

ENCS 234 – Digital Systems – First Semester 2015/2016

Homework set 1

Issued Wednesday 7-10-2015

Due Wednesday 14-10-2015 for sections 1, 2, and 5 (Beginning of class)

Due Thursday 15-10-2015 for sections 3 and 4 (Beginning of class)

Problem 1:

Given the two variables $X = 37$ and $Y = -56$,

- Convert both variables to 8-bit signed binary format.
- Perform the binary addition of the two numbers.
- Write down the ASCII code representing the following sentence: “37 – 56 = –19, OK?”
Use 7-bit ASCII plus an additional parity bit.

Problem 2:

Given the Boolean function:

$$F(W, X, Y, Z) = \sum(0, 4, 5, 8, 11, 12, 13, 15)$$

- Represent F as a sum of minterms.
- Using algebraic manipulation, simplify the expression you obtained in (a) to get the minimum sum of products.
- Represent F as a product of maxterms.
- Using algebraic manipulation, simplify the expression you obtained in (c) to get the minimum sum of products. Do you get the same result as in (b) above?

Problem 3:

Given the Boolean function:

$$F = C'D' + BC' + ABD' + AB'CD$$

- Use algebraic manipulation to expand F to sum of minterms format.
- Use algebraic manipulation to expand F to product of maxterms format.