

Name: _____

ES 4 Problem Set 1

Due Monday February 15, 10am

Problem Set 1 covers material in Sections 1.5, 2.1, and 2.2 in the textbook.

Practice Problems - For review

These are selected problems from the textbook (at the end of each chapter) which may be helpful for practice and review. The answers to these problems are online at <https://booksite.elsevier.com/9780128000564/solutions.php>. You do not have to turn in these exercises in your HW submission.

- Exercise 1.13 (binary to decimal)
- Exercise 1.25 (decimal to binary)
- Exercise 1.53 (adding binary numbers)
- Exercise 2.1 (sum-of-products form)
- Exercise 2.3 (product-of-sums form)

Problem 1: Numbers

(2 Points) Write 47 and 25 in binary, and add them.

(2 Points) What is the result of $01111101 + 01101100$? Write the answer in both binary and decimal.

(2 Points) Suppose you have a circuit that can store only 6 bits, which currently has the value 45. If you add 36 to this and store the result back, what will the value be (in decimal)?

Problem 2: Truth tables

(3 Points) Write a truth table for the logic equation $A \oplus \overline{B} \oplus C$.

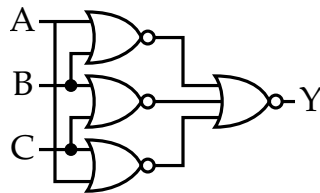
(3 Points) Write a logic equation in canonical sum-of-products form for the following truth table:

A	B	C	Y
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

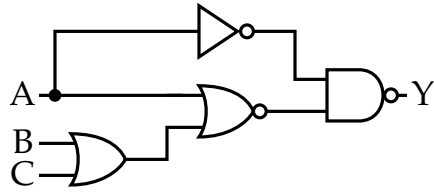
(3 Points) Repeat the above, but use product-of-sums form instead.

Problem 3: Logic diagrams

(3 Points) Write a logic equation representing the circuit below:



(3 Points) Write a logic equation representing the circuit below.



(3 Points) Draw a logic diagram for the boolean equation $Y = (\overline{AB} \oplus \overline{BC}) + ABC$

Problem 4: Reflection

(1 Points) How long did you spend on this assignment?