





Academic Year	Module	Assessment Number	Assessment Type
S20	Introductory Data Structures and Algorithms (DipIT02)	A1	Assignment Submission

## [Assignment Submission]

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Section : [DC8]

Module Leader : [Mr. Prakash Gautam]

Submitted on : 06-03-2020





*	Tutorial. 4  For any positive integer on a tree with an various has n-1 edges.  It is proof by Mathematical induction.  Base case  A tree with one vertex has a edge.
x	Suppose a tree having in restitut has in I edges.
	Index Indactive step  Chive from Inductive hypothers a tree having  'n' partice has 'n-1' edges.  Add a single vertex in any leaf made of tree  having a verticy - tree.  number of edges = a
р	The # leaves in a non-empty full binary tree is as one more than the # internal modes.





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17	In a perfect binary free, T: fold number of
	nodes with height h is n = 2ht=1
	0.2
	lotal number of nodes =
	5, 15, 75, 7 75, 0 05,
	Sum of Geometric gence =
	$= a(r^{n}-1)$ 0 0 0 02
	Y-1 /\ /\ ,
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	In a complete binary drec . T: the max & nude with heigh h is: no ship - 1 = 2 there'- 1
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11/3	Cm n = 2 h 1 1 - 1
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4.	To a becker producting print of
1	Total Only of tapic of the cool of the following
A NO	In a perfect binary tree Tithe height of Thoung of lable in the nodes is in - log (nsi) = 1010) number of nodes (n): 2ht-1  taking log as both sides we get  to n12 = 2h
8/	13 = 5 p
	on 100 5 (UTI) = 100 5 (51,)
	or h=1092 (nx1)
	or 1 = 109 & 2 (1+1) -5
65.	In a can plate binary from F. Abr beight Of T
	Los a complete binary tran Fisher height Of Thoughing total n# modes is in = log (n +1)-1
	total number of nucle for complete binary
	$0 = 2^{1/2} \circ -1$
	low s (ut 1) = lod S (Sp.)
	gu 1003 (USI) = P+T
	on 1092 (U1)= P17





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-	e) On Complete binary tree are balanced (T)
	C) ON Camplete broad free are bolonced ( vice - vasa (TB)
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	of Bridgest binony tree (as always be 2-4mc. ( ) (1)
	a) Bolomed tree con mun be pointingies! (F)
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- c)	Binory Snorth trop
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()	mini-hop.
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	Inoider-(1eft, Rock, Right)
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	Post adaz - (1014, Right, Root)
1	Productor - (Rod 1814, Rights) (5)
	= 12345
6)	(F)
	In Order - PBCDEFCHI ( Loft, Root, Right) BC
	Preciden + BRDCE GSHI
	Past Order ACE DBHIGE
	(1cf.), Right, Raol) (8 B)
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	binosy south trac: 50.25,75.22,40, 60.80,90.15.30
	SO
	(25) (79)
	62 (10)
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	1001 = NCM vogs (K)
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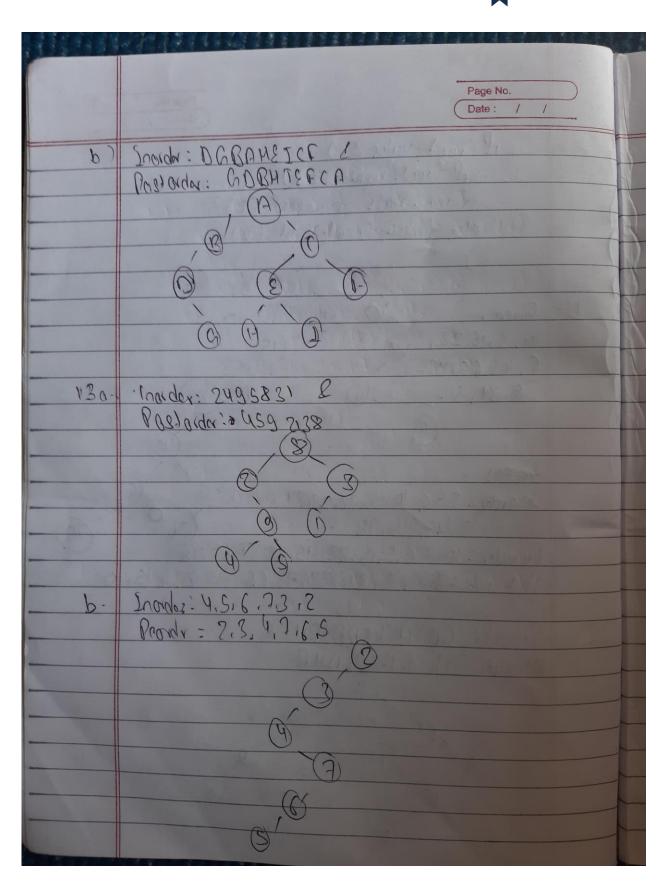




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	if (roal. value 2k)
	2, P (1001- right = 20182) 2, 1002- right = mon node (K)) else final (1001-right, (K))
	Stor given (construct (K))
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11-	Criven, (10)
	6, 48, 65, 23,
	78.34,5.
N	6
	(US)
	In order = 3,5,6, 10,15, 22,23,34, 23
	45,65,78
	P. parder = 10,3,65,15,22,45,23,34,65,78
	Nov Order = 8.6, 3, 34, 23, 78.68, 45, 28, 15, 10
12->	Breaker: GBOA (KEDDSRN L
	BINDIGE: CBOB CE BCEDHS BLEGIGES: CBOB (FEDDESH F
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	(3) (3)
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	9-1 321 N
	(3)-
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16.0	An algorithm to smorth a dota to Bs.
	Scorch (w.root, K) x
	if (w = NULL)
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	Total reduce OUII;
	if (m det gola () = = K)
	2 return W;
	il (w-gez dora () > k)
	7
	Sporch (w. left ik)
	Sporch (w.left ik)  if (w.got doto() < k)  Sporch (w.night, k)
	Scorch (w. right, K)
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	2 if (P1 == NULL P2 == NULY)
	refuse 1:
	if (bij=natt 66 bi=nast)
	it (Px -1 dota = = P2 -) dota &l
	Chack (Pa +) left, Pa +1 elt) RE
	Chack (P1 + right , P2 + righ)
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	(H) (D)





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	(b) (a)
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132	Pseudorade DFS (Depth First Scorch) Void Enorder (Struct node Front)
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	if (1001 = = NOM)
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	2 relun;
	inoida (1001 -) (alt);
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	Void Presider (struct node Froot)
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	if (100) == NULL)
	2 re-lus;
	buy of broader (, 3,9, 100)
	Preorder (1001 > 1014)
	preorder ( 20 1 100 20 100);  preorder ( rout > right);





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void Postorder (Struct node * root)
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if (root = 2 NULZ)
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go q. enqueue (root)
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int lorgest = i;  int (= 2x; t1;  int (x = 0 and ACT) > A Clargest )  if (x = 0 and ACT) > A Clargest )  if (lorgest = x)  if (lorgest = x		
I (1 \(\frac{1}{2}\) \(\frac{1}\) \(\frac{1}{2}\) \(\frac{1}{2		5 J. 11, 1619 (1) 4)
I (1 \(\frac{1}{2}\) \(\frac{1}\) \(\frac{1}{2}\) \(\frac{1}{2		int lorgest = i;
I (1 \(\frac{1}{2}\) \(\frac{1}\) \(\frac{1}{2}\) \(\frac{1}{2		int 1= 2x; +1;
if (lorgery = s)  Smob (U [i] ency U [lorgery. 0])  Smob (U [i] ency U [lorgery. 0])		int x = 5 x ! + 5;
if (lorgery = s)  Smob (U [i] ency U [lorgery. 0])  Smob (U [i] ency U [lorgery. 0])		(Control of CTTY poo us C) TI
if (lorgery; - op i)  Snob (U [i] eng U [lordery. o))  1 ender = 8)		( ( orge) : 1)
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21)-	broild Sol & Psaudrade to build mini-hoop	3
	and to illustrate Min - heapify procedure.  build - minheap ( Floray in)	
	build -micheap (Array in)	
1	ladia di la	1
	Por (i = [n-1] 100)	<b>Y</b> -
		7
	2 min-heapify (Akroy, n.i)	1
	Min-hoopif (Anoy in i)?	
	184	
	int largest = 10; int largest = 10;	
	int (el) = 2 xi + 1;	
	int 1(ight = 8 x 1 1.5)	
	( C 10 2 11 1 1 0 600 0 2 10 17 1)	
	(Chopped I felt; Chopped & Chop of the Chapt) fi	
	if (Right 20 and A [Right] LA Llorger 2]	
	largus = Right;	
	if (Right = n and A[Right] LA Llorgest 2]  lorgest ! -i)  il (lorgest ! -i)	
La Chapt	of ball Lands) July grows of the same	_
	Swap (Ali) and Allerget) min-heapity (Array in larger)	-
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22)	a) get mini (Arroy & La);
	reduin Arroy & Las,
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pi pi	Cxtrois min (Arroy, n)? noy [a] : Arroy [n-1)
	March [O] Grand [O-D)
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	minheapidy (Array, n.a);
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	insert (Arroy 1 kry) 2  Heapt by = 00
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	Tod ? - Hopping
	D 1 3 7 - 1000'
	Hoopsize - Hoopsize & i  Of i i > Levi  While (i > 1 and A Lid < A Lid)
	2
	2000 1012 and A [7]
	Smab (US ang US)
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d.	driver & Mail Arous , Kry X
	dricas de Kryi ( Arroy , Kry X
	B/ i) = Ka.
	while (i >1 and ALT) A Cila)  Swop (A [i] and Ali ila)
	(Co) (A (;) and A (;) (2))
	1= 1/2
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28.	a) get maxir refuir Arroy Cali
P	9
(b)	est 1 m s l Arra 1)
D1	Patract Max ( Array . n) ?  Array [ a) = Array [ n-2)
	n=0-1;
	maxheopify (Array, n.a);
	" (at the bis)
()	in robert Cirriay, Keye ) {
	Heap size - Heap size +1;
	while (i > 1; and A [i/2] (A)
	1. (i) = kiy:
	(Li) 27 [2/1] to pro : [ [ ] sidu
	(Cs)i"] A bap [i] A) gowl
	6 - 1/2
d.	do a contra ( O contra )
<u> </u>	decrease key ( Acray, ky)?
	Ulig kidi
	While (12) 2000 A [1/2] 2 ALI])
	2 Swop [Asi] 62 A[1/2]
	1-1/2
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742	maximum (node)
	2
	il (node == NULL)>
	2 refun-1
	6/2 5
	Lmax = Max ( node-1eft)
	Rmax = Man Max (nock- night)
	if (node-volve > 1 max and nack-volve > Rman)
	2 refun node value
	ele il (on 2 max > Rmax)
	< refun - nado value) 2 maso)
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	Eu (2) (5) (5)	1
	(6) 85	-
The same of the sa	$(E_{4})$ $E(3)$	
	Es 6	
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27-3	Lint find Mar ( node root)	
	il(1001 == NOL)?	
	refun -7;	
	had abadamada y	
	22/9	
	int max left = find max( 5001-181);	
	int manRight = lindmanCroat-right	-
	int marRight = findmar(root-right)  int mathmax = marleft;	1
	14 (max Right > marlelt )	-
	if (most Right > maxLeft X  mathmax = max (2:ght;  resum most max;	-
	refun moth max;	





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78:-)	· Unid paid Roop (int lower int upport)?
	print Ronge 2 (rood, lower &pprin) g
	The state of the s
	void prix Ronge 1 ( Node P int lower and up per)
	if (bi=van) ; literainal congigue
(200)	if (b. gata >= 10 mar EE b. gata <= upper)
	2 port [P. dota)
	Print Range 1 (P. 10 Pt. 10 wes - Up pro)
	Prist Ronge 1 [P. right, 10 ur, 1/pred)
	6/15, the Chigata Clower)
	2 print Ronge 2 ( A. right , Blown, Upper)
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-	2 print Roage 1 ( D. left i Own upper) ]
	the trade and hong block to find the
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	the four to that the bottom is the second of
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29-)	implement a method that prints all nodes in a
	Cortois level
	Invaking pinh levil(2) on the
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	binony her about should as (150)
	Print 92-111 (175)
	Print: 92 111 166 92-111 (75)
	(1) (1) (200)
	Good bout ford Cont lonal S
	print ( wode root, int level)
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	School low appoint had boll
	S(1) 19 1 ( 1) 200 1 (
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	A (1000) = 20) pnot (n > dota) 2)
	else
	Print (n =1eft, level-1)
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