October 4! Begin Turing Machines (Ch. 3 (Sip]) Remerk: DEA's: input 51521 531 5n 101010  $G_{1,1}, G_{n} \in \Sigma$ length arbitrarily long Make our algorithms just a bit more powerfil-(1) input is on a read/wrote tape that is infinitely long (2) Can more L= left as well as R=right, (3) we can write over any type cell For that's it ... Turing Mechine: tope --just cell ( cell 2 cell 2 - - -Stote Set Q import is a word in Z, Z= some applahet. We have a "blank" Symbol [] 671000000-3 4 ----+ 0 0 a 2 Turing Acchine has I = tape symbols, sit. LIEF, ZCJ The transition function fi Q × Z - Q (DFA) Turky meane 5: Qx [-> Qx [x{L,R}]

Roughly speakny: read, allowed to more L, R at each step 3 4 7101000 00 6 ۹ ---2 90 f On In Example : L= 01111111 first blank symbols tells you  $( \sqcup \not \Sigma )$ Tar con choose you've seen all the import B = ret of Steres must be finite Idea Algorithm' First you must see a O, then go to the end, look for a l. blank  $\boxed{\bigcirc}$ τL 7 # see C, I, more R Let's make table of & function values don't charge the 0,1->R tape culi  $\mathcal{E}(q_{mit}, 1) = (q_{reject})$ ONR ) 1-R of (qimit, L) = (qreject) 0-10,R O > O'R  $I \rightarrow I, R$ ( left -> right) mit 9 reject

blenk V NOW-Ô L ĩ 7 0 see first L 0,1-1R O > O'R 9 mit G lettomshell is and here 1, LI, O' 0,0 9 reject Q just best to the end of tape, have to now see a l ccoupt r o'→r 1->1,L GI-L Saw the 1 that 6 I needed to see, ) how more left blank The ×-- $\overline{O}$ 000) 00  $\tau$ 1 0  $\nabla$  $\nabla$ Possible bud cases: 001 86111 JU CLU alg ວ່ວເ 001 0'7 Ś s. c OK óó í í όο *S* ۍ  $\sigma' \cup \cup$ d1 1 0 G ١