

## MORE EXAMPLES DPDA

✓  $L = \{x \text{ belongs to } \{a, b\}^* \mid n_a(x) > n_b(x)\} \rightarrow q_a$   
OR

✓  $L = \{x \text{ belongs to } \{a, b\}^* \mid n_a(x) < n_b(x)\} \rightarrow q_b$   
OR

✓  $L = \{x \text{ belongs to } \{a, b\}^* \mid n_a(x) = n_b(x)\} \rightarrow q_0$   
OR

✓  $L = \{x \text{ belongs to } \{a, b\}^* \mid n_a(x) \neq n_b(x)\} \rightarrow q_a, q_b$

## MORE EXAMPLES DPDA

abb

baa

abaaa

bba

↑

abbba

q<sub>b</sub>

q<sub>a</sub>

q<sub>a</sub>

q<sub>b</sub>

q<sub>0</sub>

q<sub>0</sub>

bcaab

q<sub>0</sub>

-

## MORE EXAMPLES DPDA

1	$q_0$	a	$z_0$	$(q_a, z_0)$ — Push
2	$q_a$	a	$z_0$	$(q_a, a z_0)$ — Push
3	$q_a$	a	a	$(q_a, aa)$ — Recursive Push
4	$q_a$	b	a	$(q_a, \Lambda)$ — Pop
5	$q_0$	b	$z_0$	$(q_0, z_0)$ — Recursive
6	$q_0$	b	$z_0$	$(q_b, z_0)$ — Push
7	$q_b$	b	$z_0$	$(q_b, b z_0)$ — Push
8	$q_b$	b	b	$(q_b, bb)$ — Rec. Push
9	$q_b$	a	b	$(q_b, \Lambda)$ — Rec. Pop

## MORE EXAMPLES DPDA

$q_0$     $q_b$     $a$     $z_0$     $(q_0, z_0)$ .

$(q_0, abba, z_0)$

$(q_a, bba, z_0)$

$(q_0, ba, z_0)$

$(q_b, a, z_0)$

$(q_0, \wedge, z_0)$

Accepted

$$L = \{x \in \{a, b\}^* \mid n_a(x) = n_b(x)\}$$

$$A = \underline{\underline{\{q_0\}}}$$

## MORE EXAMPLES DPDA

Move no.	State	Input	Stack symbol	Move(s)
1	$q_0$	$a$	$Z_0$	$(q_a, Z_0)$ ✓
2	$q_0$	$b$	$Z_0$	$(q_b, Z_0)$ ✓
3	$q_a$	$a$	$Z_0$	$(q_a, aZ_0)$ ✓
4	$q_a$	$a$	$a$	$(q_a, aa)$ ✓
5	$q_a$	$b$	$a$	$(q_a, \Lambda)$ ✓
6	$q_a$	$b$	$Z_0$	$(q_0, Z_0)$ ✓
7	$q_b$	$b$	$Z_0$	$(q_b, bZ_0)$ ✓
8	$q_b$	$b$	$b$	$(q_b, bb)$ ✓
9	$q_b$	$a$	$b$	$(q_b, \Lambda)$ ✓
10	$q_b$	$a$	$Z_0$	$(q_0, Z_0)$ ✓
(all other combinations)				none

$$L = \{x \in \{a,b\}^* \mid n_a(x) > n_b(x)\}$$

$$A = \{2a\}$$

$$(q_0, baaba, 20)$$

$$(q_b, aaba, 20)$$

$$(q_0, aba, 20)$$

$$(q_a, ba, 20)$$

$$(q_0, a, 20)$$

$$(q_a, \epsilon, 20) \Rightarrow \text{Accepted}$$

# MORE EXAMPLES DPDA

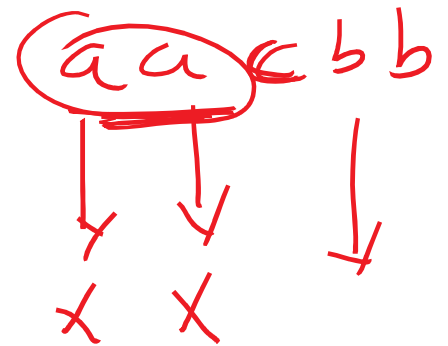
$L = \{xcy \mid x, y \text{ belongs to } \{a, b\}^* \text{ and } |x| = |y|\}$

$\underline{abcb}$   $\underline{bb}$  ✓  
 $|x|$   $|y|$

$bbca$   $aa$  ✓  
 $|x|$   $|y|$

$abcb$   $a$  ✓  
 $|x|$   $|y|$

$aa$   $ca$   $a$   
 $\underline{\underline{|x|}}$   $\underline{\underline{|y|}}$



## MORE EXAMPLES DPDA

$q_0$	$a$	$z_0$	$(q_0, xz_0)$
$q_0$	$b$	$z_0$	$(q_0, xz_0)$
$q_0$	$a$	$x$	$(q_0, xx)$
$q_0$	$b$	$x$	$(q_0, xx)$
$q_0$	$c$	$x$	$(q_1, x)$
$q_1$	$a$	$x$	$(q_1, \wedge)$
$q_1$	$b$	$x$	$(q_1, \wedge)$
$q_1$	$\wedge$	$z_0$	$(q_2, z_0)$



# MORE EXAMPLES DPDA

Move Number	State	Input	Stack Symbol	Move(s)
1	$q_0$	$a$	$Z_0$	$(q_0, XZ_0)$
2	$q_0$	$b$	$Z_0$	$(q_0, XZ_0)$
3	$q_0$	$a$	$X$	$(q_0, XX)$
4	$q_0$	$b$	$X$	$(q_0, XX)$
5	$q_0$	$c$	$X$	$(q_1, X)$
6	$q_0$	$c$	$Z_0$	$(q_1, Z_0)$
7	$q_1$	$a$	$X$	$(q_1, \Lambda)$
8	$q_1$	$b$	$X$	$(q_1, \Lambda)$
9	$q_1$	$\Lambda$	$Z_0$	$(q_2, Z_0)$
(all other combinations)				none

## MORE EXAMPLES DPDA

$(q_0, aacbb, z_0)$

$(q_0, acbb, xz_0)$

$(q_0, cbb, xxz_0)$

$(q_1, bb, xxz_0)$

$(q_1, b, xz_0)$

$(q_1, \Lambda, z_0)$

$(q_2, z_0).$

$(q_0, c, z_0)$

$(q_1, \Lambda, z_0)$

$(q_2, z_0).$

Accepted

$(z_0, cb^q, z_0)$

$(q_1, ba, z_0)$

⑨

$(z_2, ba, z_0)$

we have not consumed the whole i/f  
Machine will not accept the Pattern.

Machine will CRASH.

## MORE EXAMPLES DPDA

Move no.	State	Input	Stack symbol	Move(s)
1	$q_0$	$a$	$Z_0$	$(q_1, aZ_0)$
2	$q_0$	$b$	$Z_0$	$(q_4, bZ_0)$
3	$q_1$	$a$	$a$	$(q_1, aa)$
4	$q_1$	$b$	$a$	$(q_2, \Lambda)$
5	$q_2$	$b$	$a$	$(q_2, \Lambda)$
6	$q_2$	$\Lambda$	$Z_0$	$(q_3, Z_0)$
7	$q_3$	$b$	$Z_0$	$(q_4, bZ_0)$
8	$q_4$	$b$	$b$	$(q_4, bb)$
9	$q_4$	$a$	$b$	$(q_5, \Lambda)$
10	$q_5$	$a$	$b$	$(q_5, \Lambda)$
11	$q_5$	$\Lambda$	$Z_0$	$(q_6, Z_0)$
(all other combinations)				none