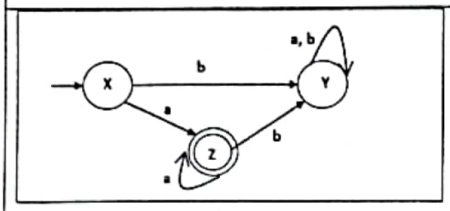
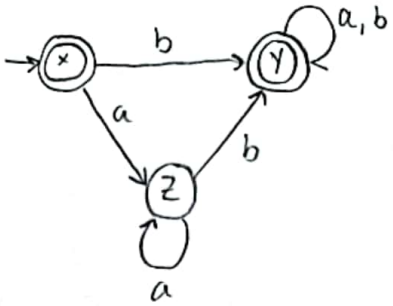
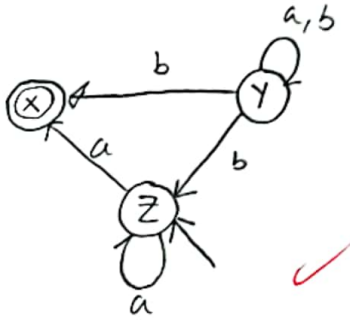
30/30

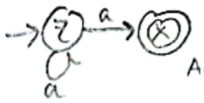
Jonathan Dang

CS3186 Midterm #2

(I) (6 points) Given the DFA for a language L, Give the DFA that accepts the complement and reverse of L.

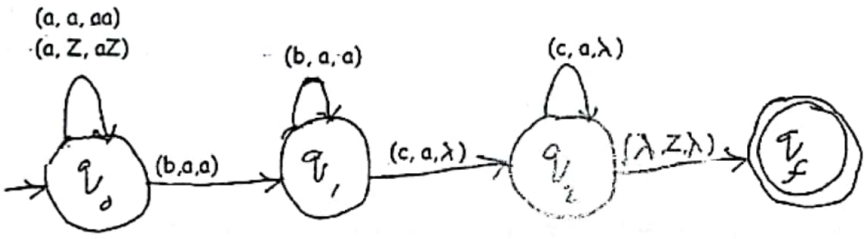
	DFA that accepts the complement of L	DFA that accepts the reverse of L
 DFA accepting language L		
Accepted w: aa^*	Accepted w: $\lambda + b(a+b)^*$	

• Note that Y can no longer be reached.
Suggested new DFA:



Accepted w: aa^*

(II) (8 points) Given a PDA below



(i) Write the configuration sequence on input aabbcc starting with

$(q_0, aabbcc, Z) \vdash (q_0, abbcc, aZ) \vdash (q_0, bbcc, aaZ) \vdash$
$(q_1, bcc, aaZ) \vdash (q_1, cc, aaZ) \vdash (q_2, c, aZ) \vdash (q_2, \lambda, Z) \vdash$
(q_F, λ, Z)

(ii) Is the string aabbcc accepted?

Yes, The string aabbcc is accepted

(III) (6 points) Given the following Grammar,

1. $S \rightarrow AB$	2. $A \rightarrow aaA$	4. $B \rightarrow Bb$
	3. $A \rightarrow \lambda$	5. $B \rightarrow \lambda$

(i)Write a leftmost derivation sequence for deriving the string aabb

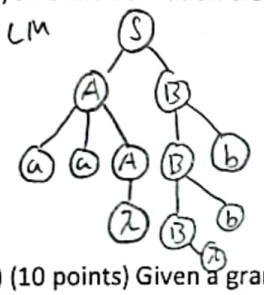
$S \Rightarrow AB \Rightarrow aaAB \Rightarrow aaB \Rightarrow aaBb \Rightarrow aaBbb \Rightarrow aabb$

(i)Write a rightmost derivation sequence for deriving the string aabb

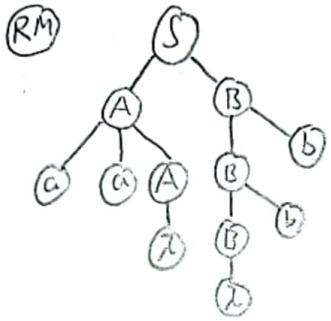
$S \Rightarrow AB \Rightarrow ABb \Rightarrow ABbb \Rightarrow Abb \Rightarrow aaAbb \Rightarrow aabb$

(iii)Give the derivation tree corresponding to the above derivations

LM



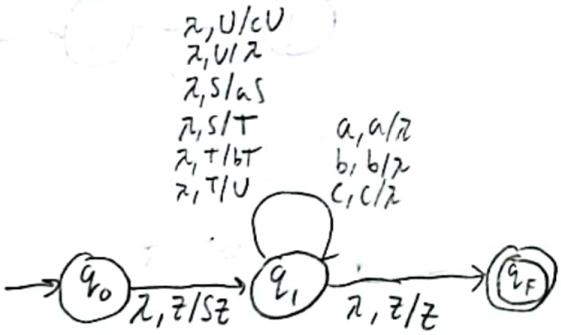
RM



(II) (10 points) Given a grammar:

S → aS | T
T → bT | U
U → cU | λ

(i)give an equivalent PDA transition diagram that accepts the same language.



(ii)give the configuration sequences on the string ab from the initial configuration to the accepting configuration.

$(q_0, ab, Z) \vdash (q_1, ab, SZ) \vdash (q_1, ab, aSZ) \vdash (q_1, b, SZ) \vdash (q_1, b, TZ) \vdash$

$(q_1, b, bTZ) \vdash (q_1, \lambda, TZ) \vdash (q_1, \lambda, UZ) \vdash (q_1, \lambda, Z) \vdash (q_F, \lambda, Z)$

Accepted