PROBLEM 1: (10 points) Draw the truth table for the Single-bit Addition/Subtraction Unit. Design the circuit using AND, OR and NOT gates.

![Figure 1: Single-bit Addition/Subtraction Unit](image)

PROBLEM 2: (10 points) Design a FSM that outputs a 1 when the last three inputs are 010 or 101. Show the FSM and the state table. Design and show the circuit that implements the design.

PROBLEM 3: (10 points) Write assembly code for PIC16F84 that monitors the input on a PortB pin RB4 (using interrupt on pin change) and outputs a 1 on PortA pin RA4 when the last three inputs are 010 or 101.

PROBLEM 4: (10 points) Problem 7.1 Chapter 7 page 293 in the textbook: Principles of Computer Architecture by Murdocca and Hearning.

PROBLEM 5: (10 points) (a) Compute the CRC code for a message to be transmitted $M(x) = 101100110$ and a generator polynomial $G(x) = x^3 + x^2 + 1$.
(b) To which IPv4 class does address 165.230.140.67 belong?