ENCS 234 – Digital Systems – First Semester 2015/2016

Homework set 3

Issued Wednesday 25-11-2015

Due Wednesday 2-12-2015 for sections 1, 2, and 5 (Beginning of class)

Due Thursday 3-12-2015 for sections 3 and 4 (Beginning of class)

Problem 1:

Implement the Boolean function:

$F(A,B,C,D) = \sum (1, 2, 5, 7, 8, 10, 11, 13, 15)$

Using two 3-8 decoders with active-high Enable.

Problem 2:

Implement the Boolean function:

$F(A,B,C,D) = \sum (1, 2, 5, 7, 8, 10, 11, 13, 15)$

Using a 8-1 multiplexer.

Problem 3:

Implement the Boolean function:

$F(A,B,C,D) = \sum (1, 2, 5, 7, 8, 10, 11, 13, 15)$

Using a 4-1 multiplexer plus external gates.

Problem 4:

Use half-adders as building blocks to construct a 6-bit incrementer.

Input: A (6 bits)
Outputs: S = A + 1 (6 bits), carry (1 bit).

Problem 5:

The adder–subtractor circuit of Fig. 4.13 has the following values for data inputs A and B.
A = 1011, B = 0110.
Determine the values of the four SUM outputs, the carry C, and overflow V, for the following two cases:

(a) **M = 0**
(b) **M = 1.**

For each case, provide an interpretation of the inputs and the results in decimal values.