Assignment-1

Oriven: Algorithm A

Running Time 0(27)

80, if n=5, sunning time = 25=32 hubruthous

Sunvay Taihylight - 1017 Instructions/Second.

problem s

Ma) (a) n=100

Time taken by survey Taihulight to Finish the algorithm with n=100.

Isecond -> 1017 instructions

9 -> 2100 instructions

 $\chi = 2^{160} = (12,676,506,002,282 \times 2940 - \sim)$

1 century -> 3,155,69 5,200 seconds 12,676,506,002,282:2940 fonds

2 = 12,676,506,002,282 = 4017 centuryos 3,155,695,200

So, Survey Taihulight need 4017 contaves to Loroth the algorithm with 2 100 instructions.

1(p)

1 seems -> 1017 mitmutions

1 Reads -> 2 1000 mitmutions

 $\chi = \frac{2^{1000}}{10^{17}} = 1.07150860 - 9060 + 284 seconds.$

1 century -> 3,155,695,200 scands 2 centuries -> 1.07150160---968e+284 Seuks

X = 1.07-150860 906 e + 284 sents 3,155,695,200



= 3.395475-- e+274 centures

So, Survey Taihulight supercomputer needs 2.395475-- et27el century to front the algorithm with 21000 instructions.

J. S. 1952 SC

(2)

Ø n^2 Enput 513e doubles ⇒ $(2n)^2$ ⇒ $\frac{yn^2}{m} = \frac{y + imes}{m}$ slower.

© n^3 2nput 513e doubles ⇒ $(2n)^3 = 3n^6 = \frac{1}{n^3}$

= 2 Hmes slower.

@ 100 n²

Enput size doubles $\Rightarrow (00(2n)^2 = 4 \times 100n^2$ 100n²

100n²

= 4 times slower.

an ning n

Zinput size doubles = 2 page 2 log (20) 2 (1 + log n) they

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② 2ⁿ Snput x12e doubles ⇒ 2 2ⁿ

= 201-17 = 21 Homes slower.



(3) (a) f(n) = 100n + 10gn + 10gn n + 10gn () = 6n + 10gn f(n) = 0g(n)

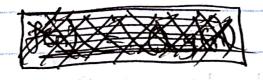
fen) = 0 g(n)

n² > nlogn

fen) = 12 g(n)

@ fen = Jn 4 9 (n) = Log n

In \$ log in



Ph) = 12g(n)

$$9(n) = n2^{n}$$

$$n2^{n} \leq 3^{n}$$

$$n \leq (n5)^{n}$$

Problem: 4

1

Here, In this algorithm the knapsack is taken as list. The Herry Eq size of the items are taken as a Cij. In starting i took with as empty and sum =0. Then the fin loop starts.

If sum +a[i] < K, then we added acij into the list. list-add(acij).

Ment, we incremented the sum with size of all

Hent, check whether sum ZKL. . If it is satisfied, then break the algorithm. otherwise proceed with aliti

else (Sum + ali) > K), then check whether ali] is led than 81 equal to 1c. If this condition is is satisfied add ali) into me list and break the algorithm. otherwise proceed with alit!

Here I wrote only one forloop from Iton where we considered each item only once, the sunning time of an algarium is O(11).

Pseudocode s 5/12e = K1, K2,K3 -- Kn 4 Enput. items = atil, atil --- atil Sum = 0, Ust = 6 +81 i=1 to n if sum + KI & K list. add (acij) sum = sum + ki if sum > K/2 breek; else if kisk . list add (ati) study of break; and allowed and Output! knapsack list of factor 2 appron solution Discused with Shivaketh Reddy Annepally Sahiti Katragadda 1 mas it is a supplement in 1000