CSE/AMS 547 Discrete Mathematics Septebmer 3, 2024

Homework One

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Due by Thursday, September 10, 2023, 3:25 pm.
Please select **eight** of the following exercises and provide solutions.

From the textbook's exercises:
1). 1.10
2). 1.14
3). 1.16
4). 1.21
5). 2.14
6). 2.21
7). 2.28
8). 2.31

9). $T(n) = T(\frac{n}{2}) + n$, where $n = 2^k$, and $T(2) = 1$. Please solve $T(n)$.

10). The following sequence is called **Fibonacci sequence**:

$$1, 1, 2, 3, 5, 8, \ldots,$$

where $F_n = F_{n-1} + F_{n-2}$, we know $F_1 = 1$, $F_2 = 1$, and we also set $F_0 = 0$. Please prove

$$\begin{bmatrix} F_{n+1} & F_n \\ F_n & F_{n-1} \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}^n.$$