

# Recursion Theorem Notes

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# Self Reference

- ▶ This sentence is false.

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- ▶ This sentence is false.
- ▶ Print the following twice, the second time in quotations:  
“Print the following twice, the second time in quotations:”

# Self Reference

- ▶ This sentence is false.
- ▶ Print the following twice, the second time in quotations:  
“Print the following twice, the second time in quotations:”
- ▶ “yields falsehood when appended to its own quotation.”  
yields falsehood when appended to its own quotation.”

# Quine Pages

- ▶ <https://www.nyx.net/~gthompso/quine.htm>
- ▶ <http://www.madore.org/~david/computers/quine.html>

# A Quine Turing Machine

- ▶ Consider the TM  $B$ :

$B$ : on input  $\langle M \rangle$ :

- ▶ Create TM  $A$ :

$A$ : on input  $w$ :

- ▶ Erase  $w$
- ▶ Write  $\langle M \rangle$  on the tape.
- ▶ Simulate what's on the tape.

- ▶ Write  $\langle A \rangle$  on the tape.

- ▶ Now consider TM  $A$ :

$A$ : on input  $w$ :

- ▶ Erase  $w$
- ▶ Write  $\langle B \rangle$  on the tape.
- ▶ Simulate what's on the tape.