

## EE2000 - Assignment 1

### Question 1

- (a) For the logic function  $F(A,B,C,D) = \sum m(0,1,2,5,6,7,9,10,11,13,14,15)$ , draw a 4-variable Karnaugh map. Instead of plotting the cells with 1's, fill the corresponding cells with their minterm notations such as  $m_0$ ,  $m_1$ ,  $m_2$ , etc.
- (b) Based on the K-map, list all possible pairs of two adjacent minterms such as  $(m_0, m_1)$ , i.e. list/group all possible combinations of two adjacent minterms. Write the resulting implicants produced by the minterm pairs in term of logic variables, use “-” for the reduced variables, e.g.

$$(m_0, m_1): \bar{A}\bar{B}\bar{C}-$$

$$(m_0, m_2): \bar{A}\bar{B}-\bar{D}$$

- (c) Based on the K-map, list all possible of four adjacent minterms in term of two-minterm pairs given in (b). Write the resulting implicants produced by the two minterm pairs in term of logic variables, use “-” for the reduced variables, e.g.

$$(m_0, m_1), (m_4, m_5) : \bar{A}-\bar{C}-$$

- (d) Based on (b) and (c), express  $F$  in the form of sum-of-products. Make sure all the minterms given in (a) have been included in your result.

### Question 2

- (a) Use the Quine-McCluskey method to minimize the logic function given in Question 1(a). Comments on the procedures given in Question 1 and the Quine-McCluskey method you used in this question.
- (b) Can Quine-McCluskey method be applied to the maxterm case (so as to have product-of-sums result) or not? If “no”, give reasons, If “yes”, give the procedures.