CSCI 301 HW 6

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Problem 1

a.

$$S \to A \mid B$$
$$A \to \epsilon \mid aAbb$$
$$B \to aaab \mid aaaBb$$

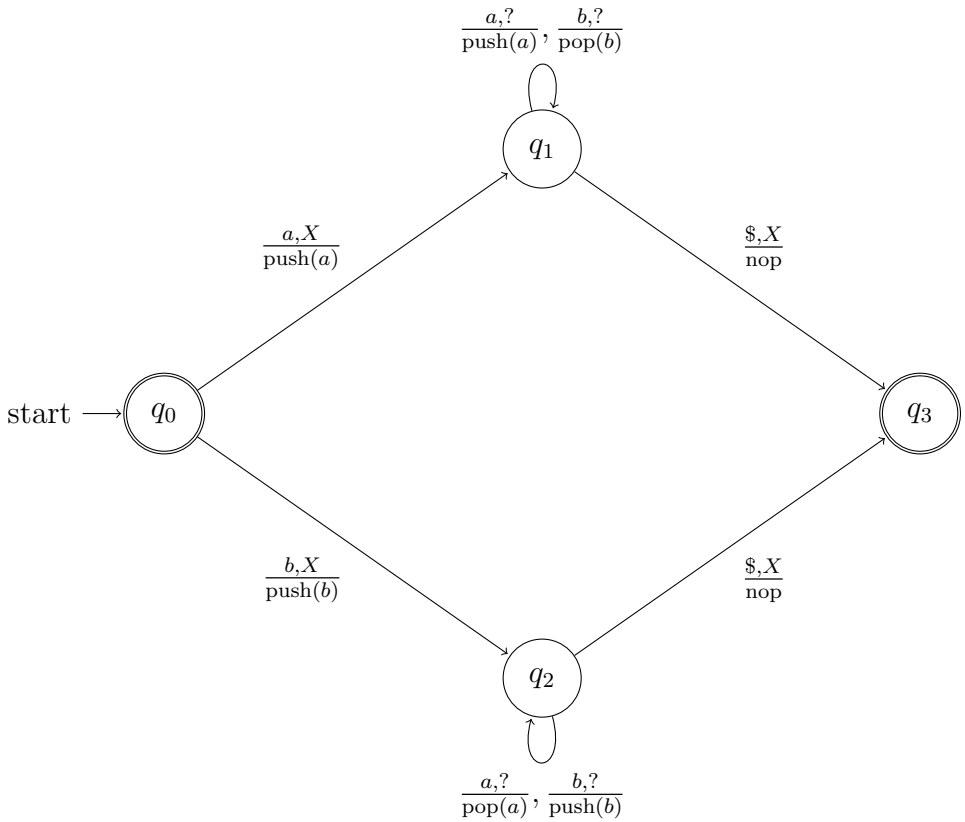
b.

$$S \to aAB$$
$$A \to \epsilon \mid aA$$
$$B \to ab \mid aBb$$

c.

$$S \to \epsilon \mid aSb \mid bSa$$
$$S \to abSba \mid baSab$$

Problem 2


$\frac{a,?}{\text{push}(a)}, \frac{b,?}{\text{pop}(b)}$
q_1
$\frac{a,X}{\text{push}(a)}$
$\frac{\$,X}{\text{nop}}$
start
q_0
q_3
$\frac{b,X}{\text{push}(b)}$
$\frac{\$,X}{\text{nop}}$
q_2
$\frac{a,?}{\text{pop}(a)}, \frac{b,?}{\text{push}(b)}$

Problem 3

Derivation	**Rule**	**Lookahead**
$E \implies TR$	$E \to TR$	(
$TR \implies FVR$	$T \to FV$	(
$FVR \implies (E)VR$	$F \to (E)$	(
$(E)VR \implies (TR)VR$	$E \to TR$	(
$(TR)VR \implies (FVR)VR$	$T \to FV$	a
$(FVR)VR \implies (aVR)VR$	$F \to a$	a
$(aVR)VR \implies (aR)VR$	$V \to \Lambda$	+
$(aR)VR \implies (a+TR)VR$	$R \to +TR$	+
$(a+TR)VR \implies (a+FVR)VR$	$T \to FV$	a
$(a+FVR)VR \implies (a+aVR)VR$	$F \to a$	a
$(a+aVR)VR \implies (a+aR)VR$	$V \to \Lambda$	)
$(a+aR)VR \implies (a+a)VR$	$R \to \Lambda$	)
$(a+a)VR \implies (a+a)*FVR$	$V \to *FV$	*
$(a+a)*FVR \implies (a+a)*aVR$	$F \to a$	a
$(a+a)*aVR \implies (a+a)*aR$	$V \to \Lambda$	$
$(a+a)*aR \implies (a+a)*a$	$R \to \Lambda$	$