

Construct a **multi-tape TM** that accepts the language:

$$L(M) = \{wcw^R \mid w \in \{a, b\}^*\}$$

...	<i>B</i>	a	b	b	c	b	b	a	<i>B</i>	...
...	<i>B</i>	...								

- 1: Find the first c in the input
- 2: Check if left and right parts of c are reverse of each other

Construct a **multi-tape TM** that accepts the language:

$$L(M) = \{wcw^R \mid w \in \{a, b\}^*\}$$

...	$B$	a	b	b	c	b	b	a	$B$	...
-----	-----	---	---	---	---	---	---	---	-----	-----

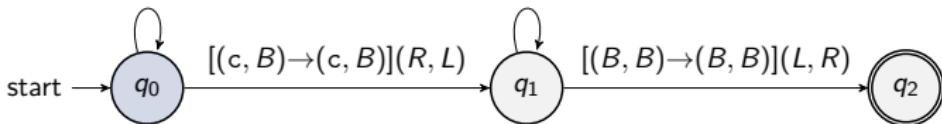
...	$B$	...								
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

$[(a, B) \rightarrow (a, a)](R, R)$

$[(b, B) \rightarrow (b, b)](R, R)$

$[(a, a) \rightarrow (a, a)](R, L)$

$[(b, b) \rightarrow (b, b)](R, L)$



Find the first c in the input.

Construct a **multi-tape TM** that accepts the language:

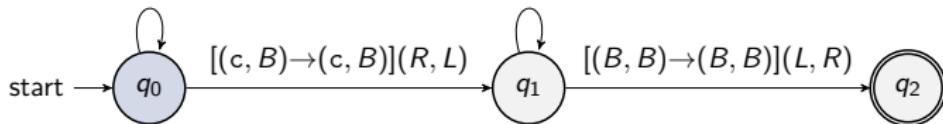
$$L(M) = \{wcw^R \mid w \in \{a, b\}^*\}$$

...	$B$	$a$	$b$	$b$	$c$	$b$	$b$	$a$	$B$	...
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

...	$B$	$a$	$B$	...						
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

$$\begin{array}{l} [(a, B) \rightarrow (a, a)](R, R) \\ [(b, B) \rightarrow (b, b)](R, R) \end{array}$$

$$\begin{array}{l} [(a, a) \rightarrow (a, a)](R, L) \\ [(b, b) \rightarrow (b, b)](R, L) \end{array}$$



Construct a **multi-tape TM** that accepts the language:

$$L(M) = \{wcw^R \mid w \in \{a, b\}^*\}$$

...	$B$	a	b	$b$	c	b	b	a	$B$	...
-----	-----	---	---	-----	---	---	---	---	-----	-----

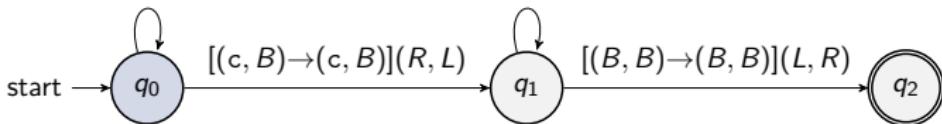
...	$B$	a	b	$B$	$B$	$B$	$B$	$B$	$B$	...
-----	-----	---	---	-----	-----	-----	-----	-----	-----	-----

$$[(a, B) \rightarrow (a, a)](R, R)$$

$$[(b, B) \rightarrow (b, b)](R, R)$$

$$[(a, a) \rightarrow (a, a)](R, L)$$

$$[(b, b) \rightarrow (b, b)](R, L)$$



Construct a **multi-tape TM** that accepts the language:

$$L(M) = \{wcw^R \mid w \in \{a, b\}^*\}$$

...	$B$	a	b	b	c	b	b	a	$B$	...
-----	-----	---	---	---	---	---	---	---	-----	-----

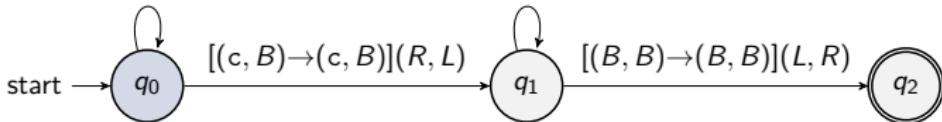
...	$B$	a	b	b	$B$	$B$	$B$	$B$	$B$	...
-----	-----	---	---	---	-----	-----	-----	-----	-----	-----

$$[(a, B) \rightarrow (a, a)](R, R)$$

$$[(b, B) \rightarrow (b, b)](R, R)$$

$$[(a, a) \rightarrow (a, a)](R, L)$$

$$[(b, b) \rightarrow (b, b)](R, L)$$



Construct a **multi-tape TM** that accepts the language:

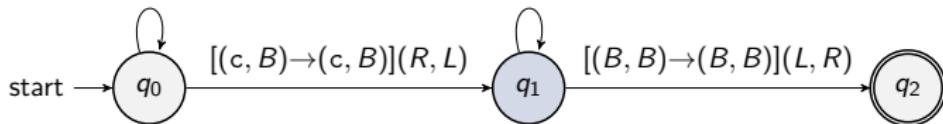
$$L(M) = \{wcw^R \mid w \in \{a, b\}^*\}$$

...	$B$	a	b	b	c	$b$	b	a	$B$	...
-----	-----	---	---	---	---	-----	---	---	-----	-----

...	$B$	a	b	$b$	$B$	$B$	$B$	$B$	$B$	...
-----	-----	---	---	-----	-----	-----	-----	-----	-----	-----

$$\begin{array}{l} [(a, B) \rightarrow (a, a)](R, R) \\ [(b, B) \rightarrow (b, b)](R, R) \end{array}$$

$$\begin{array}{l} [(a, a) \rightarrow (a, a)](R, L) \\ [(b, b) \rightarrow (b, b)](R, L) \end{array}$$



Check if left and right parts of c are reverse of each other.

Construct a **multi-tape TM** that accepts the language:

$$L(M) = \{wcw^R \mid w \in \{a, b\}^*\}$$

...	$B$	a	b	b	c	b	$b$	a	$B$	...
-----	-----	---	---	---	---	---	-----	---	-----	-----

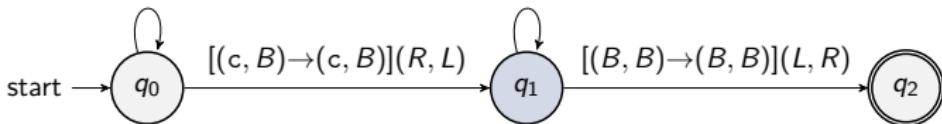
...	$B$	a	b	b	$B$	$B$	$B$	$B$	$B$	...
-----	-----	---	---	---	-----	-----	-----	-----	-----	-----

$$[(a, B) \rightarrow (a, a)](R, R)$$

$$[(b, B) \rightarrow (b, b)](R, R)$$

$$[(a, a) \rightarrow (a, a)](R, L)$$

$$[(b, b) \rightarrow (b, b)](R, L)$$



Construct a **multi-tape TM** that accepts the language:

$$L(M) = \{wcw^R \mid w \in \{a, b\}^*\}$$

...	$B$	a	b	b	c	b	b	a	$B$	...
-----	-----	---	---	---	---	---	---	---	-----	-----

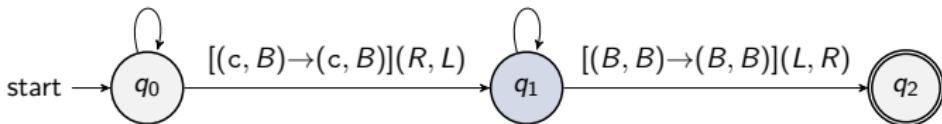
...	$B$	a	b	b	$B$	$B$	$B$	$B$	$B$	...
-----	-----	---	---	---	-----	-----	-----	-----	-----	-----

$$[(a, B) \rightarrow (a, a)](R, R)$$

$$[(b, B) \rightarrow (b, b)](R, R)$$

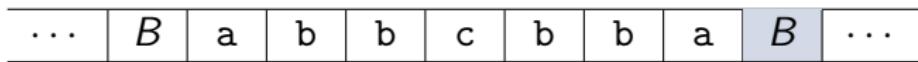
$$[(a, a) \rightarrow (a, a)](R, L)$$

$$[(b, b) \rightarrow (b, b)](R, L)$$



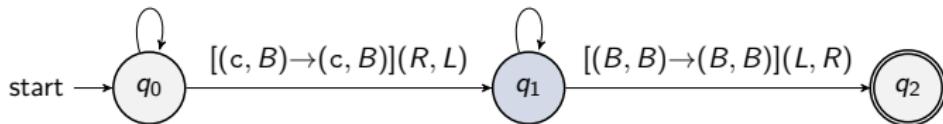
Construct a **multi-tape TM** that accepts the language:

$$L(M) = \{wcw^R \mid w \in \{a, b\}^*\}$$



$$\begin{array}{l} [(a, B) \rightarrow (a, a)](R, R) \\ [(b, B) \rightarrow (b, b)](R, R) \end{array}$$

$$\begin{array}{l} [(a, a) \rightarrow (a, a)](R, L) \\ [(b, b) \rightarrow (b, b)](R, L) \end{array}$$



Construct a **multi-tape TM** that accepts the language:

$$L(M) = \{wcw^R \mid w \in \{a, b\}^*\}$$

...	$B$	a	b	b	c	b	b	a	$B$	...
-----	-----	---	---	---	---	---	---	---	-----	-----

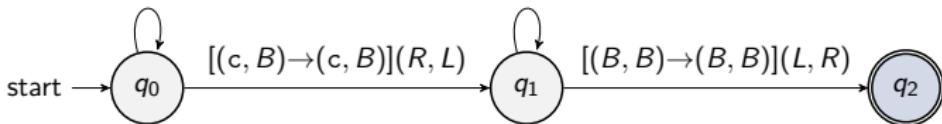
...	$B$	a	b	b	$B$	$B$	$B$	$B$	$B$	...
-----	-----	---	---	---	-----	-----	-----	-----	-----	-----

$[(a, B) \rightarrow (a, a)](R, R)$

$[(b, B) \rightarrow (b, b)](R, R)$

$[(a, a) \rightarrow (a, a)](R, L)$

$[(b, b) \rightarrow (b, b)](R, L)$



Accept!