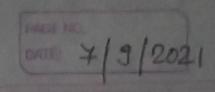
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Test 1 - C341001 (ThOC)

2. VIS = { (Map) | Mon input & visits elatep during Conquetations

machine that reduces leating Problem to Mis.

HP < M VIS

(N,V) - > (M,24P)

N halts on V (>) Mon input x visits state p

Behavior of M on input x,

- evan xe from the trong machine tape

- write v on the tap and simulate Now v

- If N halts on on , move to state p

of Nhalts on v, L(M) = 5*

of Ndoes not halt on v, L(M) = 8.

:. When N halts on v, M visits the state pfor every Such v.

4.(a) PCP is decidable over mary appliable 1. are can ducible a tring markine M that decides Crimen lenong PCP instance: $A = d w_1 w_2 ... w_k^2 B = d w_1 x_2 ... x_k^2$ $= \sqrt{a_1 a_2 ... a_k^2}, = \sqrt{b_1 b_2 ... b_k^2}$ $= \sqrt{a_1 b_1^2 a_2 ... a_k^2}, = \sqrt{a_1 b_1^2 a_2 ... a_k^2}$ $+ \sqrt{a_1 b_1^2 a_2 ... a_k^2}$ Behavior of M on input (A,B),

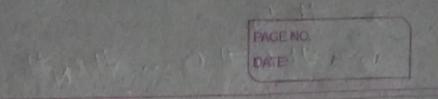
Scheck if a;=bi for some i, If so, accept -> Check if there exist i, i such that a; > b; and a; < bi . If so, accept I og none of the above holds, reject. ... M halts in all juputs (A,B) and either accepts or sejects.

... M is a total propy neachine and PCP over I is decidable.

3-6) G is antiquous - undecidable heducing from PCP. PCP Sm

Moderate A = war wr, w. . . . w. , B = x, x2, x3 - My over 5 PCP Unstance = (A1B) Let (a,a, an) be symuls nom E. Ret 9 be CFa givenby, S = X | Y X = wi Xai | wiai for 15i5k Y = ni Yai | xiai for 15i6k unu 3, x, y & & & D& a1, ... axy Suppose Gris aussporu, and elet CE & S, X, Y) such that · 3 => x Cp => x y p => z · s => x Cp => x y p => z

three there is atmost I devination A7 ... => 2 and dt most one demination B=>....=> z, here xCB=S Une story obtained by removing all ai's from z is a solvable. of PCP instance has a solution, elel-solution be (i,i2... ij &[i,k]) $(v_i, w_{i_2} \dots w_i) = \chi_{i_1} \times \chi_{i_2} \dots \chi_{i_j}$ Concaturating ai; aij aig to both side, = ni, xiz ni; aisaij aizai, We can see teral - they can be desired from S S->A -> wi, wiz ... wi; aj. . . ai, ai, 3 7 B 7 12 ... rijaij ... aizai, : PCP interne in somable > G is ambiguous



.. Par interne is solvable (=> lous ambignous

. Hence à reduction is possible from PCP to PRO.

· PCP is unduidablet aus jous is also induidable

30.3.a) & (h) = & (h) & (h) is induidable

Vong reduction from halting problem complement.

7 +18 < m & 6/ 2(4) = 2(4) 2(4) and 6 is CFG3

Proof, (M,W) -> 7 KP instance

Let 4 be granemar for L= TVALCOMP (M, W)

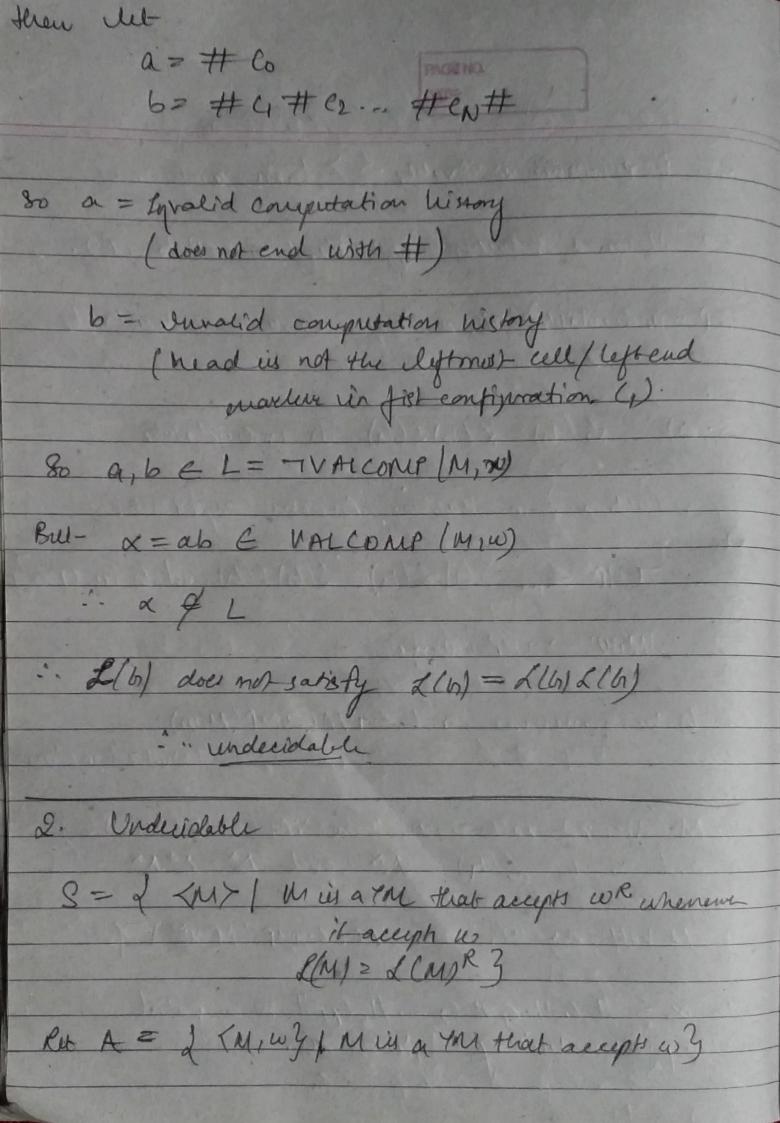
(Studied in class)

of M does not walt on w, then VALCONIP (M, W) = 0

and 80 L = L(b) = 1 and 1 = 1 + 1 +

If M halts on w, then VALCOMP (M) + \$

Let $\alpha = \# \text{ Co# } G \# \text{ Co.} \# \text{ Cw# be a valid}$ Computation wistry of M on w.



DE PUEROUS Beliavors of A on Input week, who, we clearly else rejul-- cliede if LM, we in a ratio amody else rejul-- committee a TM M2 from M and w: len on (M2)

Len on (M2) I Me accept, accept g y E 2 (00*11*)

R G 1 (00*11*) So TM A suguises (100x11x), then A count .. A TM carnot thave both LCM and ICMIR. .. Su indiadable (B) (B)