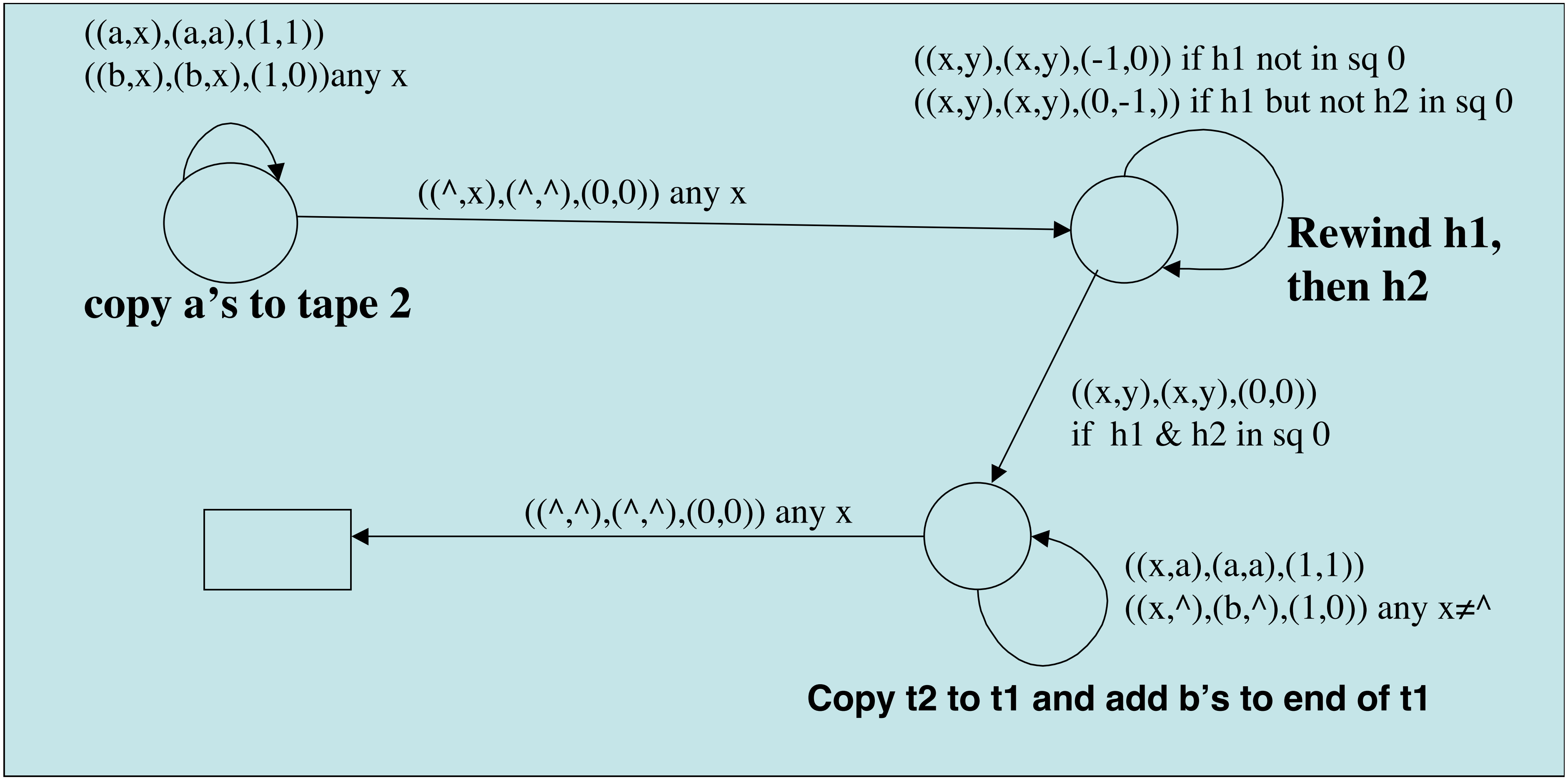


Qu. 1 solution

Tutorial 4 Solutions

1. Here is a flowchart for a 2-tape solution. It copies a's from tape 1 to tape 2. Then it rewinds both heads, copies tape 2 to tape 1, and then pads out the rest of tape 1, up to the first blank, with b's. This fills in the right number of b's. It avoids a second pass to copy the b's yet gives the correct answer.

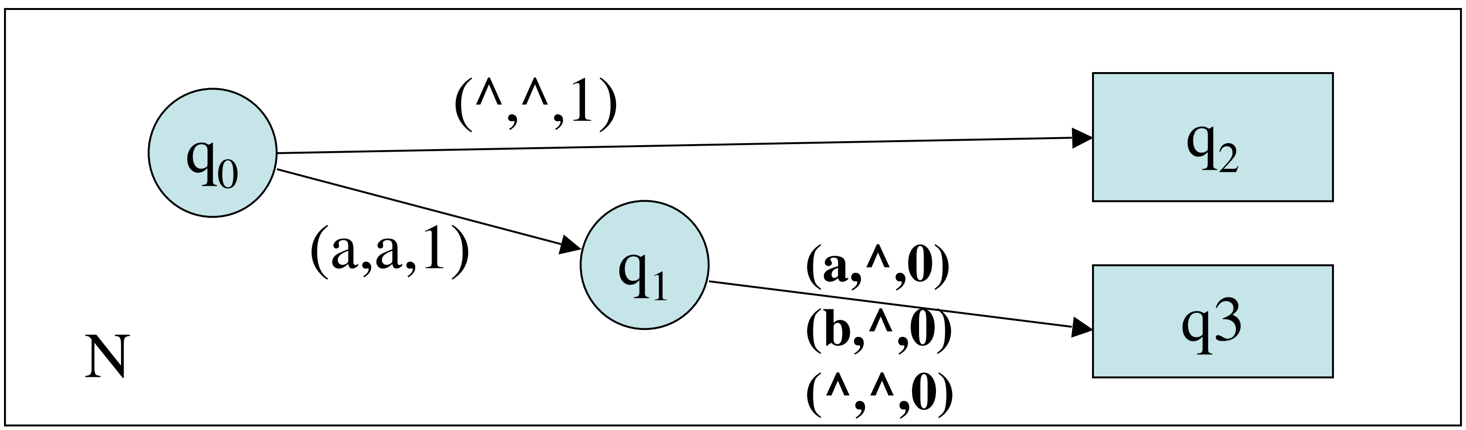
2.(a) A Turing machine is said to be standard if it has a single one-way-infinite tape, its input alphabet is C (the ordinary typewriter characters), and its full alphabet is C∪{^}. Note that only one track is therefore possible, and (hence) any marking of sq.0 must be done explicitly.

(b) The TM given calculates the Head of w.

Its code is:

3,2,(0,a,1,a,1),(0,b,1,b,1),(0,blank,2,blank,0),(1,a,3,blank,0),(1,b,3,blank,0),
(1,blank,3,blank,0)

At the beginning, “3,2” : ‘3’ indicate that the state set is {0,1,2,3), and the ‘2’ that the set F of final states is {2,3}.



3. f_U(code(U)*code(M)*babba)=f_U(code(M)*babba)=f_M(babba)=aabbb

f_U(code(U)*code(N)*)=f_U(cade(N)*)=f_N(□)= □

f_U(code(U)*code(U)*code(N)*c)=f_U(code(U)*code(N)*c)=fU(code(N)*c)=fN(c). undefined.