

# Our Topic

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AMIT DHOMNE

**PDA (pushdown automaton)**

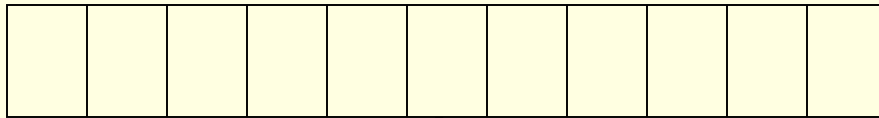
AMIT DHOMNE

# Pushdown Automaton (PDA)

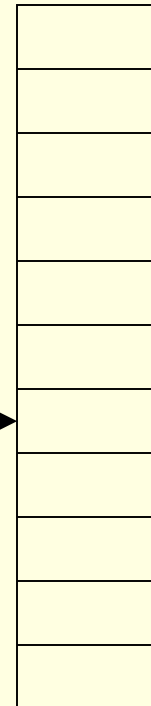
A Pushdown Automaton is a nondeterministic finite state automaton (NFA) that permits  $\epsilon$ -transitions and a stack.

# Pushdown Automaton -- PDA

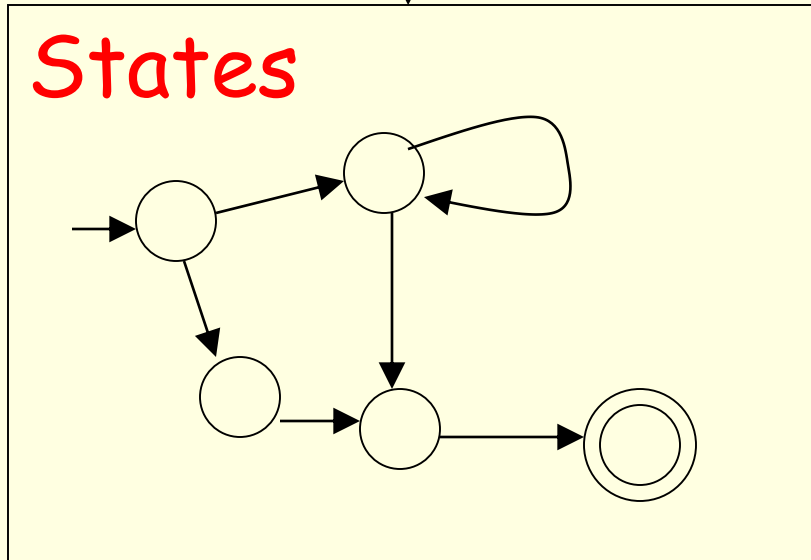
Input String



Stack



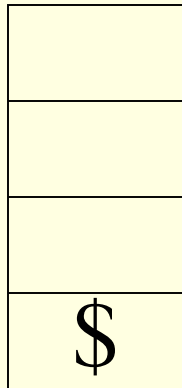
States



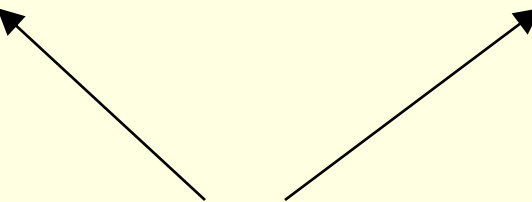
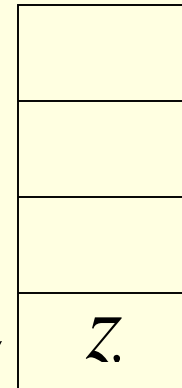
# Initial Stack Symbol

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Stack

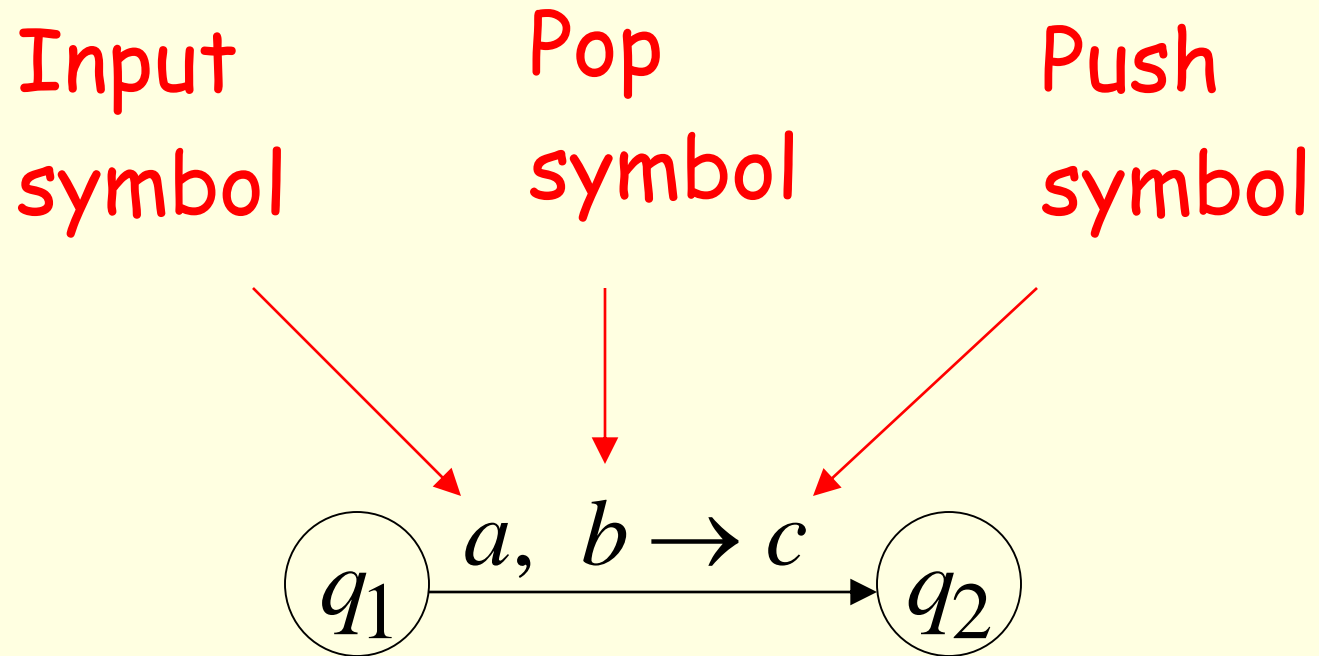


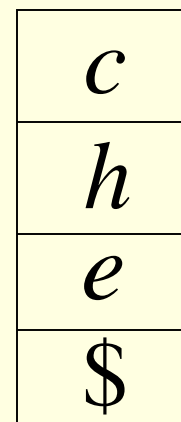
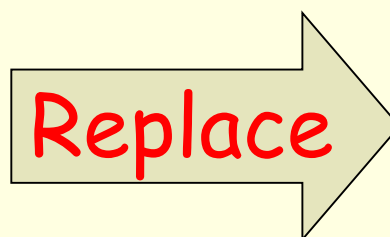
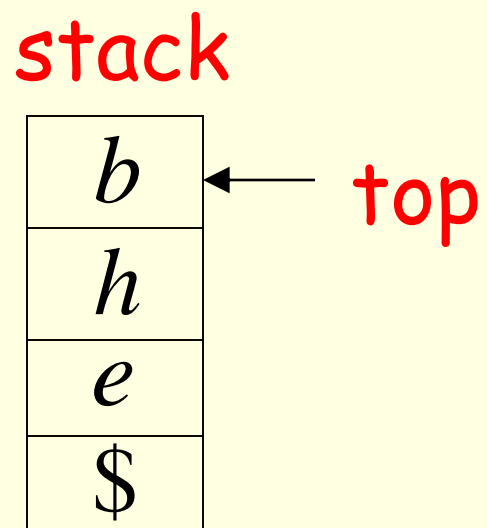
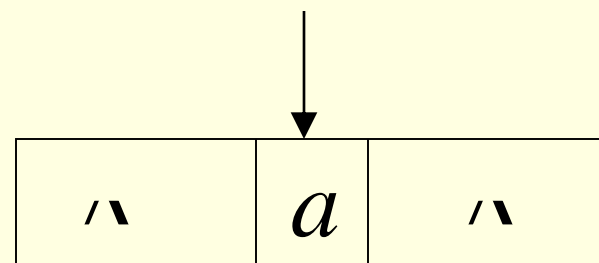
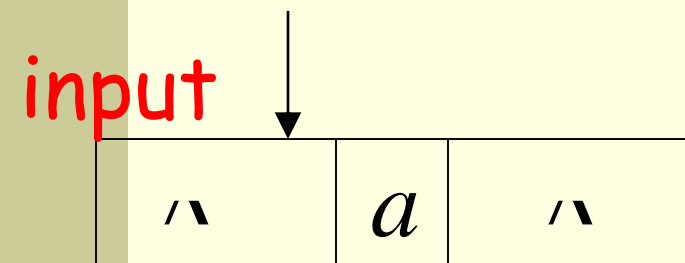
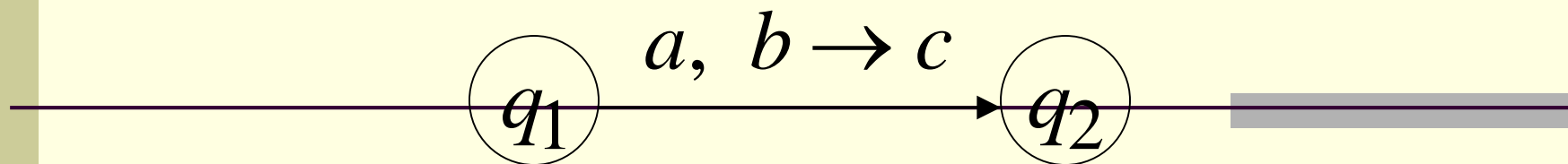
Stack

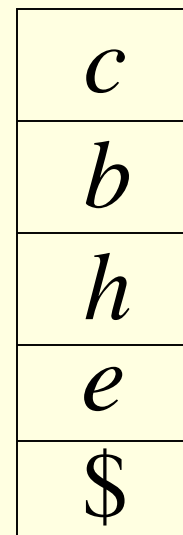
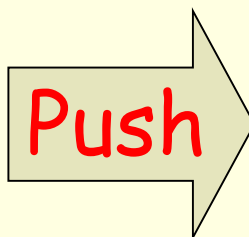
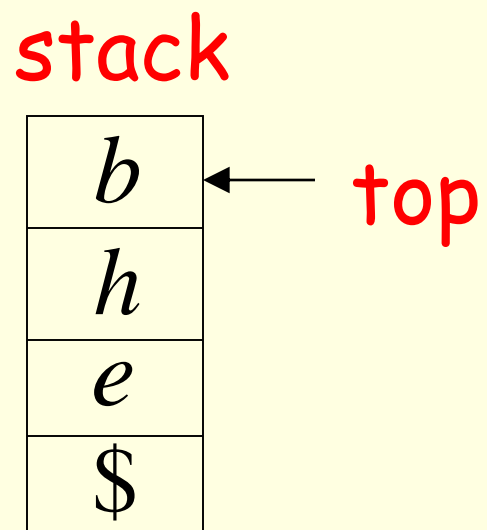
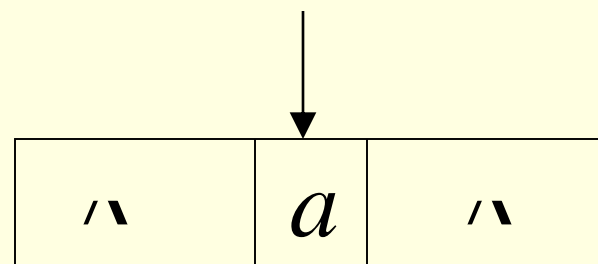
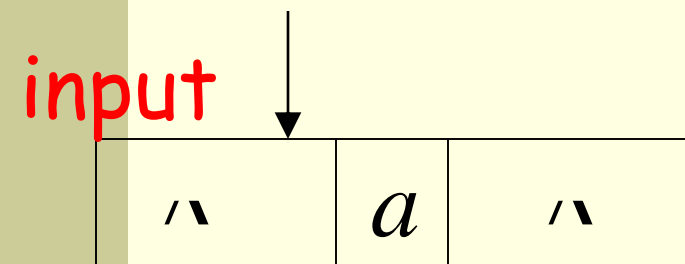
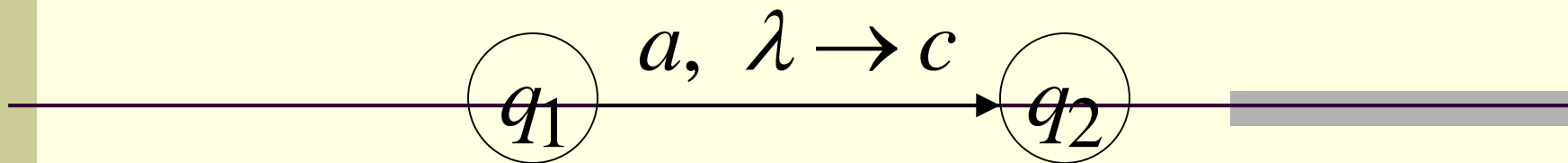


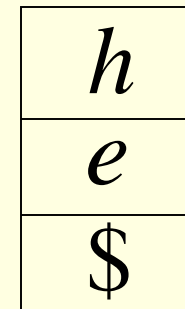
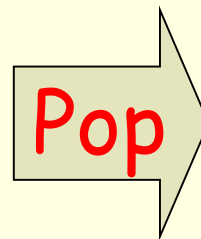
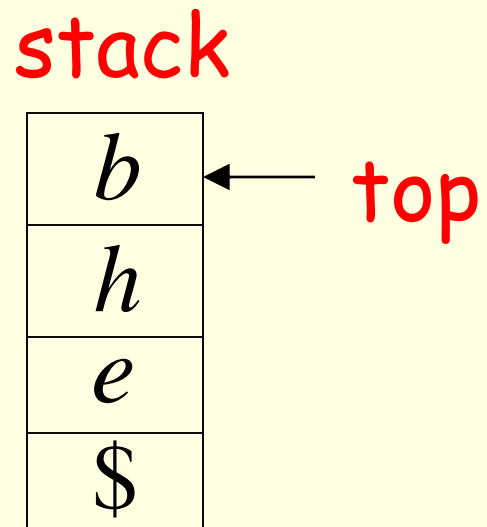
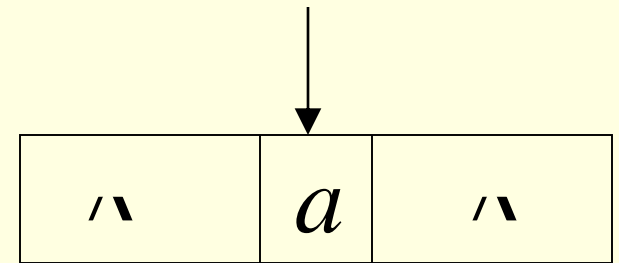
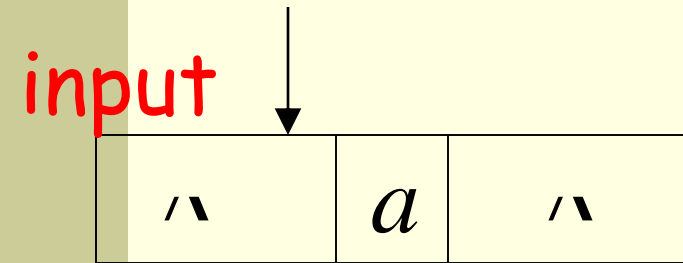
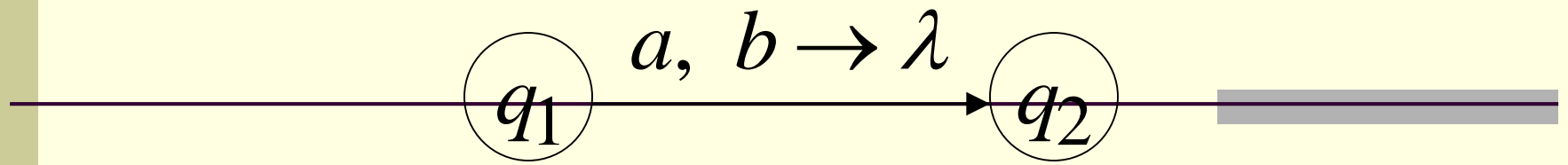
bottom  
special symbol

# The States

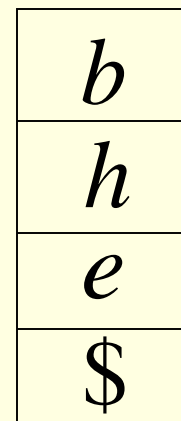
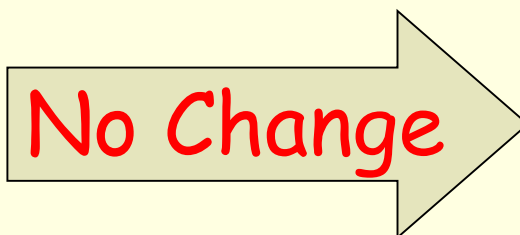
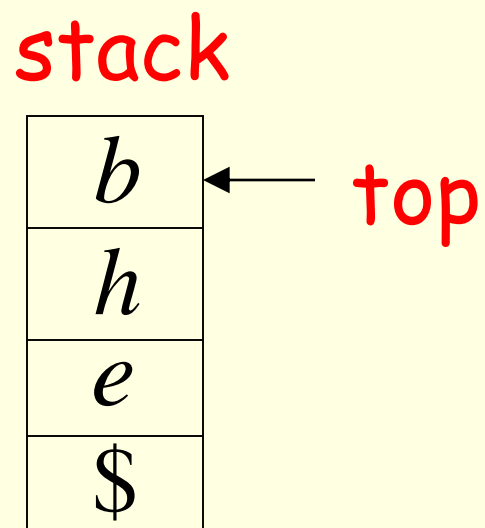
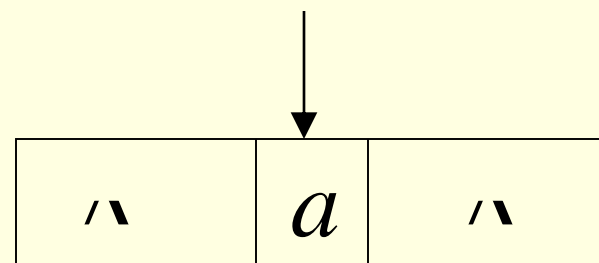
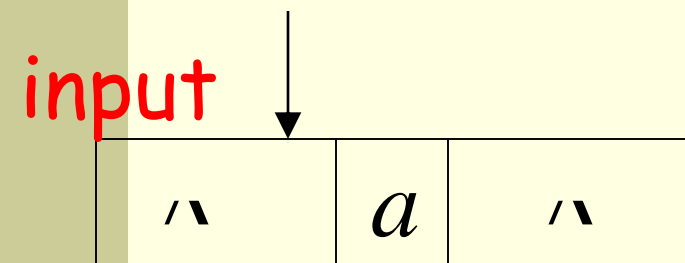
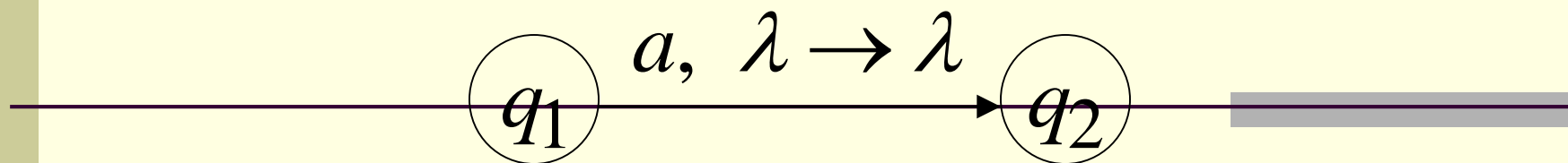




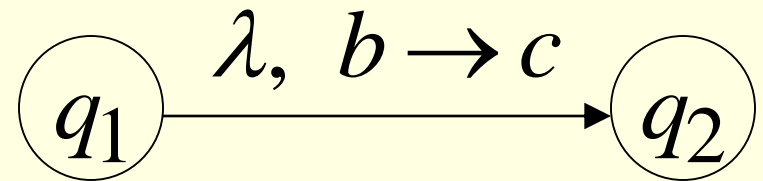
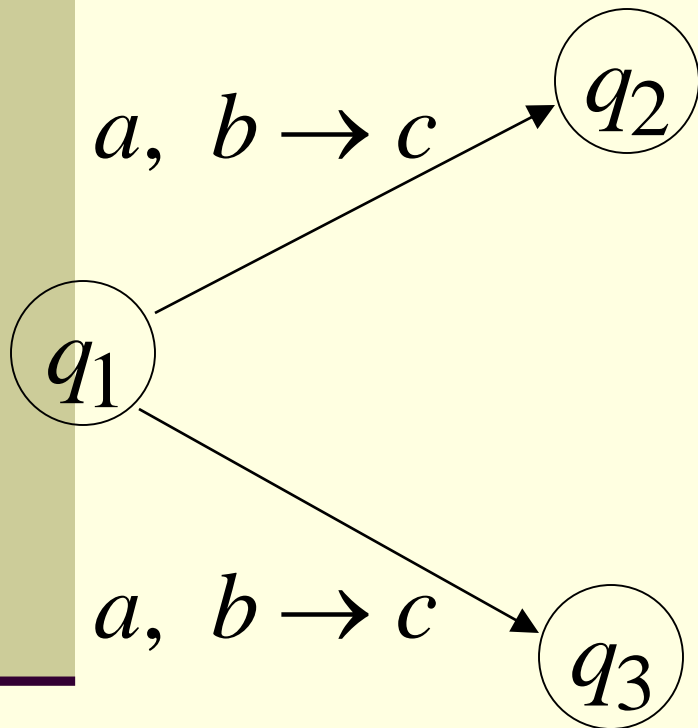








# Non-Determinism

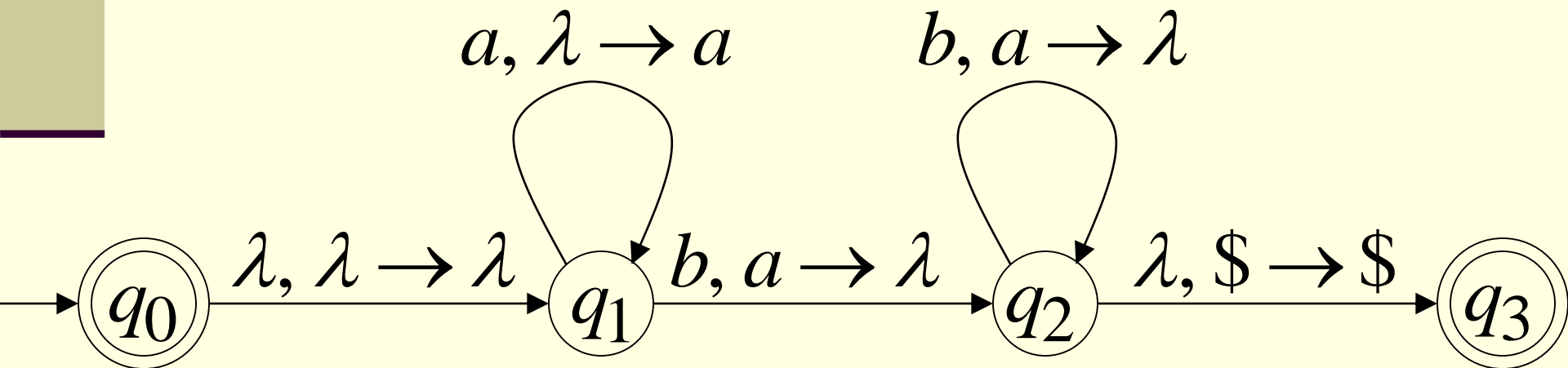


$\lambda$  – transition

These are allowed transitions in  
a Non-deterministic PDA (NPDA)

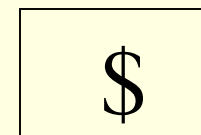
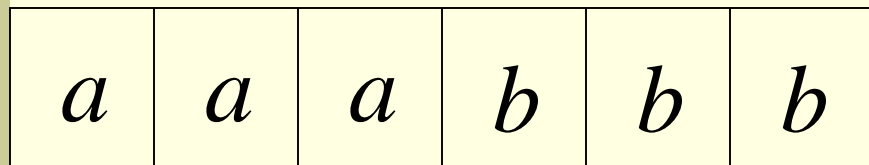
# NPDA: Non-Deterministic PDA

Example:



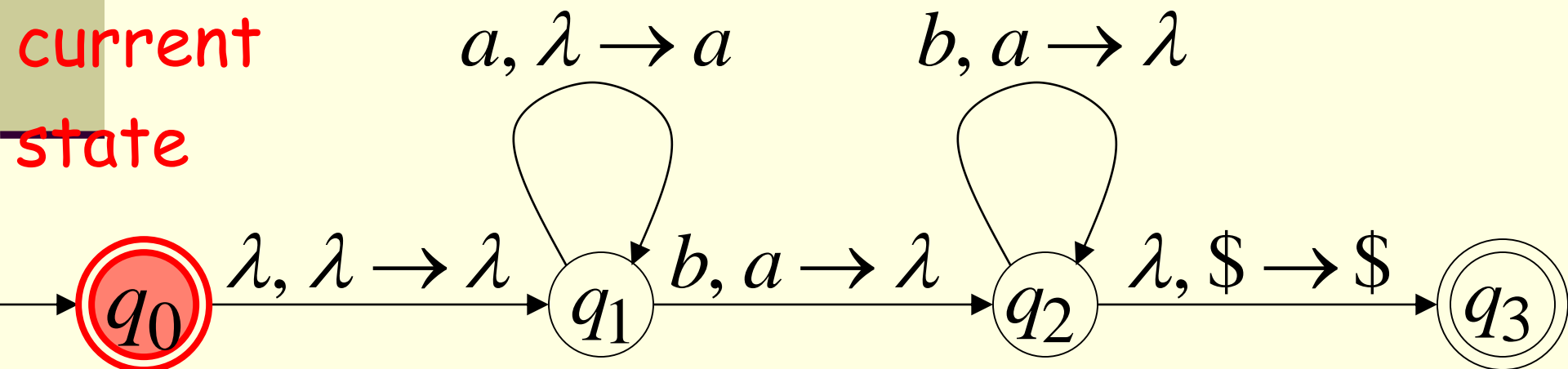
# Execution Example: Time 0

Input



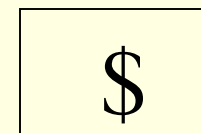
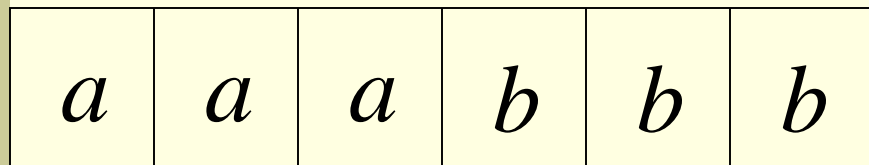
Stack

current  
state

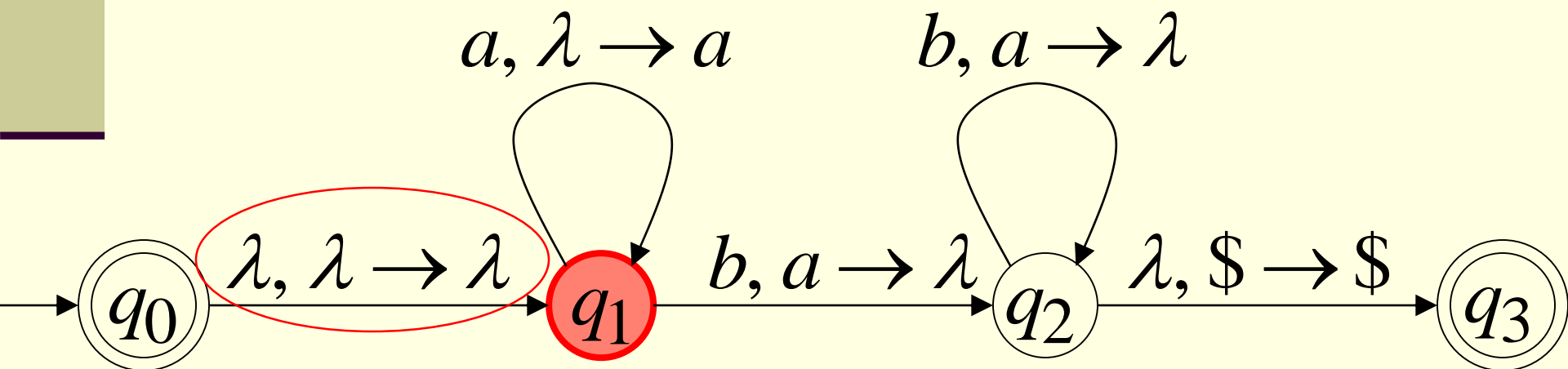


Time 1

Input

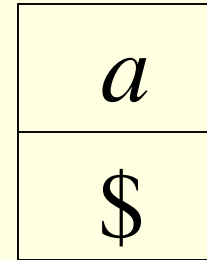
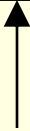
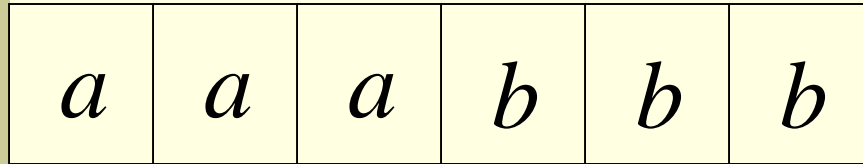


Stack

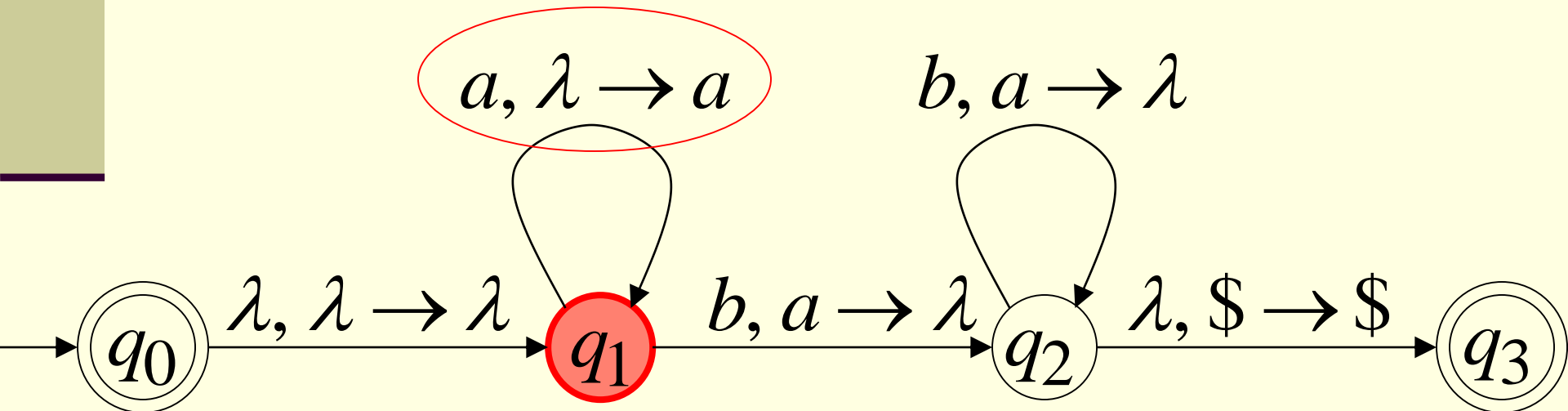


Time 2

Input

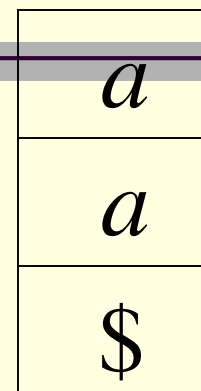
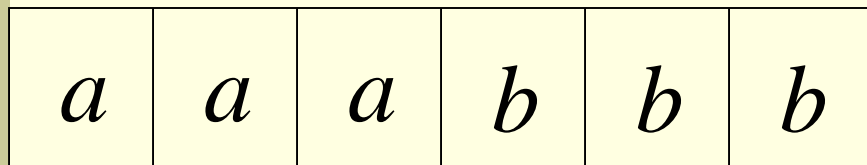


Stack

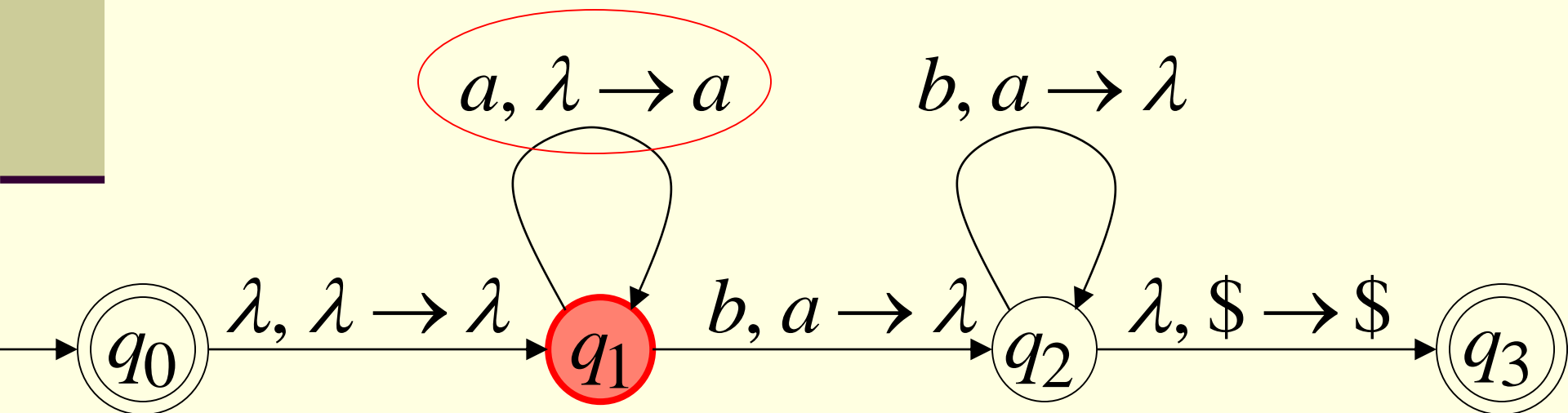


Time 3

Input

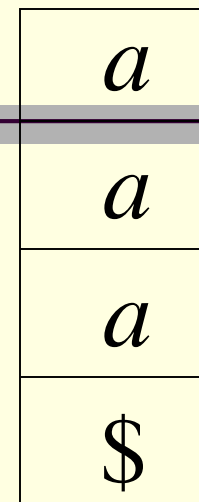
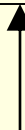
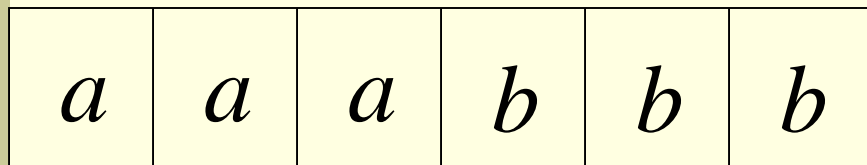


Stack

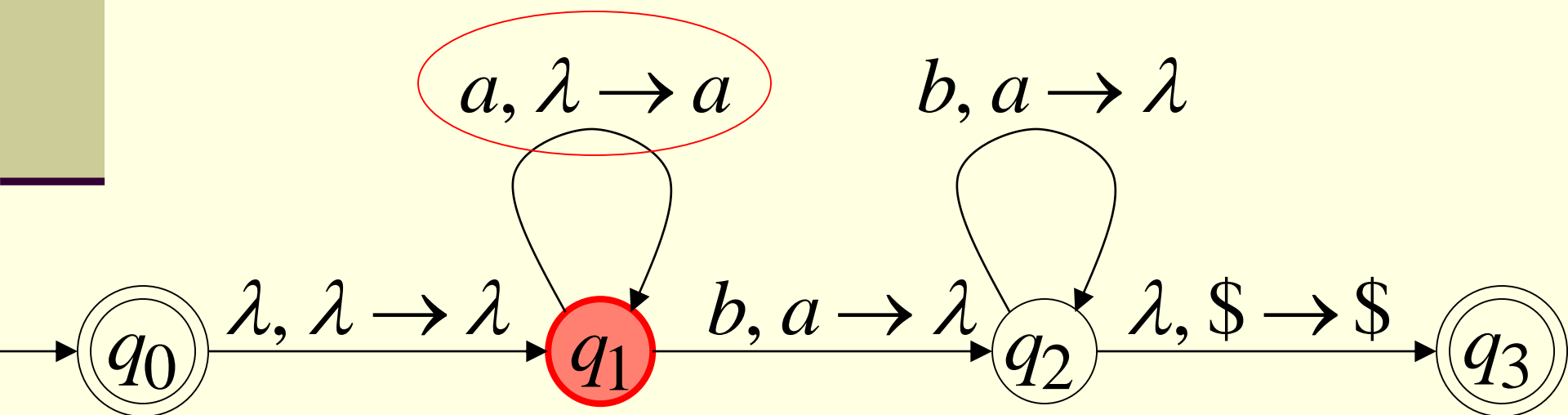


Time 4

Input



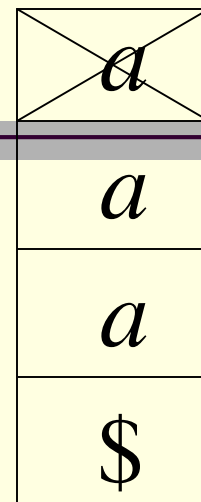
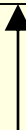
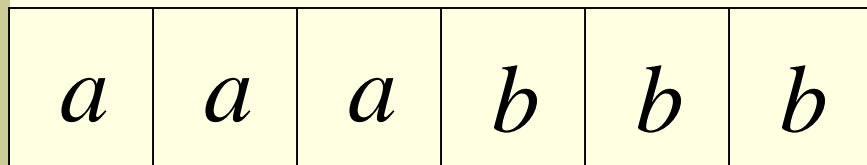
Stack



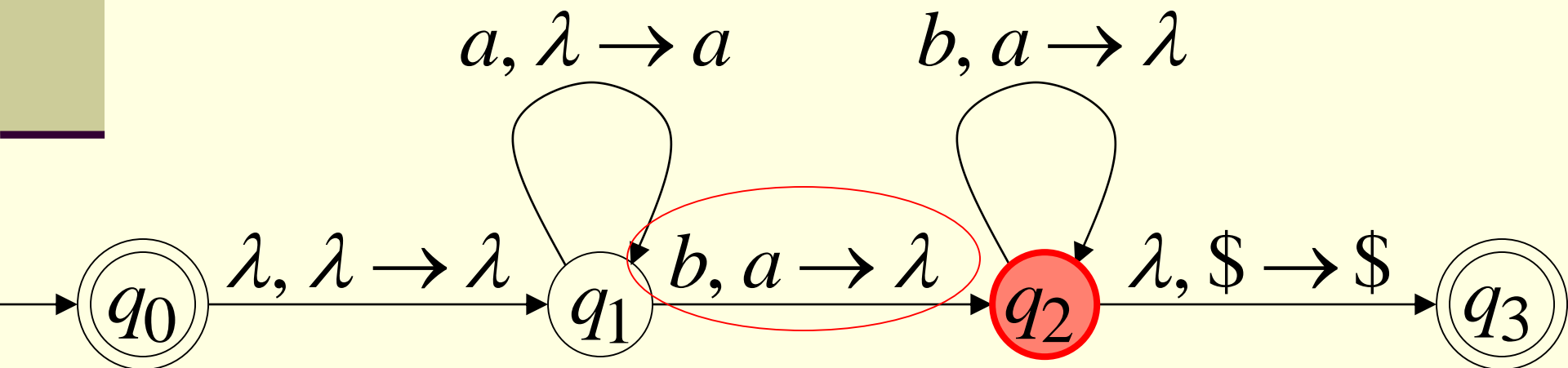


Time 5

Input

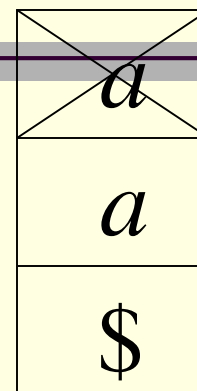
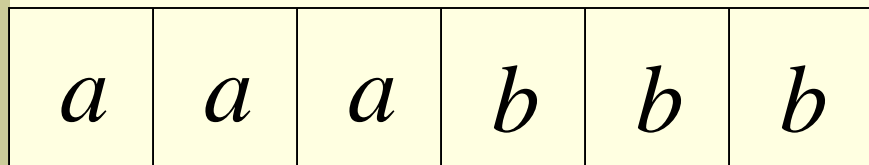


Stack

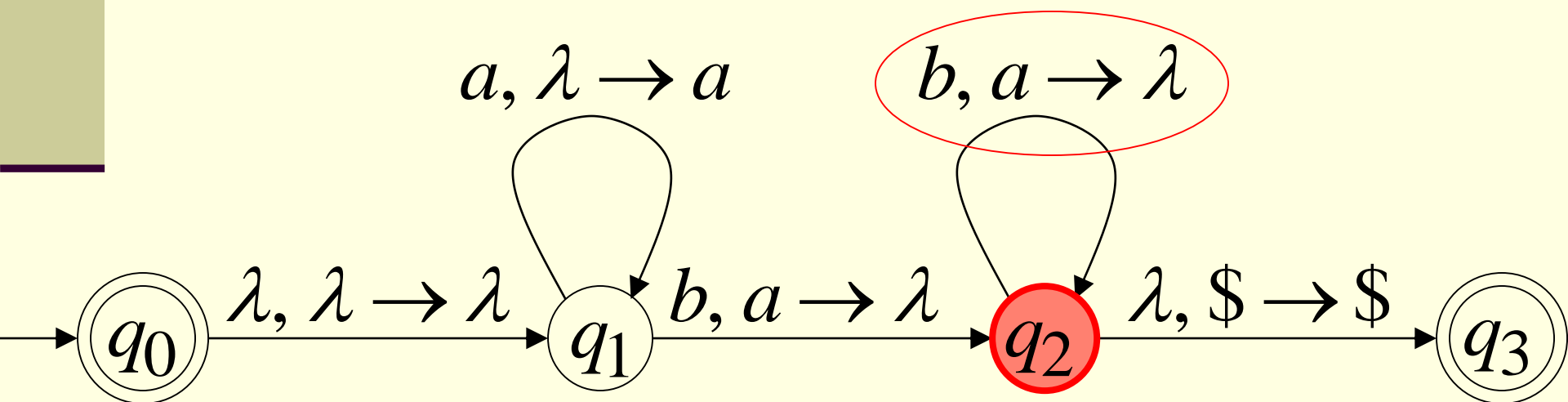


Time 6

Input

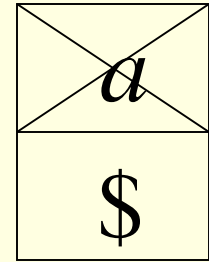
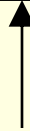
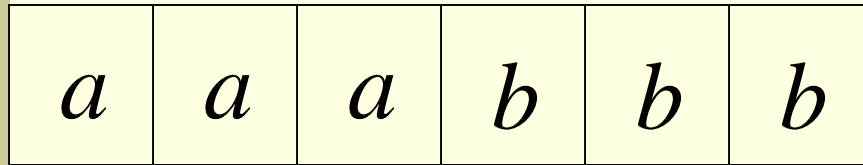


Stack

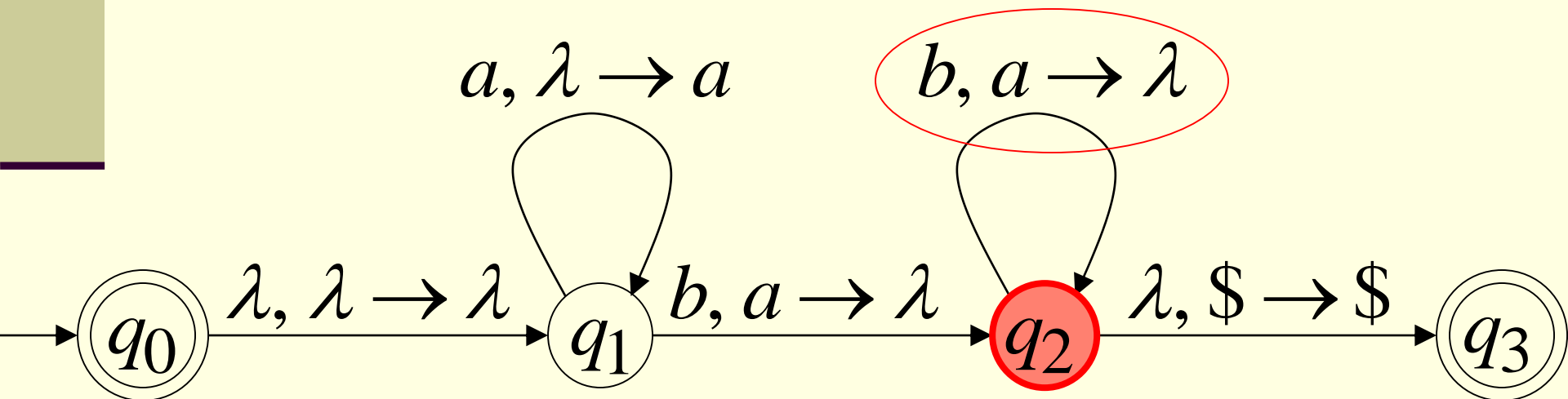


Time 7

Input

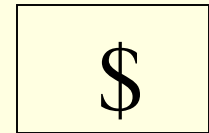
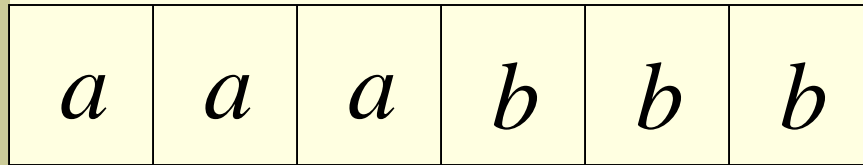


Stack

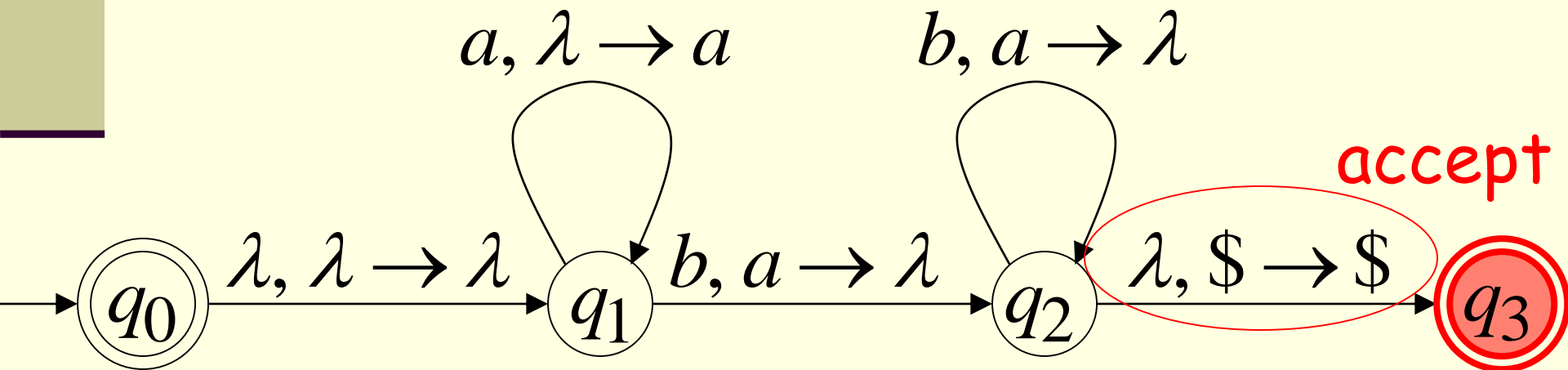


Time 8

Input



Stack



# The Language of PDA

A string is accepted if there is a computation such that:

- All the input is consumed
- The last state is a final state

At the end of the computation,  
we do not care about the stack contents

**ANY  
QUESTION**

**?????????**





THE

END