Homework #2 Solutions

1.

$$Doc \rightarrow \epsilon | Element\ Doc$$
$$Element \rightarrow Text | < EM > Doc < /EM > | < OL > List < /OL > | \ < P > Doc$$
$$Text \rightarrow \epsilon | char\ Text$$
$$char \rightarrow a|b|...|z|A|B|...|Z|0...9|\Delta$$
$$List \rightarrow \epsilon | Listitem\ List$$
$$Listitem \rightarrow < LI > Text$$

Δ = space or newline.

2. $\{A^N x | N \geq 0, x \in a, b^* and |x| \leq N\}$

$$\delta(P_0, \epsilon, Z_0) = (P_0, \epsilon)\ //accepts\ \epsilon$$
$$\delta(P_0, a, Z_0) = \{(P_0, AZ_0)(P_0, \epsilon)\}\ //Initial\ push\ or\ accept\ 'a'$$
$$\delta(P_0, a, A) = \{(P_0, AA)(P_1, \epsilon)\}\ //Push\ or\ twin\ around$$
$$\delta(P_0, b, A) = (P_1, \epsilon)\ //definetely\ turn\ around$$
$$\delta(P_1, a, A) = (P_1, \epsilon)\ //pop$$
$$\delta(P_1, b, A) = (P_1, \epsilon)\ //pop$$
$$\delta(P_1, \epsilon, Z_0) = (P_1, \epsilon)\ //accept\ if\ |x| = N$$
$$\delta(P_1, \epsilon, A) = (P_1, \epsilon)\ //if |x| < N$$

3. DPDA for:

$$E \to (L)|a$$
$$L \to L, E|E$$

$$\delta(P_0, a, Z_0) = (P_0, \epsilon)$$
$$\delta(P_0, (, Z_0) = (P_0, (Z_0)$$
$$\delta(P_0, (, () = (P_0, (()$$
$$\delta(P_0, a, () = (P_1, ()$$
$$\delta(P_1,), () = (P_1, E)$$
$$\delta(P_1, , , () = (P_0, ()$$
$$\delta(P_1, \epsilon, Z_0) = (P_1, \epsilon)$$

4. a.

$$\delta(q, \epsilon, S) = \{(q, AB)(q, BC)\}$$
$$\delta(q, \epsilon, A) = \{(q, BA)(q, a)\}$$
$$\delta(q, \epsilon, B) = \{(q, CC)(q, b)\}$$
$$\delta(q, \epsilon, C) = \{(q, AB)(q, A)\}$$
$$\delta(q, a, a) = (q, \epsilon)$$
$$\delta(q, b, b) = (q, \epsilon)$$

b. Stack Trace:

									A	a				
	B	b		A	a			C	B	B	B	b		
S	C	C	C	B	B	B	C	C	C	C	C	C	a	