



1. Webber Chap. 13 Exercise 6

Give stack machines for the following languages:

(a)

	read	pop	push
1.	a	S	S
2.	ϵ	S	B
3.	b	B	B
4.	ϵ	B	ϵ

(b)

	read	pop	push
1.	0	S	S0S0S
2.	0	0	ϵ
3.	ϵ	S	XS
4.	ϵ	S	ϵ
5.	1	X	ϵ
6.	ϵ	X	ϵ

(c)

	read	pop	push
1.	ϵ	S	XXXS
2.	ϵ	S	ϵ
3.	0	X	ϵ
4.	1	X	ϵ

(d)

	read	pop	push
1.	0	S	0
2.	1	S	1
3.	0	0	0
4.	1	0	1
5.	0	1	2
6.	1	1	0
7.	0	2	1
8.	1	2	2
9.	ϵ	0	ϵ

(e)

	read	pop	push
1.	ϵ	S	A
2.	ϵ	S	B
3.	a	A	AB
4.	a	A	BB
5.	a	B	B
6.	b	B	B
7.	ϵ	B	ϵ

(f)

	read	pop	push
1.	a	S	SBB
2.	ϵ	S	B
3.	b	B	ϵ

(g)

	read	pop	push
1.	ϵ	S	AASBB
2.	ϵ	S	ϵ
3.	a	A	ϵ
4.	b	B	ϵ

	read	pop	push
1.	ϵ	S	XXSYY
2.	c	S	ϵ
3.	a	X	ϵ
4.	b	X	ϵ
5.	d	Y	ϵ
(h) 6.	e	Y	ϵ

	read	pop	push
1.	ϵ	S	AASBB
2.	ϵ	S	AB
3.	a	A	ϵ
(i) 4.	b	B	ϵ

2. Webber Chap. 13 Exercise 9

Using the construction of Lemma 13.1, give a stack machine for this grammar:

$S \rightarrow XSY \mid \epsilon$

$X \rightarrow a \mid b$

$Y \rightarrow c \mid d$

If $G = (V, \Sigma, S, P)$, then $M = (\Gamma, \Sigma, S, \delta)$, where

$\Gamma = \{S, X, Y, a, b, c, d\}$

$\Sigma = \{a, b, c, d\}$

$S = S$

$\delta = \{\delta(\epsilon, S) = \{\epsilon, XSY\}, \delta(a, X) = \{\epsilon\}, \delta(b, X) = \{\epsilon\}, \delta(c, Y) = \{\epsilon\}, \delta(d, Y) = \{\epsilon\}\}$

	read	pop	push
1	ϵ	S	XSY
2.	ϵ	S	ϵ
3.	a	X	ϵ
4.	b	X	ϵ
5	c	Y	ϵ
6	d	Y	ϵ

Show accepting sequences of IDs for your stack machine for abcd and abbddd

$(abcd, S) \rightarrow (abcd, XSY) \rightarrow (abcd, XXSYY) \rightarrow (bcd, XSYY) \rightarrow (cd, SY) \rightarrow (cd, YY) \rightarrow (d, Y) \rightarrow (\epsilon, \epsilon)$

$(abbddd, S) \rightarrow (abbddd, XSY) \rightarrow (abbddd, XXSYY) \rightarrow (abbddd, XXXSYYY) \rightarrow (bbddd, XXSYYY) \rightarrow (bddd, XSYYY) \rightarrow (ddd, SY) \rightarrow (ddd, YY) \rightarrow (dd, Y) \rightarrow (d, Y) \rightarrow (\epsilon, \epsilon)$