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

$$\cdot \mid B \mid a \mid b \mid b \mid a \mid B \mid \cdots$$

- 1: Find the middle in the input
- 2: Check if first and second half are reverse of each other

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

$$\dots \mid B \mid a \mid b \mid b \mid a \mid B \mid \dots$$

$$[a \to a]R \quad [X \to X]R \quad [Y \to Y]R$$

$$[b \to b]R \quad [a \to a]R \quad [a \to X]L$$

$$[a \to a]R \quad [a \to A]R \quad [a \to X]L$$

$$[a \to A]R \quad [a \to A]R \quad [a \to X]L$$

$$[a \to A]R \quad [a \to X]L \quad [a \to X]L$$

$$[a \to X]L \quad [a \to X]L \quad [a \to X]L$$

$$[a \to X]L \quad [a \to X]L \quad [a \to X]L$$

$$[b \to Y]L \quad [a \to X]L \quad [a \to X]L$$

$$[b \to Y]L \quad [a \to X]L \quad [a \to X]L$$

$$[b \to Y]L \quad [a \to X]L \quad [a \to X]L$$

$$[b \to Y]L \quad [a \to X]L \quad [a \to X]L$$

$$[b \to Y]L \quad [a \to X]L \quad [a \to X]L$$

$$[a \to X]L \quad [a \to X]L \quad [a \to X]L$$

$$[a \to X]L \quad [a \to X]L \quad [a \to X]L$$

$$[a \to X]L \quad [a \to X]L \quad [a \to X]L$$

$$[a \to X]L \quad [a \to X]L \quad [a \to X]L$$

Find the middle in the input.

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

$$\hline \cdots \mid B \mid a \mid b \mid b \mid a \mid B \mid \cdots$$

$$\begin{bmatrix} [a \to a]R & [X \to X]R & [Y \to Y]R \\ [b \to b]R & [Y \to Y]R & [a \to X]L \\ [b \to b]R & [a \to X]L & [a \to X]L \\ [a \to X]L & [a \to X]R & [a \to X]L \\ [a \to X]L & [a \to X]L & [a \to X]L & [a \to X]L \\ [a \to X]L & [a \to X]L & [a \to X]L & [a \to X]L \\ [a \to X]L & [a \to X]L & [a \to X]L & [a \to X]L \\ [a \to X]L & [a \to X]L & [a \to X]L & [a \to X]L \\ [a \to X]L & [a \to X]L$$

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

$$\dots \mid B \mid a \mid b \mid b \mid a \mid B \mid \dots$$

$$[a \to a]R \qquad [X \to X]R \qquad [b \to b]R \qquad [Y \to Y]R$$

$$[b \to b]R \qquad [a \to a]R \qquad [a \to X]L \qquad [a \to X]L \qquad [Y \to Y]L$$

$$[B \to B]L \qquad [b \to Y]R \qquad [a \to X]L \qquad [Y \to Y]L$$

$$[B \to B]R \qquad [b \to Y]R \qquad [b \to Y]L$$

$$[B \to B]R \qquad [X \to X]L \qquad [A \to X]L \qquad [$$

Check if first and second half are reverse of each other.

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

$$\dots \mid B \mid a \mid b \mid Y \mid a \mid B \mid \dots$$

$$\begin{bmatrix} [a \to a]R & [X \to X]R \\ [b \to b]R & [Y \to Y]R \end{bmatrix}$$

$$[a \to a]R & [A \to A]R$$

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

$$\dots \mid B \mid a \mid Y \mid Y \mid a \mid B \mid \dots$$

$$\begin{bmatrix} a \to a \mid R & [X \to X]R \\ [b \to b]R & [Y \to Y]R \end{bmatrix}$$

$$[a \to a]R & [a \to X]L \\ [b \to b]R & [a \to X]L \end{bmatrix}$$

$$[a \to a]R & [a \to X]L \\ [b \to b]R & [a \to X]L \end{bmatrix}$$

$$[a \to A]L & [a \to X]L \\ [b \to B]L & [b \to Y]R & [b \to Y]L$$

$$[a \to A]L & [a \to X]L \\ [b \to B]R & [b \to Y]L$$

$$[b \to B]R & [a \to X]L \\ [b \to Y]L & [b \to Y]L$$

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

$$\dots \mid B \mid a \mid Y \mid Y \mid a \mid B \mid \dots$$

$$\begin{bmatrix} a \to a \mid R & [X \to X]R \\ [b \to b]R & [Y \to Y]R \end{bmatrix}$$

$$[a \to a]R & [a \to X]L \\ [b \to b]R & [a \to X]L \end{bmatrix}$$

$$[a \to a]R & [a \to X]L \\ [b \to b]R & [a \to X]L \end{bmatrix}$$

$$[a \to A]L & [a \to X]L \\ [b \to B]L & [b \to Y]R & [b \to Y]L$$

$$[a \to A]L & [a \to X]L \\ [b \to B]R & [b \to Y]L$$

$$[b \to B]R & [a \to X]L \\ [b \to Y]L & [b \to Y]L$$

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

$$\dots \mid B \mid a \mid Y \mid Y \mid X \mid B \mid \dots$$

$$\begin{bmatrix} [a \to a]R & [X \to X]R \\ [b \to b]R & [Y \to Y]R \end{bmatrix}$$

$$[a \to a]R & [A \to A]R$$

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

$$\dots \mid B \mid a \mid Y \mid Y \mid X \mid B \mid \dots$$

$$\begin{bmatrix} [a \to a]R & [X \to X]R \\ [b \to b]R & [Y \to Y]R \end{bmatrix}$$

$$[a \to a]R & [A \to A]R$$

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

$$\dots \mid B \mid a \mid Y \mid Y \mid X \mid B \mid \dots$$

$$\begin{bmatrix} [a \to a]R & [X \to X]R \\ [b \to b]R & [Y \to Y]R \end{bmatrix}$$

$$[a \to a]R & [A \to A]R & [A \to A]R \\ [A \to A]R & [A \to A]R & [A \to A]R \\ [A \to A]R & [A \to A]R & [A \to A]R \\ [A \to A]R & [A \to A]R & [A \to A]R & [A \to A]R \\ [A \to A]R & [A \to A]R$$

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

$$\dots \mid B \mid X \mid Y \mid Y \mid X \mid B \mid \dots$$

$$\begin{bmatrix} [a \to a]R & [X \to X]R \\ [b \to b]R & [Y \to Y]R \end{bmatrix}$$

$$[a \to a]R & [X \to X]R \\ [Y \to Y]R & [a \to X]L \end{bmatrix}$$

$$[a \to a]R & [X \to X]R \\ [Y \to Y]R & [a \to X]L \end{bmatrix}$$

$$[a \to a]R & [A \to A]R \\ [A \to A]R & [A \to$$

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

$$\dots \mid B \mid X \mid Y \mid Y \mid X \mid B \mid \dots$$

$$\begin{bmatrix} [a \to a]R & [X \to X]R \\ [b \to b]R & [Y \to Y]R \end{bmatrix}$$

$$[a \to a]R & [Y \to Y]R \\ [a \to X]L & [a \to X]L \\ [b \to b]R & [a \to X]L \\ [a \to X]L & [a \to X]L$$

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

$$\dots \mid B \mid X \mid Y \mid Y \mid X \mid B \mid \dots$$

$$\begin{bmatrix} [a \to a]R & [X \to X]R \\ [b \to b]R & [Y \to Y]R \end{bmatrix}$$

$$[a \to a]R & [Y \to Y]R \\ [a \to X]L & [a \to X]L \\ [a \to X]L & [a \to$$

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

$$\dots \mid B \mid X \mid Y \mid Y \mid X \mid B \mid \dots$$

$$[a \to a]R \quad [Y \to Y]R \quad [a \to X]L \quad [Y \to Y]R$$

$$[b \to b]R \quad [a \to A]R \quad [a \to X]L \quad [Y \to Y]L$$

$$[B \to B]L \quad [b \to Y]R \quad [a \to X]L \quad [Y \to Y]L$$

$$[B \to B]R \quad [b \to Y]R \quad [b \to Y]L$$

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

$$\dots \mid B \mid X \mid Y \mid Y \mid X \mid B \mid \dots$$

$$\begin{bmatrix} [a \to a]R & [X \to X]R \\ [b \to b]R & [Y \to Y]R \end{bmatrix}$$

$$[a \to a]R & [X \to X]R \\ [Y \to Y]R & [a \to X]L \end{bmatrix}$$

$$[a \to a]R & [X \to X]R \\ [A \to A]R & [A \to A]R \\ [A \to A]R & [A \to A$$

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

$$\dots \mid B \mid X \mid Y \mid Y \mid X \mid B \mid \dots$$

$$[a \to a]R \quad [Y \to Y]R \quad [a \to X]L \quad [A \to X]L$$

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

$$\dots \mid B \mid X \mid Y \mid Y \mid X \mid B \mid \dots$$

$$\begin{bmatrix} [a \to a]R & [X \to X]R \\ [b \to b]R & [Y \to Y]R \end{bmatrix}$$

$$[a \to a]R & [Y \to Y]R \\ [a \to a]R & [Y \to Y]R \end{bmatrix}$$

$$[a \to A]R & [A \to A]R & [A$$

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

$$\dots \mid B \mid X \mid Y \mid Y \mid X \mid B \mid \dots$$

$$[a \to a]R \qquad [X \to X]R \qquad [b \to b]R \qquad [Y \to Y]R \qquad [a \to X]L$$

$$[a \to a]R \qquad [x \to X]R \qquad [a \to X]L \qquad [x \to X]L$$

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

$$\dots \quad B \mid X \mid Y \mid Y \mid X \mid B \mid \dots$$

$$\begin{bmatrix} [a \to a]R & [X \to X]R \\ [b \to b]R & [Y \to Y]R \end{bmatrix}$$

$$[a \to a]R & [Y \to Y]R \\ [a \to X]L & [a \to X]L \\ [a \to X]L & [a \to$$

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

$$\dots \mid B \mid X \mid Y \mid Y \mid X \mid B \mid \dots$$

$$\begin{bmatrix} [a \to a]R & [X \to X]R \\ [b \to b]R & [Y \to Y]R \end{bmatrix}$$

$$[a \to a]R & [a \to x]L \\ [b \to b]R & [a \to x]L \\ [a \to x]L & [a \to x]L \\ [a \to x]L & [a \to x]L \end{bmatrix}$$

$$[a \to x]L & [a \to x]L & [a \to x]L \\ [a \to x]L & [a \to x]R & [a \to x]L \\ [a \to x]L & [a \to x]L & [a \to x]L \\ [a \to x]L & [a \to x]L & [a \to x]L \\ [a \to x]L & [a \to x]L & [a \to x]L \\ [a \to x]L & [a \to x]L & [a \to x]L \\ [a \to x]L & [a \to x]L & [a \to x]L \\ [a \to x]L & [a \to x]L & [a \to x]L \\ [a \to x]L & [a \to x]L & [a \to x]L \\ [a \to x]L & [a \to x]L & [a \to x]L \\ [a \to x]L & [a \to x]L & [a \to x]L & [a \to x]L & [a \to x]L \\ [a \to x]L & [a \to x]L & [a \to x]L & [a \to x]L & [a \to x]L \\ [a \to x]L & [a \to x]L \\ [a \to x]L & [a \to x]L \\ [a \to x]L & [a \to x$$

Accept!