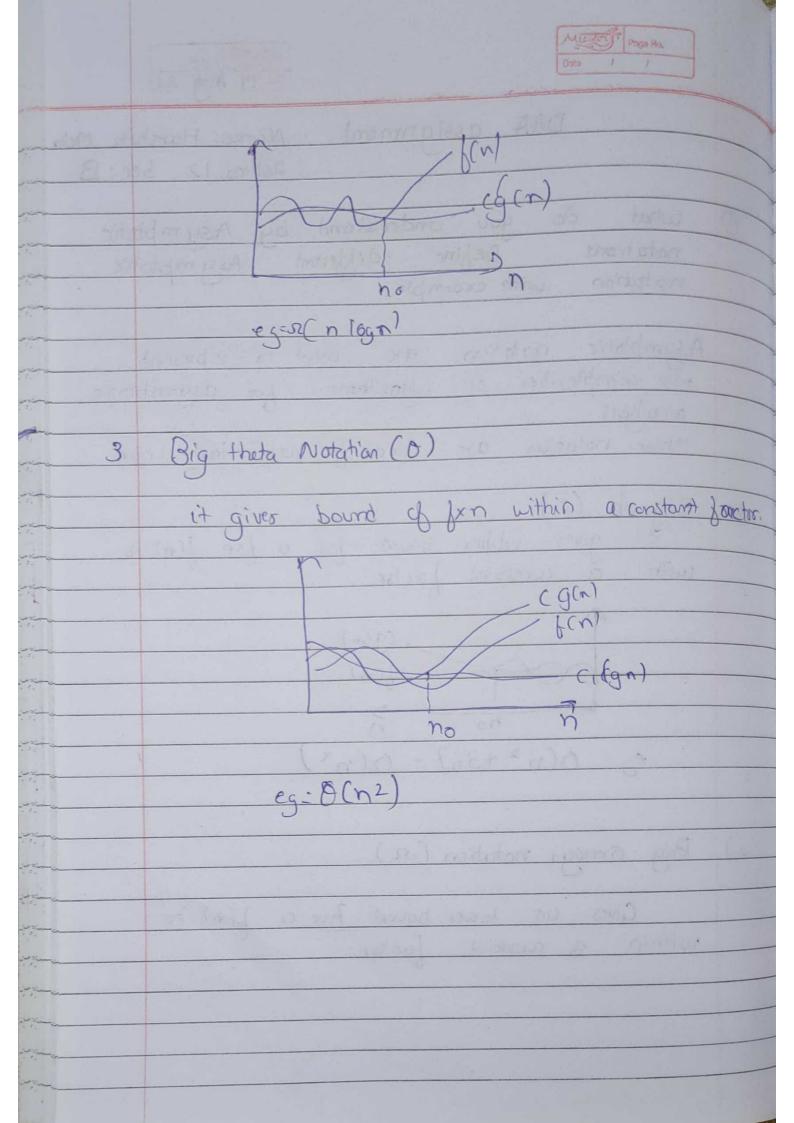
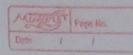


	DAA assignment Name: Harshita Mehr. Rollno: 12 Sec: B							
0	What do you understand by Asymptotic							
	what do you understand by Asymptotic notations. Define different Asymptotic							
	notation with example.							
	Carata Marki							
	Asymptotic natorion are used to represent							
	the complexities of algorithms for asymptotic							
	analysis.							
	thuse notation are used for very large input							
	0: 1 (2)							
1	Big-on (0)							
	Big-oh (0). It giver upper bound for o fix f(n) to with a constant factor							
	WITH a constant factor							
	(g(m)							
	1(n)							
	no n							
	eg: O(n2+3n7=O(n3)							
	(40)9-14							
2)	Big omega notation (sz)							
	Gives us somer bound for a f(n) to							
	within a constant Jacks.							





```
what should be time complexity of
             bor ( i=1 to n ) d
                           0 i= i*2;1.
                               i= 1, 2, 4, 8, 16,32, ____ 2*
                                * k = logn
                               T(n)= O(logn)
    T(n) = {3 + (n-1) if n>0, otherwise 13
     From backward substitution
                Tonl = 3T (n-1) -0
                   n= n-1
     1) put in eq 0
           T(n-1) = 3T((n-1)-1) = 3T(n-2) -0
                 Put F(n-1) in eq 0

Ton1= 3 (3+(n-2)
           (Tcn) = 9t (n-2) (1)
                  m = m-2
             Put in eg o
     T(n-2) = \frac{1}{3}T(n-2)=1) = 3T(n-3)
         Dut en the T(n-2): in eq 3
                  T(n) = 9: (83+(n-3)
                           = 27t (n-3)
     suppose t(n)= 3k 7 (n-k)
                   7(n)= 3n-1 (+ (y-(y-1))
                    T(n) = 3^{n-1} (T(1))
T(n) = 3^{n-1} = 3^n =
```



٧.	T(n) = 12 T (n-1)-1, if n >0, otherwir 1 3							
	T(n)= 2T(n-1)-1-0							
	M= M-1							
	Put in eq O							
	T(n+1) = 2T(n-1-1)-1							
	T(m-1) = 2+(m-2)-1							
	Put T(n-1) in ey O							
	T(n) = 2(2T(n-2)-1)-1							
	7(n) = 947 (n-2) -2 - 8							
	medicalizates formation months							
	n = n - 2							
	Put in eq 0							
	T(n-2) = 2T(n-3)-1							
- 0	Put T(n-2) value in eq 3							
	T(n) = y(2T(n-3n)-1)-2							
	= 87(n-3)-3							
	Suppose = 2x 7(n-k) - 2k-1 - 2k-2 20							
	$\frac{T(1)=1}{k=n-1}$							
- (2)	Ton)= 2n-1 + (1) - [20+21+22+ 2n-2]							
	= 2 n-1 [2/-1 + 2 n-1] APsum - n/a							
	X X MISOM - Ma							
-1	= 2 ⁿ⁻¹ + 1 - 2 ⁿ⁻¹							
	= 1(A -10) 7 10 = (or) 2 200112							
	7 (n) = 1							
	T(n) = O(1)							
	((1-in)-in) () " (3 -(a))"							
	(0) 1) 11/2 = (2)							
	TON S							

E (MONA)

W 7 78

-

-

-

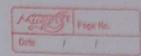
-

-

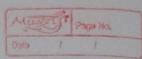
-

7

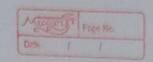
-



5)	Time complexity of
-	int by s=1, i=1;
	while (SZ=n)
	itt; handlej) m
	s= stij not (al) mad
	prin+("#");
	1
	Contract Con
	: O(Jn)
501	
*	T. 12 11 0
b)	Time complexity of
	void function (int n)
	ent i, count = 0;
	for (i=1; i*i <= n;i++)
	Count tt;
	(count tt)
	(inj) in a special count to be a count to be
Sol	(count tt)
Sol	(inj) in a special count to be a count to be
	O(n)
501	O(n) Time complexity of
	Time complexity of void Junction & int not
	O(n) Time complexity of
+)	Time complexity of void Junction & int not
+)	Time complexity of void Junction & int i, j, k, count co;
+)	Count ++; O(n) Time complexity of void junction of int n)(int i,j,k, count =0; for (i=n z; i=n; i+t)f for (j=1) j=n; j=j*2)
+)	Count ++; O(n) Time complexity of void Junchon & int n) int i,j,k, count =0; for (i=n 2) i = n; i+t)f
+)	Count ++; O(n) Time complexity of void junction of int n){ int i,j,k, count =0; for (i=n 2; i <= n; i+t)f for (j=1; j <= n; k=k*2) for (k=1; k <= n; k=k*2)
+)	Time complexity of void Junction of int n) int i,j,k, count =0; for (i=n z) i = n; i+t) f for (j=1) j (=n; j=j*z) for(k=1; k==n; k=k*z) count +1;



8	Time complexity of Junction (int n) of if (n==1) return;
	Junction (int n)
	it(n==1) return;
	log(i=1ton)d
	1 (:= 1 += 1:)
	Par (1=, 10 11)
1	4 1 0
***************************************	1
	J 10 (ATA) (ATA)
50).	0(n)
	& Hersteines mit (&
	War this midshoul tolay
9	Time complexity of - a too 3 to
	void function (int n) 1
	for (i=1 ton) of
	for (j=1) j=j+i)
	printf(" x").
	3 (0)0
	3
	THE WAR SUNTY (1) - 1 20 + 52 4 2 24
501:	@ (n2)
Property	Karting Do nothamal brow
16	
Correct	for the function, nt, a" what is asympton
Parent .	relationship blu these bens?
Name ,	Acr C IC + IN Mese min restal
Name :	Marie Carlot Contract
	(alpoint)



To assume for functions onk and an what is the rotation relation n^{k} is $O(c^{n})$ what it the time complexity of below code void func (intn) intj=1 j (=0) v while (ien) v i=i+j; j++; 33 0, 3, 6, 10, 15 - - m kth term is = k(k +1) N= K3+K Hooldmas and decks Innormal His T = 0 (In) 12) Write recurrence relation for the recursive fun that the prints Fibonacci series solve the recurrence relation me to get time complexity of the program. What will be the space complexity of this program and why?



 $T(n) = \sqrt{T(n-1) + T(n-2)} + 1 \frac{9}{9}$ = 27 (n-2) + 1 = 97 (n-9) + 3 = 87 (n-6) + 3 = 167 (n-8) + 15

 $T(n) = 2^{k} + (n-2^{k}) + (2^{k-1})$ $T(n-2^{k}) = T(0)$ $n = 2^{k}$

 $T(n) = 2N_2 + 7(6) + (2^{n/2} - 1)$ = $2^n - 1$

= 0(2n)

Space complexity O(n) deponds on height which is equal to n in Jabi nocci series.

13 Write program which have complexity -n (1921)

Jor (int i=0; j cn; ittlé

bor (int j=0; i en; i e i *2 ly

boint ("*");

void main() f

fona();



	7 n3
	void main() of
	int n;
	inson;
	for (inties) (< n; itt)
	for Circl j=0; j <n; \$<="" j+t)="" th=""></n;>
	for (lint ked; ken, ktt) of
	n++;
	1333
	PACINE S SOUND TO THE STATE OF
	-) log (logn)
	void bon (cirt n)
	of if (n==2)
	return 1;
	else de la terre de la
	bon (sqrt (n1))
	3/(++) rest (1=1 this) my
	void main()
	dun (100);
	1
14	Salve the following recurre relation to a That I to
	Solve the following recurre relation tenlet (n/4) the tenle
	$T(n) = Tn(x) + T(x) + tn^2$
	cn ²
	$T(\gamma_4)$ $T(n/2)$ \Rightarrow Cn^2
	(γ_4) (γ_2)
	(n^2) (n^2) $\rightarrow Sn^2c$
	$(\frac{n^2}{16})$ $(\frac{n^2}{4})$ $\frac{16}{16}$
	7(0) 7(0) 7(0)
	(76) (8) (2) -> 35n2C

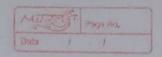


it ls a GP with a=n²
8=5
16 50 som of sp T(n) = (n) (1-5) $= 16 \text{ cn}^2 = 16 \text{ cn}^2$ T(n) = 0(n2) IS What is the time complexity
int fun Cint n) \(\)

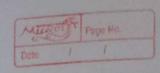
for Cint i=1; i=n; i+t) \(\)

for (int j=1; j=n; j+=i) \(\)

//some took O(1) n, n, n, n, n, n, $n\left(1,\frac{1}{2},\frac{1}{3},\frac{1}{4},\dots,\frac{1}{n}\right)$ (n/logn) T(n)= O(nlogn).



for (int i=2) i = pow(c,k))ix T(n)= 6 (log (log (n))) Henrie brust is devided in 997. 8 94 50 h = 10g N +1 109(100/99) 100100



T(n)= O(N logN) Time complexity 15 O(NlogN)

so we can conclude that if division is done more than height of tree will be more?

The cuhen division rather is less them height is less:

- 15 Arrange the following in increasing order of rate of growth.
- a- 0(100) < 0(log togn) < 0(logn) < 0(vn) < 0(n) <
- b- 0(1) < d(og(logn))) < D(log(nl) < 0 (log2n) < 0(2logn) O(n) < O(nlogn)) < O(log(nl)) < O(2n) < O(4n) < O(nl) < O(nl) < O(2(2nl))
- $C O(98) \angle O(\log_{10}(n)) \angle O(\log_{10$
- in a sorted array with minimum Comparision

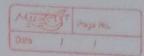
 void linear Search (intaril] into, int keyly

 for (i= 0 to inco)d

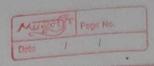
cout << " fand ",
elsp

Continue;

1



20	write preudo code for iterative and recursive					
10	insertion sort.					
	The Edward All country wholestocky "wishors					
-5	Iterative Insertion Sort.					
	voic Insertion sort (arr, n)					
-	int i, temp j)					
	jor(i-1 ton)					
	both produced a pridros orth less to principional 12					
	temp = ari [i]					
	1=1-1					
w find	while (j>=0 ll ari [j] > temp)?					
VI	arititi] = qivij]3					
	(1)0 1915-10/200 (Sm)0 took 1800 a					
	(1) 1 1 (1) 1 (FA) 1 4 (FA) 3 Hall As					
	on [j'+1] = temp 33					
	(m) o King of Know of Good of the Stopped					
	(a) 0 1 (m) o 1 hosta) o (exofa) o 1 too 1 hos					
	-) Recursive Insertion Sort					
	insertion sort (arr,n) \					
	if nc=1					
	lasely the return profess of the spirit se					
	insertion sort (are, n-1)					
	last = ari[n-1]					
giolog	while (j=20 and antij = last)					
	while (j=20 and ani(j) > lost)					
13	arr Ej+13 = onljJ					
	aro Cj+1 J = lost					
	aro Cj+1 J = lost					
	- 14 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					



Insertion sort is called online sorting because						because	
71	Insertion	17 Know	the	whole input	itr	night	make
it clon't know the whole input, it might made decision that later turn out to be not							
	a bimal						
-	ophimal. Other algorithm are obbline algorithms that are						
	chiscussed is lectures.						
	21 complexity of all the sorting algorithms that has been discussed in tec.						
21	Complexit	y 0) a	el the	sorting	algor 17tm	a ghod	
	has b	seen di	scussed	in tec.	4		
				100 100 100			
	7 CANE	Tim	e Con	blexity	Space	c Comb	lexity.
	+	Best	Aug	worst	601		
Bubl	ble sort	O(n2)	Om	0(n2)	6(1)		
- Select	ion sort	0(n2)		0 0	0(1)		
Inser	. From Sort	6)			00)		
Merge	Sort	O (nloga)			- 0	1	
	Sort	O(nlogn)	Λ	1 1 1	0(n		1
- Hea	p Sort	O(nlog n)	Olnlog	n O (nlogn)	00	03 58	17
				Y (A CE AND)	TO L DET	19357	
	D 1	1	ı h.	I. Ous	LESONA N. S.L.	12	1
	Divide	all	40 8	orting a	lgo unto	place,)
	Stable	1 online	90111	rg -	a - Paul		1
		ع، دادسا،		CH 110		Iniline	Cartin
R hh	Ja Cad	implace	1300	Stable	The state of the s		000119
	hie Sort	yes Yes		765		No	
	thin Sout	Yes		No		No	
		No		YPS	26 8 7 1001		
	ge 5064 k 506)	yes		Yes		No	
	Sort	Yes		NO		No	
Tital) 0001	1		100		N6	



23 Write recurrece relation for binary search. Write Time and Space Complexity of Linear & Binary Search Bineary Search Carr, intr, key 19 end=n-1 while (begz = end) mid=[beg f end]/2
if [an [mid] == key] else if ariEmid] zkey

beg=mid t1

else end = mid - 1 Time Complexity of Linear Search = O(n)
Space Complexity of Linear Search = O(1) Binary Search

Time Complexity = O(logn)

Space Complexity = O(n) 24 What recurrence relation for binary recursive Scorch T(n) = T(n) +1