

Q)	write linear search algorithm/prendocode to search an element in a sorted
	array with minimum comparisons.
	boolean linear (int al], int e, int n)
	int c=0;
	for (int i=0;i <n;i+t)< th=""></n;i+t)<>
	if (a[i]==e)
1	else
	C=0;
	f(c==1)
67	return true;
	vetura false;
	June Charles 12 oct 1 styles
Q2)	write pseudocode for iterative and
	is called online sorting. Why? What
	about other sorting algorithms that have
	been discussed in lectures?
	Herative -
	void insertion (int a[], int)

Date Page

for (int i=(ii < n;itt) int val=a[i]; while j>0 88 a[j-1]>val a[j]=a[j-1]; as j]=val; Recursivevoid Insertion (int arr [], int i, int) int val= arr[i]; int j=i;
while (j>0 88 arr[j-]>val) arr[j] = arr[j-i]; arr[j]-vol; if (i+1==n) Insertion (arr, it), N;



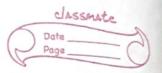
- A	Insertion sort	is call	ed an	orline
3. 1	corting algorit	then because	se inse	rtion sort
	considers on	input e	Conont	per teration
	and produces	a par	tial sol	ution
	without conf	idering for	iture	elemens.
Q3)	Complexity of	all son	rting al	govithus
	Complexity of that have be	een disce	issed.	
	Sorting Techique Best	t Average	e wor	
	Bubble day	10(h2)	dr	1
	advation OW	10(h)	Olas)
	Insertion O(n)	10(n2)	drz	
		y O(n logn) O(n)	(og n)
-		John Cogn) O(2)	98
	Merge anlogn) de log m) O(ng	(og h)
		O(ntk)	Consta	g(ntk)
		LILLIA		
Q4)	Divide all sor	ting algor	rithms	into
	Divide all sor stable/inplace/c	online sort.	11111	
	Cartina Marraitte	In-place	Stable	2 Online
	Sorting Algorithm Bubble	Yes Yes	1 Yes	No
	Selection	Yes .	No	No
	Insertion	Yes	Yes 1	Yes
	Quick	Yes	No	No
	Merge	No	Yes	No
	10 CV CV			



Q5)	Write recursive stevative pseudocode for
	Gravy search. What is the time and
2010 JA	Gace complexity of linear and binary
	search?
	without constitute the constitute
	Iterative -
	int Binary (int a(), int x)
	int low-0, high= a.longth-1; while (low-(=high)
	while (low (= high)
	to de la companya della companya della companya de la companya della companya del
	int mid=(owthigh)/2;
	if(x==a[mid]
	return mid;
	else if (x (a[mid])
	high = mid-13
(40	elje
	low=midt/i
	- Zaringa - was the sky ill led
	return-1;
	7
diaz	artighted to part their
9.0	Recursive-
	int Binary (int a (), int L, int h, int x
10	L
44	if (lano hage)
	return -/;
	int mid= (conthin)/2;
	if (x==a(mid)) return mid;
	return mid;



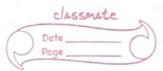
	3
1 100,0	else if(x (a [mid]) return Binary (a, (mid-1,x); else
	return Binary (a. (me mid-1x);
	else
	return Binon (a mid + 18 x);
	veteur Binary (a, midt 1, th, I);
	9
	Time Completite - Herative - O((og n)
	Time Complexity - Herative - O(logn) Recursive - O(logn)
	Charlist Market Control
	Space Complexity > Iterative - O()
	Space Complexity - Sterative - O() Recursive - O(log n)
Q6)	Write recurrence relation for Grany recursive search.
	receysive search.
	Recurrence Relation - T(n)=T(n/2)+1
	Derivation -
	T(n)=T(n/2)+1
	T(n)=T(n/2)+1 T(n/2)=T(n/4)+1T(n/4)=T(n/2)
	T(1/4)=T(1/8)+1. T(1/8)=T(1/23)
	$T(n/2^{k}-1) = T(n/2^{k}) + I(k-times)$
	Adding all equations,
	T(n)=T(n/2)+k (ag h=k)
	h = 1 $T(n) = T(1) + (ag h$
	17/2)=O((an h)
	h=2k



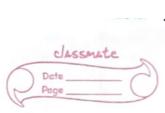
Q7)	Find two indexes such that A[i]+A[j]-k in minimum time complexity.
	vector (int> find (a[],k,r)
	vector (int) sol; for i=0 to n-1
	for j=0 to h if a[i]ta[j]=k
	sol. pushback(i) sol. pushback(j) veturn sol
a second	THE MEDICAL PROPERTY OF THE PR
6	and many development, where the same
14	(1) The Market of Mary Harles
	The second of th
(34)	11 (4) +1 - (1/4) +1 -
6/2)	(8) 11 - 14 (200) - 1 (10) 24 - 1 (10) 18)
126	with the first part of the first of
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	- 1 5 Part (1 2 7 - 1 1 2 9 0 2 2 2
	and the second s



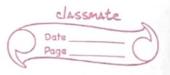
Q8) Which sorting is left for practical user? Explain. Quick sort is the fastest general purpose sort. In most practical situations, quick sort is a method of choice. If stability is important and space is are available, merge sort might be best. In some performance critical applications, the focus maybe on just sorting number, so it is reasonable to avoid the costs of using references and sort prinitive types instead. What do you mean by number of inversions in an array? Count the number of inversions in arr= (7,21,31,8,10, 1,20,6,4,56 using merge sort. Inversion Count for an array indicates how for or close the array is from being sorted. If the array is already sorted, then the inversion count is O but if the array is sorted in reverse order, the inversion court is maximum. Thursian 3 (7,1) (7,6) 7,4) (7,5) (21,8/21,10) (21,1) (21,2) (21,6)(21,4)(21,5)(31,8)(31,10)(31,1)(31,20)(31,6) (31,4)(31,5)(8,1)(8,6)(8,4)(8,5)(10,1)(10,6)(19,4)



Toping	(10,5)(20,6)(20,4)(20,5)(6,4)(6,5) Total inversions=31
	Total inversions = 31
Q10)	The which cases muck sort will give
La Thirty	In which cases quick sort will give the best and the worst case time complexity?
E.	complexity?
	ellecte by hyportist ned types
The	Best case-The best case occurs when the
a li sisa	partition process always picks the middle
	element as pivot. Following is the
<u> </u>	recurrence relation for the best case,
-100	T(n) = 2T(n/2) + O(n)
	Worst Case-The worst case occurs when
- le	the partition process always picks greatest
	or smallest element as pivot. Its
2,31,4,10	above partition process is considered
	where last element is always picked
	as pivot, the worst case would occur
12/2011	in increasing/decreasing order.
	a mustry actives ag
QI)	Write recurrence relation of merge and quick
	gort in best and worst case. What
	are the similarities and differences
	Who complexities of two algorithms and
	Why?
(1)	Quick Sort = Recurrence Relation-Best-Th-27/42+
A. C. C.	worse on jes it yrou



	Merge Sort =) Recurrence Relation-Best - 21/4/2/toly
nech.A	Worst age-27(n/2)tde
	The same of the sa
	Time Complexity >
	Quick Sort O(rlogn) dn2)
	Ruick Sort O(n logn) dn²) Merge Sort O(n logn) O(n logn)
	Cryc 20, c c c c c c c c c c c c c c c c c c c
Q12)	Selection sort is not stable by default
	but can you write a version of stable selection sort?
	stable selection sort?
	void stable (int a[], int n)
	Sola hable in als, in h
	for(int i=0; i <n-1; i++)<="" th=""></n-1;>
	5
	int min=i; for (int j=it/ij <n;j+t)< th=""></n;j+t)<>
67	for (int j=it/ij (nijtt)
	if (a[min] > a[j])
	min=)
	int key = a[min];
	int key = a[min]; while(min>i)
	d
	a[min] = a[min-1];
	min-i
	26:7-ka.
	a[i]=key;



Q13)	Bubble sort sears whole array even when
- Charle	array is sorted. Can you modify the bubble
	sort so that it does not scan the whole
	array once it is sorted.
	void bubble(int a[], int n)
	L. 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	for (int i-0; i < n-1; i+t)
10,	
	district a stress of the stress
	C=0;
- 100	for (int j=0; j < n-i-l; j+t)
	d Marka Aller Was Market Tolking
	C=1; $C=1$;
	if(a[j]>a[j+1])
	to - 05:7:
	tem=a[j];
	a[j] = a[j+l]; $a[i+l] - ta(i)$
	a jt/ =tom;
	70
	if(c==p)
	if(c==0) Greak;
	2
	6
	J



Q14)	Your computer has a RAM of 2GB
	and you are given an array of 4GB
	of sorting. Which algorithm are you going
	to use for the purpose and why PAGO
	explain the concept of external and
	internal sorting.
	As the size of the given array exceeds
	the size of RAM, we will use k-way
	merge sort technique as it takes a
	part of array and sort it instead of
	loading the whole array into main
	memory.
	External sorting-This algorithm loads a
	hart of array and fort it instead
2	of loading the whole array in the
	is used to sort away of large sizes.
Si .	Internal sorting-This algorithm needs
	whole array to be loaded the FAM
	internal sorting-inis agercian.
7	