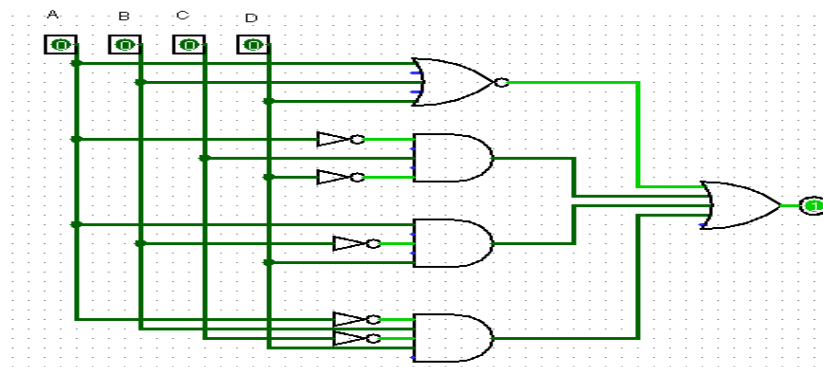**Title:** CS1026 Lab 4

Date: 17/02/2017

Aim: To design a circuit to implement $F(A,B,C,D) = \sum_m (0,2,5,6,9,11)$ using the Quine-McCluskey Method.

Iteration 1

	A	B	C	D	
(0)	0	0	0	0	✓
(2)	0	0	1	0	✓
(5)	0	1	0	1	
(6)	0	1	1	0	✓
(9)	1	0	0	1	✓
(11)	1	0	1	1	✓

Iteration 2

	A	B	C	D
(0,2)	0	0	-	0
(2,6)	0	-	1	0
(9,11)	1	0	-	1

Prime Implicant Table

	0	2	5	6	9	11	
(0,2)	X	X					✓
(2,6)		X		X			✓
(9,11)					X	X	✓
(5)			X				✓

$F= (A'B'D') + (A'CD') + (A'BD) + (A'BC'D)$

Analysis:

- I began by designing the first table made up of the grouped minterms
- Following this I then grouped the minterms with minterms from the group below it producing the second table
- When no more minterms could be grouped I then made a prime implicant table using the prime implicants (terms that were not selected)
- Using column and row dominance methods I then reduced the table to the minimum SOP solution as seen above.
- Following this I then built and tested a circuit to implement this solution using Logisim.

Boolean Algebra:

$$F= (A'B'D') + (A'CD') + (A'BD) + (A'BC'D)$$