Please show your work leading to the final answer. This homework will not be collected. Solutions to selected problems will be posted in the glass board across the hallway from REDC 143. The grade for this assignment will be determined by an in-class quiz to be given on Wednesday, October 3, 2007.

1. **(SOP\textsubscript{min} Expressions)** Determine the SOP\textsubscript{min} expressions for the following functions. Be sure to show the intermediate steps by clearly drawing the K-map and indicating all prime implicants on the K-map.
   
   (a) $F(x_2, x_1, x_0) = \sum m(0, 1, 3, 6, 7)$
   
   (b) $F(A, B, C, D) = \sum m(3, 4, 5, 7, 9, 13, 14, 15)$
   
   (c) $F(A, B, C, D) = \sum m(2, 3, 4, 7, 9, 10, 12, 13, 14, 15)$
   
   (d) $F(A, B, C, D) = \sum m(0, 1, 2, 4, 5, 7, 8, 9, 10, 12, 14, 15)$
   
   (e) $F(A, B, C, D, E) = \sum m(1, 4, 6, 7, 9, 12, 15, 17, 20, 21, 22, 23, 28, 31)$

2. **(SOP\textsubscript{min} Expressions for Functions with Don’t Cares)** Determine the SOP\textsubscript{min} expressions for the following functions. Be sure to show the intermediate steps by clearly drawing the K-map and indicating all prime implicants on the K-map.
   
   (a) $F(x_3, x_2, x_1, x_0) = \sum m(0, 2, 8, 9, 10, 15) + \sum d(1, 3, 6, 7)$
   
   (b) $F(x_1, x_2, x_3, x_4) = \sum m(0, 3, 4, 5, 7, 9, 11) + \sum d(8, 12, 13, 14)$
   
   (c) $F(A, B, C, D, E) = \sum m(1, 4, 6, 7, 9, 27, 28, 30, 31) + \sum d(8, 16, 21, 22)$

3. **(POS\textsubscript{min} Expressions)** Determine the POS\textsubscript{min} expressions for the following functions. You may choose any method. Be sure to show all the intermediate steps.
   
   (a) $F(x_3, x_2, x_1, x_0) = \prod M(0, 2, 4, 5, 7, 8, 9, 15)$
   
   (b) $F(x_1, x_2, x_3, x_4) = \sum m(2, 5, 7, 8, 9, 12) + \sum d(1, 13, 14)$
   
   (c) $F(A, B, C, D) = \prod M(2, 4, 9, 10, 15) \cdot \prod d(0, 13, 14)$

4. **(Design of Circuit in SOP\textsubscript{min} Form)** Problem 1 of Section 3.8 in text (page 58).

5. **(SOP\textsubscript{min} Expression and Circuit)** Problem 3 of Section 3.8 in text (page 58). Be sure to show the intermediate steps by clearly drawing the K-map and indicating all prime implicants on the K-map.

6. **(SOP\textsubscript{min} Expressions)** Problem 4 of Section 3.8 in text (pages 58-59). Be sure to show the intermediate steps by clearly drawing the K-maps and indicating all prime implicants on the K-maps.