NAME -> AVANTIKA SINGH €CYION> CST SPL 1 ROLL NO. -01 TUTORIAL - 3 white linear reach pseudo vode to realch an element in a raded allay with minimum companions. int linearlearch (a, m, key) if (abs(a[0]-key) > abs(a[n]-key))

for (i=n-1 to 0;i--)

if (a[i]==key)

netum i; else fa(i=0 to n-1; i++)

f(a(i]== key)

return i; Pseude rode for iterative of Recursive insertion cost Insertion Lost ralled Online Sorting why I what about other sorting algos insertion fort (int ats, int n) for (i=1 to n; i++) { x - alij; j= (-1; while (j>-1 && a[j]>x) a[j+1]=a[j]; \$ a[j+1] = x',

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+	insertien Sort (int ars, int n)
	{
	if (n<=1)
	neturi,
	insertionalor (a, n-1); // Recursive.
	iut x = a(n-1);
	j = n-2;
	j=n-2; while (j>=0 kk a[j]>x){
	aGitIJ· aGiJ;
	j-;
	}
	a [j+1] = x;
	3
+)	Insertion Sort is called Ordine Sorting because it considers only
	one input per iteration and produces a partial solution without
	considering feature elements whereon other sating algorithms
	process the whole problem data altegether from the
	process the whole problem data altegether from the beginning and is required to output an answer which solves
	the publish at hand,

all conting Algorithms: complexity 03. Moure Average. Best Corting 0(n2) 0(n2) Bubble Lost O(n2) O(n2) Selection Sort 0 (nº) 0 (n2) O(n2) Eusertian Cort O(n2) O(n2) O(n logn) Quick Sort O(nlogn) O(n2) (VI 0 (n (gn) O(n logn) O(n logn) merge sort V) [m + raye] 0 (n+m) O(n+m)vi) count con 0(n+m) o (n logn) O(nlogn) O (n logn) Heap Sou VII)

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04.	Sorting Technique	suplace	stable	Online	
	Bubble son	1	V	X	
11)	Selection Cost	~	X	X	
	Ensection Sort	~	V		
Jul	Quick sort	V	X	χ	
v)	Merge cont	X	V	X	
VI)	count cont	X	V	* *	
VII)	Heap ser	V	X	(1)	
Q 5.	Recurire/ Iterative Reude code for Binary Search. Time & Space				
	Recurire / Iterative Plende vode for Bluary Search. Time & Space complexity of linear & Binary Search.				
01.					
101")	int Rbinary_search (a, l, x, x) // Recursive.				
	1				
	while (1<=9) {				
1 8 3	mid = (l+n)/2;				
	if(x > a(mid))				
3	Ketun Romany-search(a, mid+1, 9, 7);				
	Relse if (x < a [mid]) neturn Rhinary_rearch(a, l, mid-1, n);				
	else				
	return mid;				
	}	fa s	i sayın	3 18 WA 186 OF THE	
4	int binay learch (a, r	(, 1)	- //	Steratine	
	3		1/2		
	(z 0 , 9	-n-1;		AND AND THE	
	white (1	(=H) {		10 1 134 1 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	A CONTRACTOR ASSESSMENT	mid = (l+4)	1/2;	1. Asserted the	

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	ey (x < a(mid]) ex- mid-1;				
	else if (x > a(mid)) else else else etturn mid;				
			A RESIDENCE SEASON STANDARD		
,		time complexity	space Complexity		
- 1	Linear Search Binary Search	O(n)	0(1)		
11)	many search	O(logn)	0(1)		
(0.0	Recubilinea Edia	Tion to month	000 11 10 11		
<u>Q6.</u>	iconomica Real	dian you Binary	recuisine search,		
dus.	1 TO	$n) \geq 7(n/2) + 1$			
M¥.	find & indexes	auch that A [i]	+ A (i) 2 K in minimum Time		
<u> </u>	find & indexe such that A[i]+A[j]= K in minimum Time complexity.				
1	find Index (int al	Dit in , int k)	// Julay is corted.		
	15				
	[20, j21;				
	izo, jz1; while (i< an kk j <m) th="" {:="" ="" <=""></m)>				
2153	CONTRACTOR	y(i!= j 22 (alj)	1-ali]== K 11 ali]-aljj==K)		
		print (")	(d, y, d', i, j);		
		else if (a[j]-a[i] < k)		
	Control of the Contro	j++;	ENCE PROPERTY NAMED IN		
	Σ	i++;			
	J.				

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Od.	which soding is west for practical uses?
Ans.	Ruich sort is one of the most efficient corting algorithms which makes it one of the most used as well, It is gaster as
	makes it one of the most used as well, It is faster as
	compared to other serting algorithms. Also, its time complexity
	is O(n log n). But in case of a larger array, Merge sor
	is preferred.
Q9.	what do you mean my no, of inversions in an away?
	Count the no. of inversions in Array are = {7,21,31,8,10,1,
	20, 6, 4, 5} using merge sort.
Aus.	Inversions in an array bancally define how for or dose close
	an away is from eveing vorted. If away is already sorted,
	snuemon count → 0; of alloy is in henerse order,
	Inversion count - maximum.
	(F) (A) (B) (D) (D) (D) (G) (G) (G) (G) (G)
	31 10 6 10 20 10
	Inversion Inversion / Inversion \(\text{C} = 3
	21>8
	Inversion Inversion [Cz 5]
	[1 6 7 8 10 20 21 31 4 5
	7>1,7 6,8>1,8>6,21>10,21>20,31>1,31>6,31>10,831>20,21>1,21>6
	114567810202131
	6>4, 6>5,7>4,8>4,8>5,10>4,10>5,20>4,20>5,21>4,21>5,31>4,31>
	Counts = 14.
	7 14+17
	Total counts = 31 due

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en which cases Quick sort will give west of worst care time complexity? BEST CASE: Ars. of partitioning element is in the middle Time complexity = O(n log n) WORST CASE: of phot is at extreme position and array is already corted in increasing decreasing order. Time complexity = O(n2). verite Recurence Relation of mage of Quick cont in best of went case? Limitarities of Deference you complexitie of & algorithms of why? 011. Quick Sour Aus. Best: T(n) = 2T(n/2) + m Worst: T(n) = T(n-1) + m T(n) = 27(n/2)+n In merge sort, the array is divided into & equal halves in times : 7. C = O(n logn) In Quick sort, the array is divided into any ratio depending on the position of fivot element. :. Time complexity naves from dn2 to olnly n.).

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Q12.	Selection Sort is not stable by default but you can write a version of Stable Selection Sort.	
	version of Stable Selection Sort.	
	0	
ifno.	In selection sort, normally me way the minimum value with	
	the first nature, which makes it senstable. To make it stable,	
	instead of ewapping, insert the least value at pas - 0 to n.	
013.	Buttle sort scans whole away even when array is soiled. Can you modify the Buttle Sort so that it deem't scan	New March
	can you modify the Bubble Sort so that it doesn't scan	
	whole allay.	
100		
Ans.	word bubblesort (int a(), int n)	
	1	
	for (i= 0 to m) {	
	swaps =0;	
	for (j=0 to n-1-i)	
	away (agi), agi+1);	
	swaps +t;	
	if (awaps = =0)	
	bicaro;	
	3 CONTRACTOR OF THE PROPERTY O	
	3	
014	Your computer has RAM of 2018; Gilven array of 4018 for coiling.	
(VI)	which algorithm you would use I External of Internal conting ?	
Ans.	In such cases, external arting algorithms with its k-way	
	marge sort is used that can handle large data amounts	
	nebich can't fit into main memory. A part of allay uesides in	4
	RAM during the execution whereas in enternal sorting, process takes	
	slace entirely within the main money; mainly used when data to be	
	sorted is small. Eg: - Bubble Sort, Drivick Sort etc.	