Midterm 2 Version 1 Solution

April 3, 2020

Question 1

1.

$$100 \div 2 = 50, \textbf{Remainders } 0$$
$$50 \div 2 = 25, \textbf{Remainders } 0$$
$$25 \div 2 = 12, \textbf{Remainders } 1$$
$$12 \div 2 = 6, \textbf{Remainders } 0$$
$$6 \div 2 = 3, \textbf{Remainders } 0$$
$$3 \div 2 = 1, \textbf{Remainders } 1$$
$$1 \div 2 = 0, \textbf{Remainders } 1$$

Then, it follows from above that the binary representation of 100 is $(1100100)_2$.

2. The smallest number that can be expressed by an n-digit balanced ternary representation is

$$\sum_{i=0}^{n-1} d_i \cdot 3^i, \text{ where } d_i \in \{0, 1, 2\} \tag{1}$$

Question 2

Question 3

Question 4