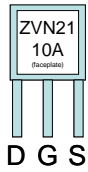


EE 334 Practical Exercise: MOSFET Logic Gates

EQUIPMENT:

- Protoboard
- 3 ZVN2110A MOSFETs
- 2 1 kΩ resistors
- Connector wire



PART 1: PREDICTION

For these circuits the inputs and outputs will be either high voltages (~5V) representing a '1', or low voltages (~0V) representing a '0'. Predict the truth table and the corresponding logic function for the following circuits.

A		<table border="1" style="margin: auto;"> <thead> <tr> <th style="padding: 5px;">V_{IN}</th> <th style="padding: 5px;">V_{OUT}</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">0</td> <td style="padding: 5px;"></td> </tr> <tr> <td style="text-align: center; padding: 5px;">1</td> <td style="padding: 5px;"></td> </tr> </tbody> </table>	V_{IN}	V_{OUT}	0		1		<p>Function:</p> <hr style="width: 80%; margin: auto;"/>									
V_{IN}	V_{OUT}																	
0																		
1																		
B		<table border="1" style="margin: auto;"> <thead> <tr> <th style="padding: 5px;">$V_{IN,X}$</th> <th style="padding: 5px;">$V_{IN,Y}$</th> <th style="padding: 5px;">V_{OUT}</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">0</td> <td style="text-align: center; padding: 5px;">0</td> <td style="padding: 5px;"></td> </tr> <tr> <td style="text-align: center; padding: 5px;">0</td> <td style="text-align: center; padding: 5px;">1</td> <td style="padding: 5px;"></td> </tr> <tr> <td style="text-align: center; padding: 5px;">1</td> <td style="text-align: center; padding: 5px;">0</td> <td style="padding: 5px;"></td> </tr> <tr> <td style="text-align: center; padding: 5px;">1</td> <td style="text-align: center; padding: 5px;">1</td> <td style="padding: 5px;"></td> </tr> </tbody> </table>	$V_{IN,X}$	$V_{IN,Y}$	V_{OUT}	0	0		0	1		1	0		1	1		<p>Function:</p> <hr style="width: 80%; margin: auto;"/>
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$V_{IN,X}$	$V_{IN,Y}$	V_{OUT}																
0	0																	
0	1																	
1	0																	
1	1																	

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PART 2: BUILD AND TEST

Build and test the circuits from Part 1. Use the switches on the protoboard for the inputs and the lights on the protoboard for the output. Record the actual truth tables below.

A.

V_{IN}	V_{OUT}
0	
1	

B.

$V_{IN,X}$	$V_{IN,Y}$	V_{OUT}
0	0	
0	1	
1	0	
1	1	

C.

$V_{IN,X}$	$V_{IN,Y}$	V_{OUT}
0	0	
0	1	
1	0	
1	1	

D.

$V_{IN,X}$	$V_{IN,Y}$	V_{OUT}
0	0	
0	1	
1	0	
1	1	

PART 3: DESIGN

Design an AND gate using MOSFETS. Record your design below. Build and test your design