CPE201 Midterm 2 (100 points)

Answer all questions completely. Put a box around the final solution. Put your name on it. Show your work.

1. Assuming odd byte parity, generate the parity bits for the following message (20 points)

   0000 101x 0110 011x 1101 001x 0010 111x

   Odd byte parity means that each byte should have an odd number of 1's, including the parity bit

   0000 101**1** 0110 011**1** 1101 001**1** 0010 111**1**

2. For the following Boolean expression, make the Karnaugh map and use it to write the minimized POS expression: AB' + CA'B + (ABC)' (30 points)

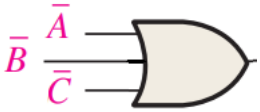
   Distributing the last NOT gives the Boolean expression
   AB' + CA'B + A' + B' + C'
   Putting this into a Karnaugh map gives

AB \ C	0	1
00	1	1
01	1	1
11	1	0
10	1	1

   There is one zero to give a POS, which is given by
   (A' + B' + C')

3. Implement a circuit for the following Boolean expression: AB' + CA'B + (ABC)' (20 points)

   Creating the circuit for the simplified POS expression in the last problem gives:



4. Given the 4-bit parallel adder in Figure 1, put the following inputs on the diagram and give all carry bits and summation bits. A = 5, B = 9, C_0=0. (30 points)

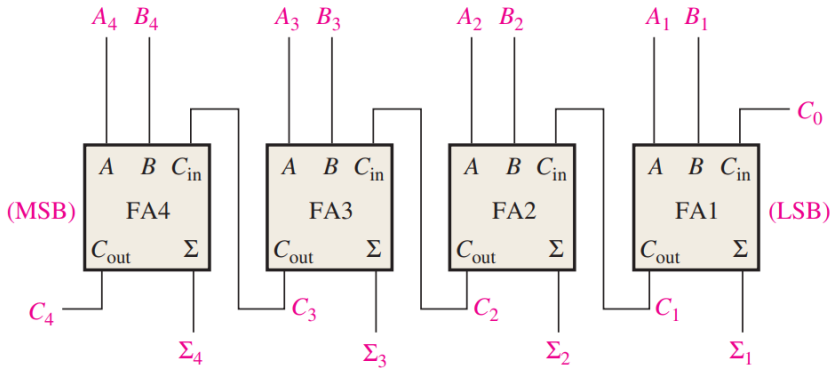


Figure 1

A_1= 1
A_2= 0
A_3= 1
A_4= 0
B_1= 1
B_2= 0
B_3= 0
B_4= 1
C_0= 0

C_1= 1
C_2= 0
C_3= 0
C_4= 0
$\sum_1$= 0
$\sum_2$= 1
$\sum_3$= 1
$\sum_4$= 1