HW-2 - Sorting Tracing

1) Insertion sort :- A simple comparison based sorting algorithm.

It inserts even arms: It inserts every array element into its proper position

algorithm 1-

1. 1st element, already sorted then return 1;

2. Next element.

Run ting o(11) 3. Compare with all elements in the sorted sub-list. 4, shift all the elements in the sorted sub-list that is greater than the value to be sorted, brands

5. Insert the value

6. Repeat until the list is stated. 29-12 10 100000 Pur time our

Tracing: let us take;

5/103 (7/10/2 4)(0)) Whiteleval and Now; 50 3 10 4 10 1 2 100 4 (4)0 1000 1000 1000 3 5 7 1 2 4) 2nd Passir Save=1; C=1; Shift=0; 1 3 5 7 3 10 Insert = 1; Total = 3 (49) 1 ho 20 13 115 117 1 11 1 1 1 1 1 1 1 1 1 7 old Insett: 1; Total: 9 5 Ja 123457

123457

3 5 60 702 100 2000 4 1 Pass : Save=1; C=2; Shift=1; Insert=1; Total=5 1 3 5 7 2 4 3 4 Pass 1- Save=1; C=Y; Shift=3 ty pass: Save=1; C=4; Shift=3 Insert:1; Total=9 5th Passi- Save=1; C=3, Shift=2 Insert = 1; Total = 7

Total Steps = 33

Tracing of sorted array : let us take. 1 3 5 7 9 A SOUND THE STATE OF THE STATE 1 3 5 7 9 1st lass The state of the s 3579 1 35 7 9 3d lass day lat 4th Pass 1 3 5 7 9 Reversed array ! 9 5 3 1 (n-1) Best case = (o(n) > 1+2+3+ ... + (n-2)+(n-1) Total pairs = (n-1) (1+(n-1))+ (2+(n-2))--+1 0 (1) worst case = o(n2) $\rightarrow n + (n-1) + \cdots + 1 = \frac{n(n-1)}{2}$

= 0(nº)

broom burkos - 7 MH Big O = for N=6:0(N2)=36 steps april 11 transmitting not on Best case to me themate your or grown where It Ar though elements already in order Steps = 15 (close to 6) better phooris, trimings 1. harists trib Run time : O(N) the seed between with an atmosphere that their programs Worst case 1. The biles art it showed rate the Horney elements in reverse order Number of steps = 52 (close to 1360) 1100 long Run time = O(N2). sing let us take; Time Complexity: · Best Case in O(N); Sorted array as Input Worst Case 1- O(N2) : Reversely sorted & finally, I and was the H & dig to de E. Insertion sort is relatively stables · bust used to verify sorted list o(N) · worst when the list in random, reversed only Du less - Sover 1 gC= U 1 Staff = 8 15 Hassi Box = 1 : 1 = 3 , shiff 2 Total Steps 23

2.) Selection Sort :

Algorithm .

- 1. Set MIN to Cocation D.
- 2. Search the minimum element in the list
- 3. Swap with value at location MIN.
- 4. Increment MIN to point to rest element
- 5. Repeat unit list is Sorted, and

Tracing: let by take;

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NOW! 2 4 hecking

2 4

1 2 17 05 314 -> 27 Pass: C=4 , B= 2, 5=3

2 3 5 1 2 wols

wind the our

5 7

3 4 5 7 2

(44) 0 completel

Stop = 62 (160 + 40 85)

libra severe of strength

Counting phishpra sml > Ist pass 11 (25; B=3; 5=3; (14) Total = 11.

apter (84)0 : 8 (8)0)

Total = 9

7 4 > 3rd Pass 7 (=3; B=3,5=3

Total = 9 Hedion sort is very stelle

4" Pass 1 C= 2; B=2; 5=3 Total = 7

7 5th Pase: C=1; B=2; S=3 Total = 6

Total steps= 42

Tracing of sorted array: let us take; 0 3 5 7 9 1 3 5 7 9 -> 1st lass 1 3 B 7 9 -> 2nd Pags 1 3 5 @ 9 -> 3 Pass 1 3 5 7 @ -> 4th Pass. Complexity -> (n-1)+(n-2)+ +1 = n(n-1) = 0(n²) Reverse sorkdi 97531 (~ (n-1) 1 7 5 3 9 C= (n-1) 1 3 5 7 9 and comparison, the comparison Complexity 2 (n-1)+(n-2)+ -.. + 2+ 1 (March 2014 = () (1/2) > n+ ...,

BUTE worst case: 0(n2)

Big 0; for N=6: O(N2): 36 steps Closet.

Best case 1- fell set in square morning at when is

elements already in orders to select the grant

Steps = 35 (close to 36) of CICI townson

Constant of Crust bear

color por

Run Fine: O(N2) of sed for topol of

Worst cayer

elements in reverse order

Steps 1 52 (close to 36)

Run time = 0 (N2)

Time Complexity & Milroa)

- · But case = 0(02) 01/21 = 1 6 2 1
- · Worst Cye: O(N2)
- * Time complexity in all cases is O(NE); no but case scenario

Finally;

selection sort is very stable, but very slow process.

and will always have a running time O(N2)

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