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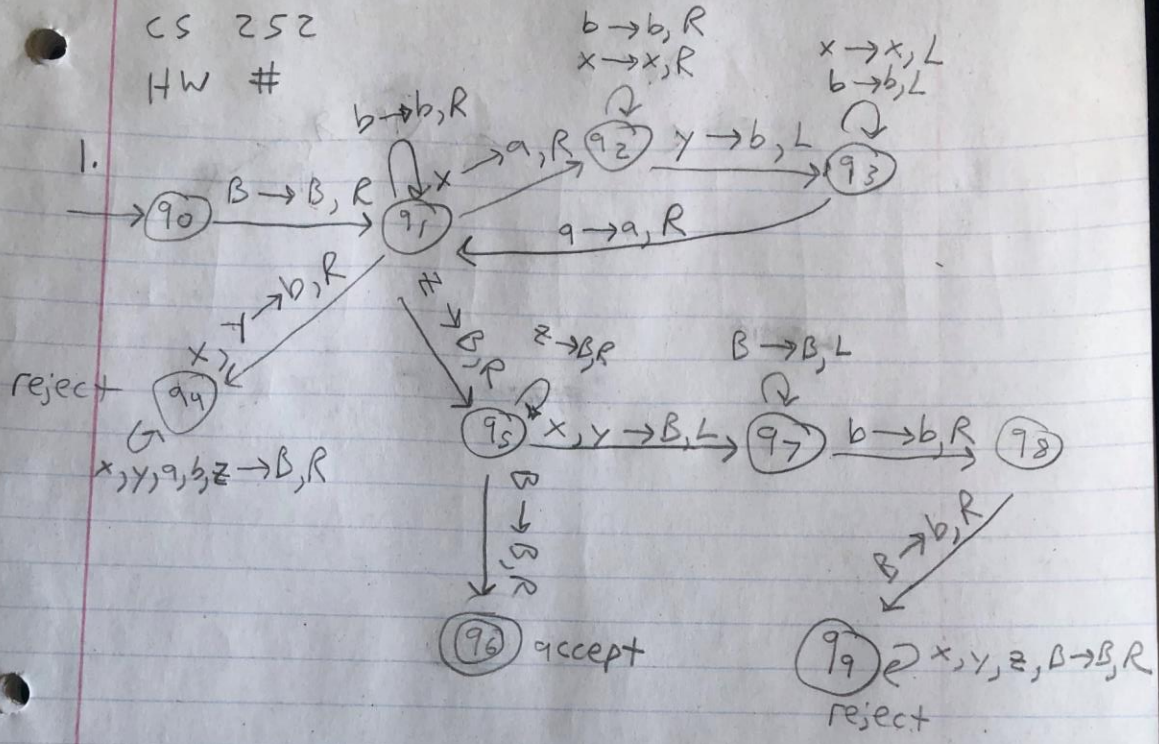
CS 252
HW #

1.



This TM makes sure the x's and y's are the same number and turns them to a's and b's respectively. If a problem is found, it adds another b to the end so it is not in the second language.

2. T is the TM described in the problem. Assume it is decidable and R decides it. Reduce A_{TM} to T with a TM S.

S: on input $\langle M, w \rangle$

1. Create a TM Q as follows:

   On input x:

   1. If x does not have the form 01*10, reject.
   2. If x has form 01, accept
   3. Else, Run M on w. Accept if M accepts w.

2. Run R on $\langle Q \rangle$
3. Accept if R accepts, else reject.

3. D decides L

D = "On input $\langle M, w, t \rangle$

1. Make a TM M' that has x's on first tape equal to t and the other tape is equivalent to M
2. Run w on the second tape and increment the tape head on the first tape one to the right whenever a transition is made on the second tape
3. If the first tape reaches a blank first reject. If the second tape reaches an accept state, accept.
4. If M' accepts, accept. Else reject."