

Math 3342 Homework #3

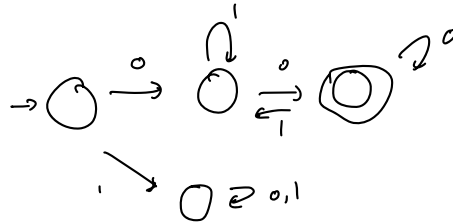
Chapter 3 #1ab, 4ab

Chapter 5 #4ad

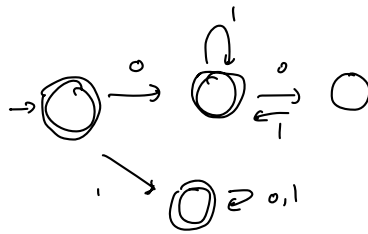
Extra questions #2

Chapter 3 #1a

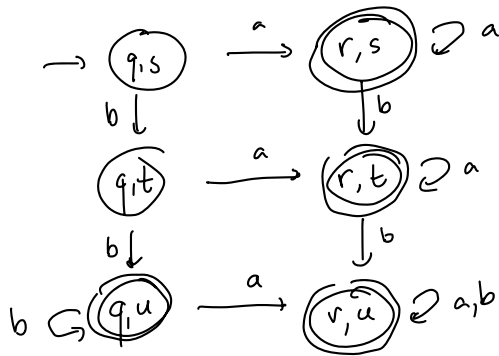
a)  $\{0 \times 0\}$



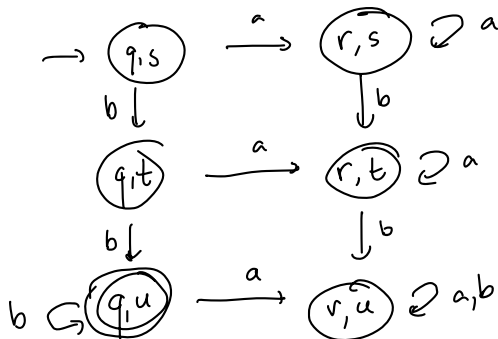
b)



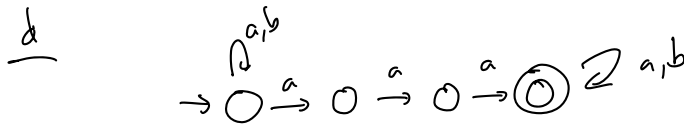
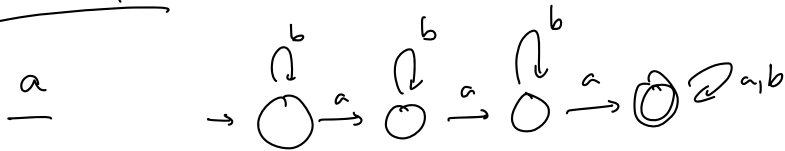
Chapter 3 #4 a



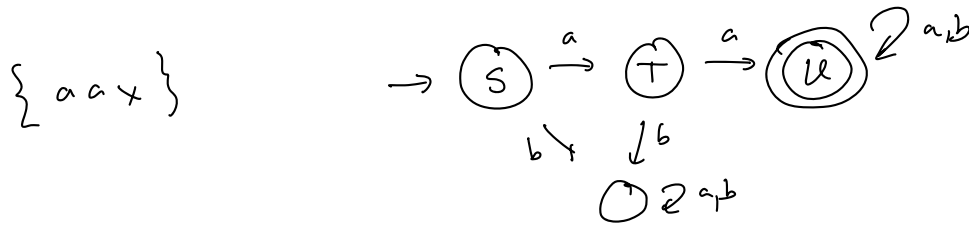
b



Chapter 5 # 4



Extra questions # 2



Thm  $\delta^*(S, aax) = U$

PF induction on  $|x|$

Base case:  $|x|=0$  so  $x=\epsilon$ . WTB  $\delta^*(S, aa) = U$   
and this is true.

Induction: Assume  $\delta^*(S, aax) = U$  when  $|x|=k$ .  
WTB  $\delta^*(S, aax) = U$  when  $|x|=k+1$ .

Let  $|x|=k+1$ , so  $x=y\ell$  for  $|y|=k$  and  $\ell$  a letter.

then 
$$\begin{aligned} \delta^*(S, aax) &= \delta^*(S, aay\ell) \\ &= \delta^*(\delta^*(S, aay), \ell) \\ &= \delta^*(U, \ell) = U \quad \text{Shew} \end{aligned}$$