Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, July 2020

Course: Advanced Data Structure **Semester: II**
Course Code: CSEG 1004 **Time: 2hr.**
Programme: B.Tech CS with IoT+IT+BlockChain **Max. Marks:100**
Instructions: Answer the All the Questions

Description

All questions are compulsory

No Negative Marking

No. of Questions :60

Maximum Time 2 hours

i. Do not access any other website except learn.upes.ac.in

ii. During exam students will not be allowed to leave the room.

iii. Mobile phones are not allowed during exam.

iv. Don't click on submit button during exam if not finished.

Instructions

Total Questions 60

Total Points 100

Number of Attempts 23

Select: Select by Type: - Question Type -

Delete and Regrade Points Hide Question Details

1. Multiple Choice: CO1:What is the output of the followi... Points: 2

← OK

Question	CO1:What is the output of the following code char symbol[3]={'a','b','c'}; for (int index=0; index<3; index++) cout << symbol [index];
Answer	✓ a b c "abc" abc 'abc'

☐ **2. Multiple Choice: CO1:If the variable count exceeds 100...** Points: 2

Question	CO1:If the variable count exceeds 100, a single statement that prints "Too many" is

Answer	if (count<100) cout << "Too many";
	if (count>100) cout >> "Too many";
	✓ if (count>100) cout << "Too many";
	None

☐ **3. Multiple Choice: CO1:If an array is declared as int a[...** Points: 2

Question	CO1:If an array is declared as int a[4] = {3, 0, 1, 2}, then values assigned to a[0] & a[4] will be_____
Answer	3,2 0,2

	✓ 3,0
	0,4

Points: 1

4. Multiple Choice: CO1:A function call mechanism that pa...

Question	CO1:A function call mechanism that passes arguments to a function by passing a copy of the valuesof the arguments is_____
Answer	call by copy
	✓ call by value
	call by reference
	call by value result

Points: 2

5. Multiple Choice: CO1:The keyword friend does not appea...

Question	CO1:The keyword friend does not appear in
Answer	the class allowing access to another class.
	the class desiring access to another class
	✓ the private section of a class
	the private section of a class

Points: 2

6. Multiple Choice: CO1:How many constructors can a class...

Question	CO1:How many constructors can a class have?
Answer	0
	1
	2
	✓ un-limited

☐ **7. Multiple Choice: CO1:What would be the output of the f...** Points: 2

Question	CO1:What would be the output of the following?
	#include<iostream.h>
	void main()
	{
	char *ptr="abcd";
	char ch;
	ch = ++*ptr++;
	cout<<ch;
	}

Answer	a
	✓ b
	both
	error

☐ **8. Multiple Choice: CO1:Member functions, when defined wi...** Points: 1

Question	CO1:Member functions, when defined within the class specification:

Answer	are not inline
	✓ are always inline.
	are not inline by default
	are inline by default, unless they are too big or too complicated.

☐ **9. Multiple Choice: CO1:What is wrong with the following ...**

Points: 2

Question	CO1:What is wrong with the following program
	int main( )
	{
	const double PI;
	int n;
	PI = 3.14159265358979;
	n = 22;
	}

Answer	double can not be followed const
	const is un identified
	✓ PI must be initialized at the time of declaration
	error

☐ **10. Multiple Choice: CO1:How many times is the copy constr...**

Points: 2

Question	CO1:How many times is the copy constructor called in the following code?
	class copy_const{ };
	copy_const f(copy_const u)
	{
	copy_const v(u);
	copy_const w = v;
	return w;
	}
	int main ( )
	{
	copy_const x;
	copy_const y = f (f (x));
	}

Answer	2 1 ✓ copy constructor is not called 3

☐ **11. Multiple Choice: CO1: #include<iostream.h> voi...** Points: 2

Question	CO1:
	#include<iostream.h>
	void main( )
	{
	int i, j, m;
	int a[5]={8, 10, 1, 14, 16};
	i = ++a[2];
	m = a[i++];
	cout <<i<<m;
	}

Answer	✓ 3 2 2 2 3 1 2 1

☐ **12. Multiple Choice: CO2:If a class C is derived from clas...** Points: 2

Question	CO2:If a class C is derived from class B, which is derived from class A, all through publicinheritance, then a class C member function can access
Answer	protected and public data only in C and B protected and public data only in C private data in A and B ✓ protected data in A and B

☐ **13. Multiple Choice: CO2:Usually a pure virtual function** Points: 1

Question	CO2:Usually a pure virtual function

Answer	has complete function body
	will never be called.
	will be called only to delete an object.
	is defined only in derived class

☐ **14. Multiple Choice: "CO2:If we create a file by ifstream...** Points: 2

Question	"CO2:If we create a file by ifstream , then the default mode of the file is_____"
Answer	ios :: out
	✓ ios :: in
	ios :: app
	ios :: binary

☐ **15. Multiple Choice: CO2:The operator << when overloaded i...** Points: 1

Question	CO2:The operator << when overloaded in a class
Answer	must be a member function
	must be a non member function
	✓ Both
	None

☐ **16. Multiple Choice: CO2:In which case is it mandatory to ...** Points: 2

Question	CO2:In which case is it mandatory to provide a destructor in a class?
Answer	Almost in every class
	Class for which two or more than two objects will be created

Class whose objects will be created dynamically

Class for which copy constructor is defined

☐ **17. Multiple Choice: CO2:Which of the statements is true i...** Points: 2

Question	CO2:Which of the statements is true in a protected derivation of a derived class from a base class?
Answer	Public members of the base class become protected members of the derived class
	Protected derivation does not affect private and protected members of the derivedclass.
	Protected members of the base class become public members of the derived class
	Private members of the base class become protected members of the derived class

☐ **18. Multiple Choice: CO2:A pointer to the base class can h...** Points: 2

Question	CO2:A pointer to the base class can hold address of
Answer	only base class object
	base class object as well as derived class object
	only derived class object
	None

☐ **19. Multiple Choice: CO2:Which of the following is the val...** Points: 1

Question	CO2:Which of the following is the valid class declaration header for the derived class d with baseclasses b1 and b2?

Answer	class d : public b1, public b2
	class d : class b1, class b2
	class d : public b1, b2
	ALL

☐ **20. Multiple Choice: CO2:If there is a pointer p to object...** Points: 1

Question	CO2:If there is a pointer p to object of a base class and it contains the address of an object of aderived class and both classes contain a virtual member function abc(), then the statementp->abc(); will cause the version of abc() in the ______class to be executed.
Answer	Base Class
	✓ Derived class
	both
	None

☐ **21. Multiple Choice: CO2:The statement f1.write((char*)&a...** Points: 2

Question	CO2:The statement f1.write((char*)&obj1,sizeof(obj1));
Answer	Writes the address of obj1 to f1.
	✓ Writes the data in obj1 to f1
	writes the member function of obj1 to f1.
	Writes the member function and the data of obj1 to f1

Points: 2

22. Multiple Choice: CO2:Consider the following class defi...

Question	CO2:Consider the following class definitions:
	class a
	{
	};
	class b: protected a
	{
	};
	
	What happens when we try to compile this class?

Answer	Will not compile because class body of a is not defined
	Will not compile because class body of b is not defined
	Will not compile because class a is not public inherited
	✓ Will compile successfully.

Points: 1

23. Multiple Choice: CO2:To access the public function fba...

Question	CO2:To access the public function fbase() in the base class, a statement in a derived class functionfder() uses the statement.fbase();
Answer	base.base();
	base::fbase();
	✓ fbase();
	fder()

Points: 1

24. Multiple Choice: CO2:Which of the following statement ...

Question	CO2:Which of the following statement is valid?
Answer	We can create new C++ operators
	We can change the precedence of the C++ operators
	We can change the associativity of the C++ operators
	✓ We can not change operator templates.

Points: 2

25. Multiple Choice: "CO3:the postorder traversal of a bin...

Question	"CO3:the postorder traversal of a binary tree is 8,9,6,7,4,5,2,3,1. the inorder traversal of the same tree is 8,6,9,4,7,2,5,1,3.the height of the is length of the lomgest path from the root to ant leaf .the height of the binary tree is"
Answer	1
	2
	3
	✓ 4

Points: 2

26. Multiple Choice: CO3:Let T be a tree with 10 vertices....

Question	CO3:Let T be a tree with 10 vertices.the sum of the degrees of all the vertices in T is
Answer	✓ 18
	19
	20
	21

Points: 2

27. Multiple Choice: "CO3:the nummber of ways in which the...

Question	"CO3:the nummber of ways in which the numbers 1,2,3,4,5,6,7 can be inserted in an empty BST,such that the resulting tree has height 6 is"
Answer	✓ 64
	65
	66
	67

Points: 2

28. Multiple Choice: CO3:the height of the tree is the len...

Question	CO3:the height of the tree is the length of the longest root to leaf path in it.the maximum and minimum number of nodes in a binary tree of height 5 are
Answer	32 and 6
	64 and 5
	✓ 63 and 6
	31 and 5

Points: 2

29. Multiple Choice: CO3:A binary tree T has 20 leaves.the...

Question	CO3:A binary tree T has 20 leaves.the number of nodes in T having two childrens is
Answer	22
	21
	20
	✓ 19

Points: 2

30. Multiple Choice: CO3:which one of the following hash f...

Question	CO3:which one of the following hash functions on integers willdistribute keys most uniformly over 10 buckets numbered 0 to 9 for k ranging from 0 to 2020?
Answer	h(k)=i^2 mod 10
	✓ h(k)=i^3mod 10
	h(k)=(11*i^2)mod 10
	h(k)=(12*i)mod 10

Points: 1

31. Multiple Choice: "CO3:Given a hash table T with 25 slo...

Question	"CO3:Given a hash table T with 25 slots that stores 2000 elements,the load factor a for T is"
Answer	50
	✓ 80
	60
	70

Points: 1

32. Multiple Choice: CO3:consider a binary tree T that has...

Question	CO3:consider a binary tree T that has 200 leaf nodes .then the number of nodes in T that have exactly two childrens are
Answer	196
	197
	✓ 199
	198

Points: 2

33. Multiple Choice: CO3:consider a rooted n node binary t...

Question	CO3:consider a rooted n node binary tree represented using pointers.the best upper bound on the time required to dertine the number of subtrees having exactly 4 nodes is O(n^alog^bn).then the value of a+10b is
Answer	2
	3
	4
	✓ 1

Points: 1

34. Multiple Choice: "CO3:consider a hash table with 9 slo...

Question	"CO3:consider a hash table with 9 slots.the hash function is h(k)=k mod 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 lenghts in hash table are"
Answer	✓ "3,0 and 1"
	"3,3 and 3"
	"4,0 and 1"
	"3,0 and 2"

Points: 2

35. Multiple Choice: CO3:in a binary tree with n nodes eve...

Question	CO3:in a binary tree with n nodes every node has an odd number of descendants.every node is considered to be its own descendant.what is the number of nodes in the tree that have exactly one child
Answer	✓ 0
	1
	(n-1)/2
	(n-1)

Points: 1

36. Multiple Choice: CO3:the height of a binary tree is th...

Question	CO3:the height of a binary tree is the maximum number of edges in any root to leaf path.the maximum number of nodes in a binary tree of height h is
Answer	2^h-1
	2^(h-1)-1
	2^(h+1)+1
	✓ 2^(h+1)-1

Points: 2

37. Multiple Choice: CO4:consider the following statements...

Question	CO4:consider the following statements I. the smallest element in a max-heap is always at a leaf node II. The second largest element in a max-heap is always a child of the root node III. A max-heap can be constructed from a BST inO(n) time IV. A BST can be constructed from a max-heap inO(n) time
Answer	✓ "I,II and III"
	"II,III and IV"
	"I,III and IV"
	"I,II and IV"

Points: 2

38. Multiple Choice: CO4:Let T be a full binary tree with ...

Question	CO4:Let T be a full binary tree with 8 leaves. Suppose two leaves a and b of T are chosen uniformly and independently at random. The expected value of the distance between a and b in T(i.e. the number of edges in the unique path between a and b) is
Answer	5.54
	1.34
	✓ 4.25
	3.82

Points: 2

39. Multiple Choice: "CO4:the number of possible min-heaps...

Question	"CO4:the number of possible min-heaps containing each value from {1,2,3,4,5,6,7} exactly once is"
Answer	✓ 80 81 82 83

Points: 2

40. Multiple Choice: "CO4:A complete binary min-heap is ma...

Question	"CO4:A complete binary min-heap is made by including each integer in [1,1023] exactly once. The depth of a node in the heap is the length of the path from the root of the heap to that node.thus the root is at depth 0.the maximum dpth at which integer 9 can appear is"
Answer	✓ 8 9 10 11

Points: 2

41. Multiple Choice: "CO4:consider the following array of ...

Question	"CO4:consider the following array of elements (89,19,50,17,12,15,2,5,7,11,6,9,100).the minimum number of interchanges needed to convert it into max-heap is"

Answer	4
	5
	✓ 3
	2

Points: 2

42. Multiple Choice: "CO4:while inserting the elements 71,...

Question	"CO4:while inserting the elements 71,65,84,69,67,83 in an empty BST in the sequence shown ,the element in the lowest level is"
Answer	83
	65
	✓ 67
	69

Points: 2

43. Multiple Choice: CO4:the worst case running time to se...

Question	CO4:the worst case running time to search for an element in a balanced search tree with n2^n elements is
Answer	O(nlogn)
	O(n2^n)
	✓ O(n)
	O(logn)

Points: 2

44. Multiple Choice: CO4:what is the maximum height of any...

Question	CO4: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

Answer	2
	3
✓	4
	5

Points: 2

45. Multiple Choice: "CO4:consider a binary max-heap imple...

Question	"CO4:consider a binary max-heap implemented using an array,which one of the following array represents a binary max-heap"
Answer	"{25,12,16,13,10,8,14}"
	"{25,14,13,16,10,8,12}"
✓	"{25,14,16,13,10,8,12}"
	"{25,14,12,13,10,8,16}"

Points: 2

46. Multiple Choice: "CO4:in a binary max heap containing ...

Question	"CO4:in a binary max heap containing n numbers,the smallest element can be found in time"
Answer	O(nlogn)
	O(logn)
✓	O(n)
	O(1)

Points: 1

47. Multiple Choice: CO4:An Abstract Data Type is

Question	CO4:An Abstract Data Type is
Answer	same as an abstract class

a data type that cannot be instatiated

✓ "a data type type for which only the operations defined on it can be used ,but none else"

All

☐ **48. Multiple Choice: "CO4:in a complete k-ary tree,every i...**

Points: 2

Question	"CO4:in a complete k-ary tree,every internal node has exactly k children.the number of leavesin such a tree with n internal nodes is"
Answer	nk
	(n-1)k+1
	✓ n(k-1)+1
	n(k-1)

☐ **49. Multiple Choice: "CO5:Let G be a weighted connected un...**

Points: 2

Question	"CO5:Let G be a weighted connected undirected graph with distinct positive edges weights.if every edge weight is increased by the same value,then which of the following statement is /are TRUE P. mininum spanning tree of G does not change Q. Shortest path between any pair of vertices does not change"
Answer	✓ P only
	Q
	None
	Both

☐ **50. Multiple Choice: "CO5:Breadth First Search is started ...**

Points: 2

Question	"CO5:Breadth First Search is started on a binary tree beginning from the root vertex.there is a vertex t at a distance four from root . If t is the n-th vertex in this BFS traversal,then the maximum possible value of n is"

Answer	✓ 31
	32
	33
	34

51. Multiple Choice: CO5:Let G be a graph with n vertices ...

Points: 1

Question	CO5:Let G be a graph with n vertices and m edges.what is the tightest upper bound o the running time of Depth First Search on G.when G is represented as an adjacency
Answer	O(n)
	O(n+m)
	✓ O(n^2)
	O(m^2)

52. Multiple Choice: "CO5:consider the tree arcs of a BFS ...

Points: 1

Question	"CO5:consider the tree arcs of a BFS traversal from a sourece node W in an unweighted,connected,undirected grapg.the tree T formed by the arcs is a datastructure for computing"
Answer	the shortest path between every pair of vertices
	✓ the shortest path from W to every vertex in the graph
	the shortest paths from W to only those nodes that are leaves of T
	the longest path in graph

53. Multiple Choice: CO5:the most efficient algorithm for ...

Points: 2

Question	CO5:the most efficient algorithm for finding the number of connected components in an undirected graph on n vertices and m edges has time complexity

Answer	✓ O(n)
	O(n+m)
	O(m)
	O(mn)

Points: 1

54. Multiple Choice: CO5:An undirected graph C has n nodes...

Question	CO5:An undirected graph C has n nodes.Its adjacency matrix is given by an n*n square matrix whose (i) diagonal elements are 0's and (ii) non diagonal elements are 1's which of the following is true
Answer	Graph G has no mimimum spanning tree
	Graph G has a unique MST of cost n-1
	✓ Graph G has multiple distinct MST's each of cost n-1
	graph G has multiple spanning trres of diferrent costs

Points: 1

55. Multiple Choice: CO5:For an undirected graph with n ve...

Question	CO5:For an undirected graph with n vertices and e edges, the sum of the degree of each vertex isequal to
Answer	2n
	(2n-2)/2
	✓ 2e
	(2e-1)/2

Points: 2

56. Multiple Choice: CO5:An undirected graph G with n

vert...

Question	CO5:An undirected graph G with n vertices and e edges is represented by adjacency list. What is the time required to generate all the connected components?
Answer	O(n)
	O(e+1)
	✓ O(n+e)
	O(e^2)

Points: 1

57. Multiple Choice: CO5:A graph with n vertices will defi...

Question	CO5:A graph with n vertices will definitely have a parallel edge or self loop of the total number ofedges are
Answer	more than n
	more than n+1
	more than (n+1)/2
	✓ more than n(n-1)/2

Points: 1

58. Multiple Choice: CO5:The maximum degree of any vertex ...

Question	CO5:The maximum degree of any vertex in a simple graph with n vertices is
Answer	✓ n-1
	n+1
	2n-1
	2n+1

Points: 1

59. Multiple Choice: CO5:A graph with n vertices will defi...

Question	CO5:A graph with n vertices will definitely have a parallel edge or self loop if the total number of edges are
Answer	greater than n 1
	less than n(n 1)
	greater than n(n 1)/2
	less than n^2/2

Points: 2

60. Multiple Choice: CO5:An adjacency matrix representatio...

Question	CO5:An adjacency matrix representation of a graph cannot contain information of :
Answer	nodes
	edges
	direction of edges
	parallel edges

All None - Question Type -

Select: Select by Type:

Delete and Regrade Update and Regrade Hide Question Details

Points