

## CENG 223—Discrete Computational Structures

## MIDTERM

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25 minutes

**Q-2)** {20 points}

Let  $(f_0, f_1, f_2, \dots, f_n, \dots)$  be an infinite sequence where

$$f_n = \begin{cases} n + 1, & \text{for } 0 \leq n \leq 2 \\ f_{n-1} + f_{n-2} + f_{n-3}, & \text{for } n \geq 3 \end{cases}$$

Prove by induction that  $\forall n \in \mathbb{N}, f_n \leq 2^n$