
<tr><td>48</td><td colspan="8">A binary tree with 14 nodes what is the minimum possible height of this tree?</td></tr>
<tr><td></td><td>A</td><td>1</td><td>B</td><td>2</td><td>C</td><td>3</td><td>D</td><td>4</td></tr>
<tr><td>49</td><td colspan="8">What is depth of following tree?

</td></tr>
<tr><td></td><td>A</td><td>2</td><td>B</td><td>4</td><td>C</td><td>3</td><td>D</td><td>1</td></tr>
<tr><td>50</td><td colspan="8">A binary tree with 14 nodes what is the minimum possible height of this tree?</td></tr>
<tr><td></td><td colspan="8">A -2, B-4, C- 3, D-1</td></tr>
</table>