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CS311
Proof of towers of Hanoi

You may type or handwrite your answers. If it is not legible, you will not receive credit.

Submit a **hardcopy** at the beginning of lecture. Absolutely **NO late submissions will be accepted (anything submitted after lecture started)**. If you have to skip class or cannot come to class on time, you have to email it to me before the class starts (printing deduction -5%).
No need to submit it to CC.

Recall for the towers of Hanoi problem, $T(n) = 2^n - 1$ [theorem] where $T(n)$ is the amount of work needed to move n disks.

We came up with the above theorem by guessing using a table and also solving the recurrence relation.

Recall the recurrence relation was

$$T(1) = 1$$

$$T(n) = 2T(n-1) + 1 \quad \text{where } n \geq 2$$

<Question>

Prove that the theorem is true using PMI (proof by induction).

HINT: Use the recurrence relation somewhere in your proof.