Model Engineering College Ernakulam
VI th Semester Computer Science & Engineering - A Batch (C6A)
CS 302 Design and Analysis of Algorithms
Assignment I

Roll no.	Name	Questions
CSU 171 01	ABHIJITH G ANIL	Prove that $n!=\omega(2^n)$ and $n!=o(n^n)$
CSU 171 02	ABIN M N	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>1 $T(n) = T(n/4)+T(3n/4) + cn$
CSU 171 03	ADVAIDH SUDHAKARAN	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>1 and c is some positive constant $T(n) = T(n/2) + c \log n$
CSU 171 04	AJESH KUMAR S	Let $p(n) = a_k n^k + a_{k-1} n^{k-1} + \ldots\ldots\ldots\ldots + a_1 n + a_0$ be a polynomial in n of degree k with $a_k>0$. Prove that p(n) is in $\theta(n^k)$
CSU 171 05	AJITH PADMALOCHANAN	Rank the following functions by order of growth in ascending order $2^{\lg n}$, $(\lg n)^{\lg n}$, e^n, $4^{\lg n}$, (n+1)!, $\sqrt{\lg n}$
CSU 171 06	AKASH JOE	Prove that for any constant k, $\log^k N = O(N)$
CSU 171 07	AKHIL M D	Let $f(n) = n^2 \log n$ and $g(n) = n(\log n)^{10}$ be two positive functions of n. Check whether the following is correct or not? a) f(n)=O(g(n)) and g(n) ≠ O(f(n)) b) f(n) ≠O(g(n)) and g(n)=O(f(n)) c) f(n) ≠ O(g(n)) and g(n) ≠ O(f(n)) d) f(n)= O(g(n)) and g(n) = O(f(n))
CSU 171 08	ALEESHA K B	Find the order of growth for solutions of the recurrence equation T(n) = 3T(n/2) + nlogn, where T(1)=1 using suitable methods
CSU 171 09	AMAL D B	Find the order of growth for solutions of the recurrence equation T(n) = T(n-a) + T(a) + cn, where a>=1 & c>0 using suitable methods
CSU 171 10	AMBIKA K M	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>1 $T(n) = 4T(n/2) + n^2 \log n$
CSU 171 11	AMITH J MADATHIL	Show that the Red-Black trees that result after successively inserting the keys 25,22,15,12,3,8 into an initially empty Red-Black tree. Also show how to delete any internal node
CSU 171 12	ANJITH PAUL K	Find the order of growth for solutions of the recurrence equation T(n) = 4 T(n/2) + n^3 where T(1) = 1 using suitable methods
CSU 171 13	A PIOUS	For the following pairs of functions detemine the smallest integer value of n>=0 for which the first function becomes greater than or equal to the second function i)n^2,10n ii)2^n, $2n^3$ iii) $n^2/\log n$, $n(\log n)^2$ iv) $n^3/2$, $n^{2.81}$
CSU 171 14	APPU AJIL	Arrange the following growth rates in the increasing order $O(n^3)$,O(1),$O(n^2)$,O(nlogn),$O(n^2 \log n)$,$\Omega(n^{0.5})$,Ω(nlogn),$\Theta(n^3)$,$\Theta(n^{0.5})$
CSU 171 15	ARJUN P K	What is the smallest value of n such that an algorithm whose running time is $100n^2$ runs faster than an algorithm whose running time is 2^n on the same machine?
CSU 171 16	ARUNDHATHI JANARDHANAN	Find the order of growth for solutions of the recurrence equation T(n) = 2T(n/2) + n logn where T(1) = 1 using suitable methods
CSU 171 17	ARUN H	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>1 and c is some positive constant $T(n) = T(n/2) + c\, n^2$
CSU 171 18	ASWIN G	Find the order of growth for solutions of the recurrence equation T(n) = 9T(n/3) + n where T(1) = 1 using suitable methods
CSU 171 19	ASWIN M PRABHU	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>1 $T(n) = 3T(n/4) + n \log n$

CSU 171 20	ASWIN SHANIL	Find the order of growth for solutions of the recurrence equation T(n) = 4T(n/2) + cn where T(1) = 1 using suitable methods
CSU 171 21	ATHIRA LAL	Show the red-black trees that result after successively inserting the keys 51,48,41,22,29,18 into an initially empty red-black tree
CSU 171 22	ATHUL VINCENT	Create a B-tree with numbers from 1 to 15. Delete all odd numbers starting from 1
CSU 171 23	DEEPAK P P	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>1 $T(n) = 7T(n/2) + n^2$
CSU 171 24	DELLA MANI	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>1 $T(n) = T(n/3)+T(n/6)+T(n/9) + n$
CSU 171 25	GEO J KADAVAN	Show that for any real constants a and b, where b>0 $(n+a)^b = \Theta(n^b)$
CSU 171 26	GOPIKA MURALI	Show the results of inserting the keys F, S,Q,K,C,L,H,T,V,W,M,R,N,P,A,B,X,Y,D,Z,E in order into an empty B-tree with minimum degree2.
CSU 171 27	HARIKRISHNAN V	Create a red-black tree with numbers from 1 to 10. Delete all odd values starting from 1.
CSU 171 28	HARINARAYANAN SHAJI	Which function grows faster: nlogn or $n^{(1+(\varepsilon/\sqrt{\log n}))}$, $\varepsilon > 0$.
CSU 171 29	JAIRAM R PRABHU	Show that the Red-Black trees that result after successively inserting the keys 41,38,31,12,19,8,into an initially empty Red-Black tree
CSU 171 30	JERY JAMES JACOB ARANGATH	Find the order of growth for solutions of the recurrence equation T(n) = 4T(n/2) + $n^2\sqrt{n}$ where T(1) = 1 using suitable methods
CSU 171 31	J HARISANKAR	Obtain the height balanced tree by the insertions of data given below in their order of occurrence. 1,2,3,4,5,6,7,8,9,10,11,12.
CSU 171 32	JISNA JOSE	Find the order of growth for solutions of the recurrence equation T(n) = T(n-2) + 2logn where T(1) = 1 using suitable methods
CSU 171 33	JOSEPH ANTONY	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>1 $T(n) = 2T(n/2) + n/\log n$
CSU 171 34	JOYAL A JOHNEY	Find the order of growth for solutions of the recurrence equation T(n) = 4T(n/2) + √n where T(1) = 1 using suitable methods
CSU 171 35	KARTHIK RAJAGOPALAN	Show the B-tree that results when inserting R,Y,F,X,A,M,C,D,E,T,H,V,L,W,G (in that order)branching factor of t=3.
CSU 171 36	KAUMUDI H	Create a B-tree with numbers from 80 to 100. Delete all even numbers starting from 80
CSU 171 37	M BHARATH KRISHNA PAI	Explain why the statement, "**The running time of algorithm A is at least $O(n^2)$**" is meaningless
CSU 171 38	MEGHA K C	With the help of an example show "Deletion in a Red-black tree"
CSU 171 39	NOEL THOMAS BEJOY	Obtain the height balanced tree by the insertions of data given below in their order of occurrence. 8,9,10,2,1,5,6,4,7,11,12,3. Explain each step in detail
CSU 171 40	PARVATI K NAIR	Create a B-tree with numbers from 30 to 50. Delete all even numbers starting from 30
CSU 171 41	PRIYANGA P KINI	Show that the Red-Black trees that result after successively inserting the keys 25,22,15,12,3,8 into an initially empty Red-Black tree
CSU 171 42	RAHUL R	Find the order of growth for solutions of the recurrence equation T(n) = √nT(√n) + n, where T(1)=1 using suitable methods
CSU 171 43	REENU BIJU THOMAS	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>1 $T(n) = 2T(n/2+17) + n$
CSU 171 44	RIBA JACOB	Find the order of growth for solutions of the recurrence equation T(n) = 4 T(n/2) + n^2 where T(1) = 1 using suitable methods
CSU 171 45	SADAY NARAYANAN	Rank the following functions by order of growth in ascending order ln ln n, lg n, $n2^n$, $n^{\lg\lg n}$, ln n, 1
CSU 171 46	SANGEETH D MENON	Show that the Red-Black trees that result after successively inserting the keys 5,10,15,20,25 into an initially empty Red-Black tree
CSU 171 47	SARATHLAL K S	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>1 $T(n) = 2T(n/4) + \sqrt{n}$

CSU 171 48	SHWETHA B MENON	Rank the following functions by order of growth in ascending order $(3/2)^n$, n^3, $lg^2 n$, lg(n!), 2^{2n}, $n^{1/lgn}$
CSU 171 49	SIDHARTH NAIR	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>1 $T(n) = T(\sqrt{n}) + 1$
CSU 171 50	SILPA T S	Show the results of inserting the keys F, E,Z,D,Y,X,B,A,P,N,R,M,W,V,T,H,L,C,K,Q,S in order into an empty B-tree with minimum degree2.
CSU 171 51	SNEHA SAJ	Create a B-tree with numbers from 65 to 90. Delete all odd numbers starting from 65
CSU 171 52	SREEHARI K S	Show the red-black trees that result after successively inserting the keys 31,28,21,02,09,08 into an initially empty red-black tree
CSU 171 53	SREEJESH T S	Check whether the following are true or not? a)100nlogn=O(nlogn/100) b) √logn=O(loglogn) c) if 0<x<y then n^x=O(n^y) d)$2^n \neq O(n^k)$
CSU 171 54	SREERAG T S	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>=2 $T(n) = 2T(n/2) + \sqrt{n}$
CSU 171 55	SRIVIDYA KRISHNAKUMAR	Show that the Red-Black trees that result after successively inserting the keys 90,80,70,60,50,40,30,20,10 into an initially empty Red-Black tree
CSU 171 56	STEEV JAMES P	Obtain the height balanced tree by the insertions of data given below in their order of occurrence. Jan,Feb,Mar,Apr,May,Jun,Jul,Aug,Sep,Oct,Nov,Dec.
CSU 171 57	SYAM PRASAD	Find the order of growth for solutions of the recurrence equation T(n) = 16 T(n/4) + n^2 where T(1) = 1 using suitable methods
CSU 171 58	VIDYA SREEKUMAR	Create a red-black tree with numbers from 10 to 20. Delete all even numbers starting from 10
CSU 171 59	VIGNESH RADHAKRISHNAN	Find the order of growth for solutions of the recurrence equation T(n) = 2T(√n) + 1 where T(1) = 1 using suitable methods
CSU 171 60	VISHNU K A	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>1 $T(n) = 5T(n/5) + n/\log n$
CSU 171 61	VIVEK R	Find the order of growth for solutions of the recurrence equation T(n) = 4 T(n/2) + n where T(1) = 1 using suitable methods
CSU 171 62	KARTHIK S	Show that the Red-Black trees that result after successively inserting the keys 41,38,31,12,19,8,into an initially empty Red-Black tree
CSU 171 63	DEVDUTT SHENOI	Consider the following functions f(n) = $3n^{\sqrt{n}}$, g(n)=$2^{\log n \sqrt{n}}$, h(n)=n! Check whether the following is true or not? a) h(n) is O(f(n)) b) h(n) is Θ(g(n)) c) g(n) is not O(f(n)) d) f(n) is O(g(n))
CSU 171 64	AJISHNA K	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=2, $T(n) = 3T(n/4) + n$
CSU 171 65	ALLEN JOSEPH	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>1 $T(n) = T(n/2) + n^2$
CSU 171 66	DEVIKA DEVADAS	Create a red-black tree with numbers from 1 to 10
CSU 171 67	PATRICK PRAKASH	Find the asymptotic order of the solution for the below recurrence equation using suitable methods. You may assume T(1)=1, the recurrence is for n>=2 $T(n) = 4T(n/2) + n$