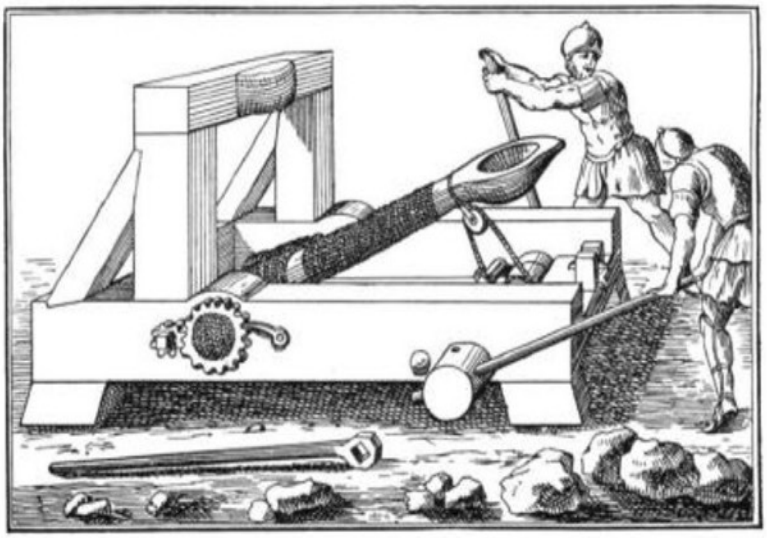
Name: Prachi Singhroha Roll No.: 101903545 Group: 2CO21

DEPARTMENT
OF
ELECTRONICS AND COMMUNICATION ENGINEERING

THAPAR INSTITUTE
OF ENGINEERING & TECHNOLOGY
(Deemed to be University)

Handout/Assignment-
for
Engineering Design Project-I (UTA013)



INSTRUCTOR INCHARGE

Name: Prachi Singhroha Roll No.: 101903545 Group: 2CO21

ASSIGNMENT - 2
Study of ICs

Exercise 1 – To verify the function tables of CD4027 and CD4081 ICs.

Hardware/Software Required

Breadboard

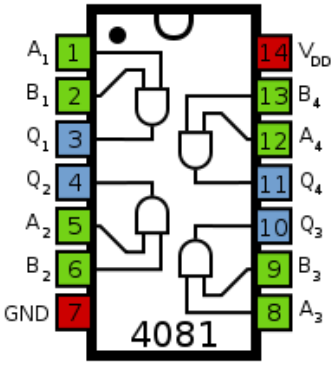
CD 4027 and CD4081

Single core connecting wires

Tinkercad Software tool (https://www.tinkercad.com/)

Theory

The data sheet of CD4027 and CD4081 is given below.



(a)

Input 1	Input 2	Output
0	0	0
0	1	0
1	0	0
1	1	1

(b)

Figure 1: Datasheet of CD4081 IC (a) pin diagram (b) functional truth table

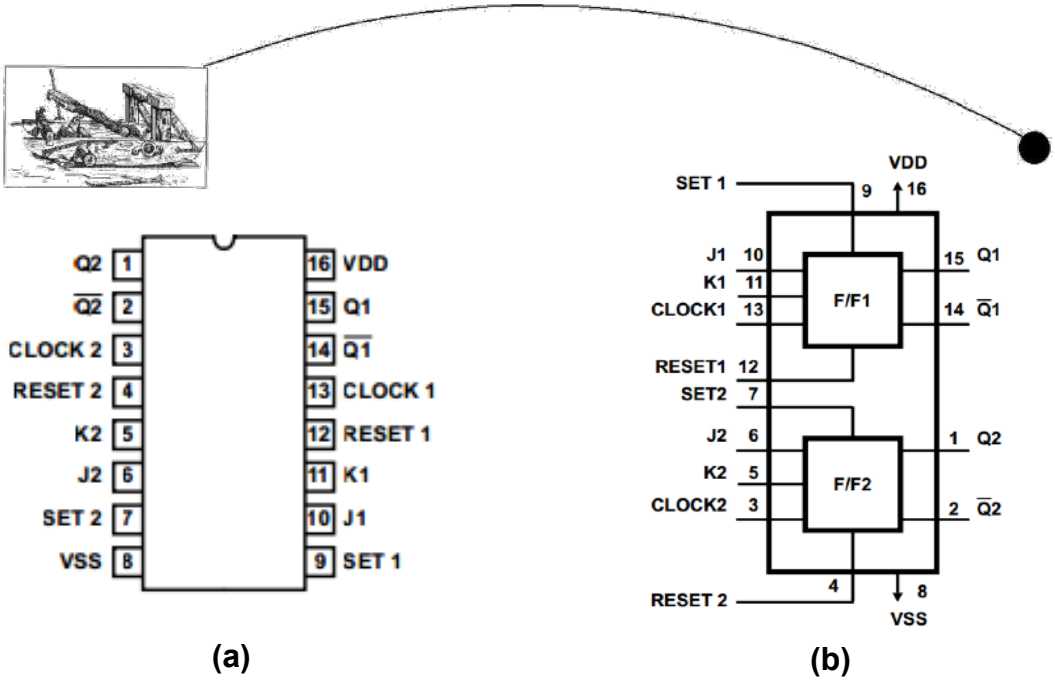


Figure 2: CD4027 IC (a) pin diagram (b) Internal architecture

Trigger	Inputs		Output				Inference
			Present State		Next State		
CLK	J	K	Q	Q'	Q	Q'	
⊠	x	x	-		-		Latched
⊓	0	0	0	1	0	1	No Change
⊓			1	0	1	0	
⊓	0	1	0	1	0	1	Reset
⊓			1	0	0	1	
⊓	1	0	0	1	1	0	Set
⊓			1	0	1	0	
⊓	1	1	0	1	1	0	Toggles
⊓			1	0	0	1	

Schematic:
CD4081

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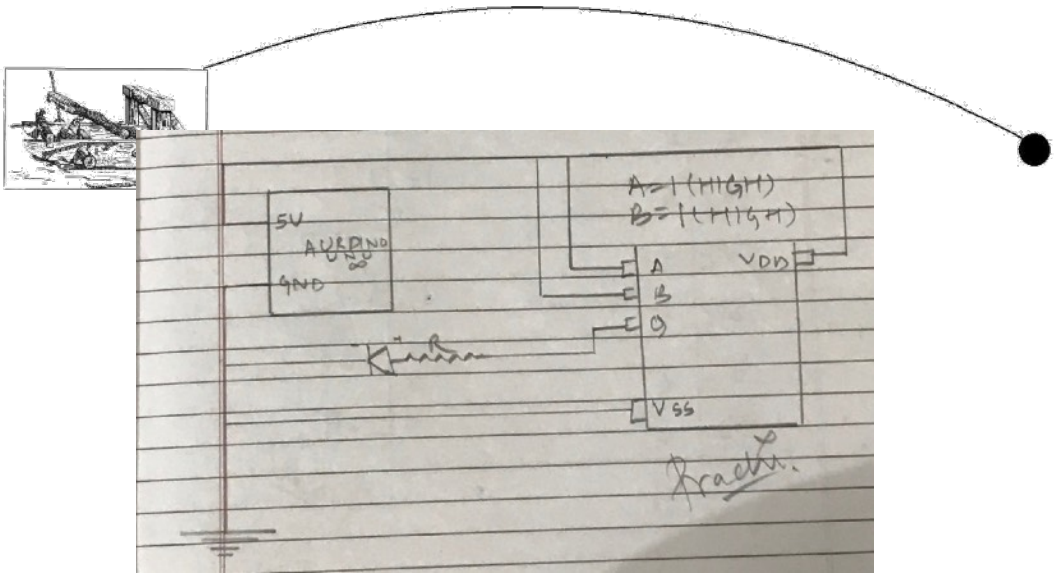
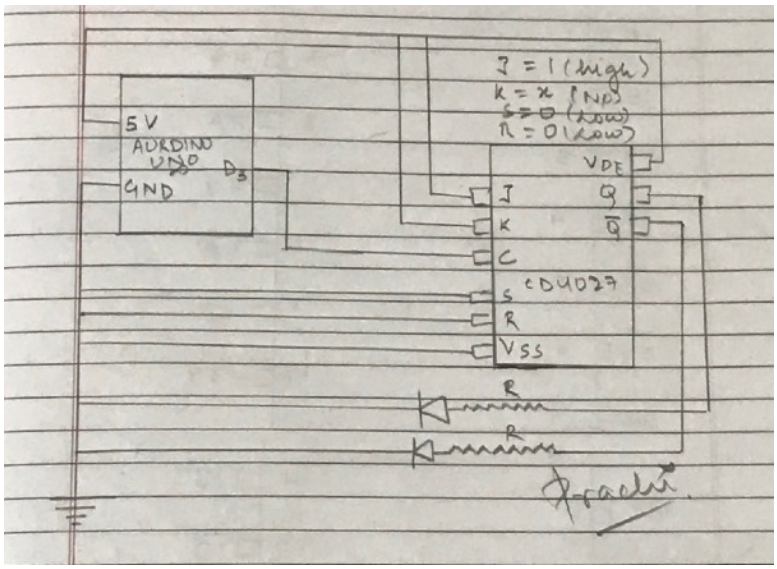
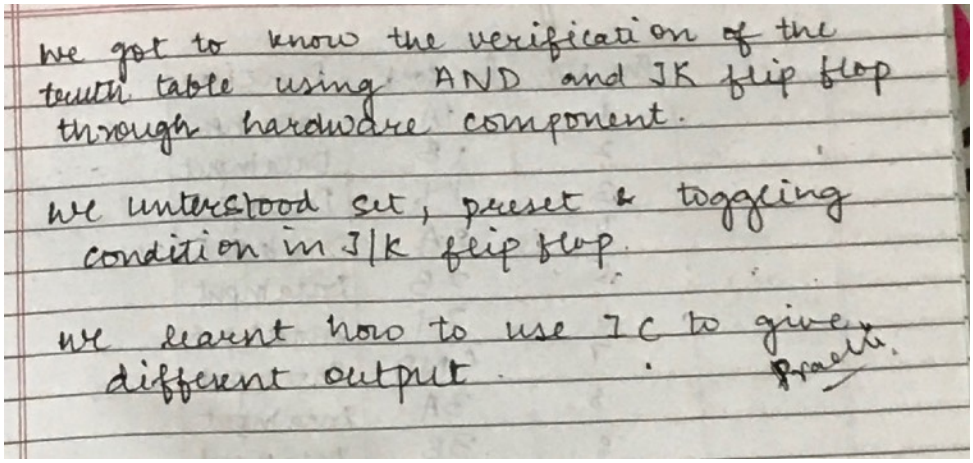


CD4027



Reflections (Conclusions):



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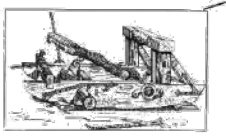


ASSIGNMENT - 2
Study of Sensors

Exercise 2

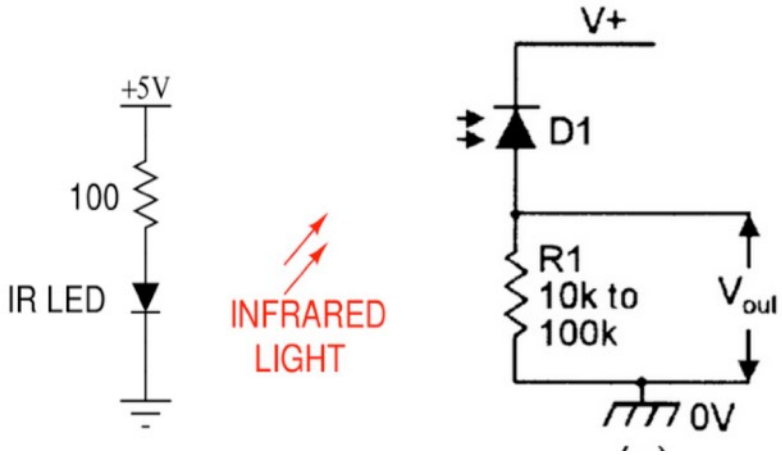
A. Demonstrate the working of IR sensors and receiverand displayoutput using LED.
B. Use the two pair IR sensors of Mangonel to combine the two sensors output into one signal.

Hardware

Bread Board, Power supply
Resistances and LED
IR transmitter and Receiver(Photodiode), Single core connecting wires

Theory

The figure below shows an IR pair in which IR LED emits infrared light which is received by photo diode D1 and the output voltage across resistor R1 is high. When we block the flow of light then the output voltage becomes low.



Reflections (Conclusions):

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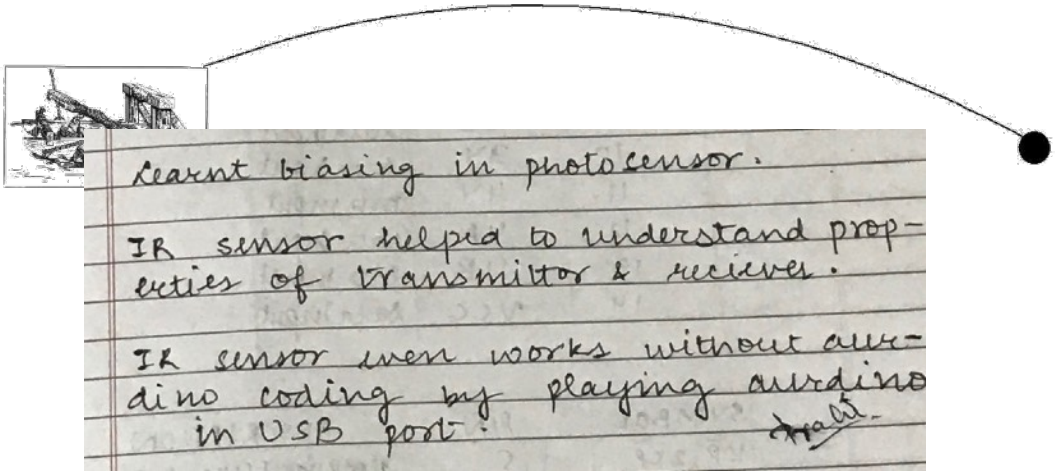
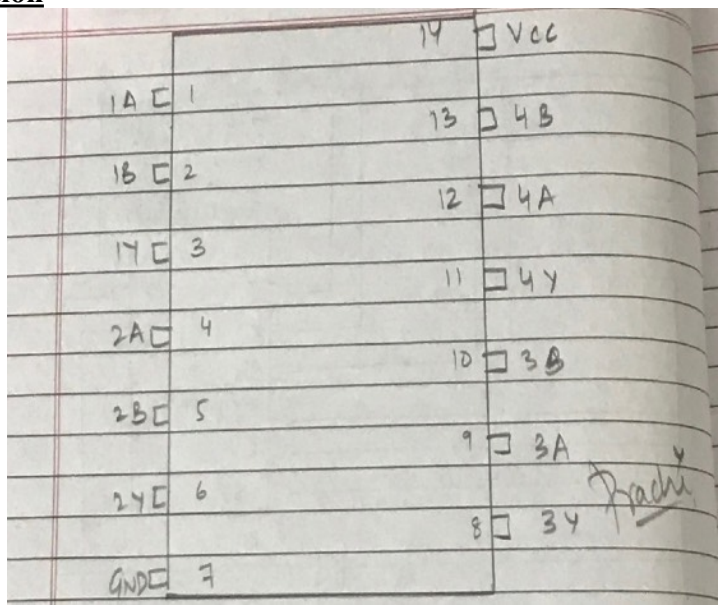
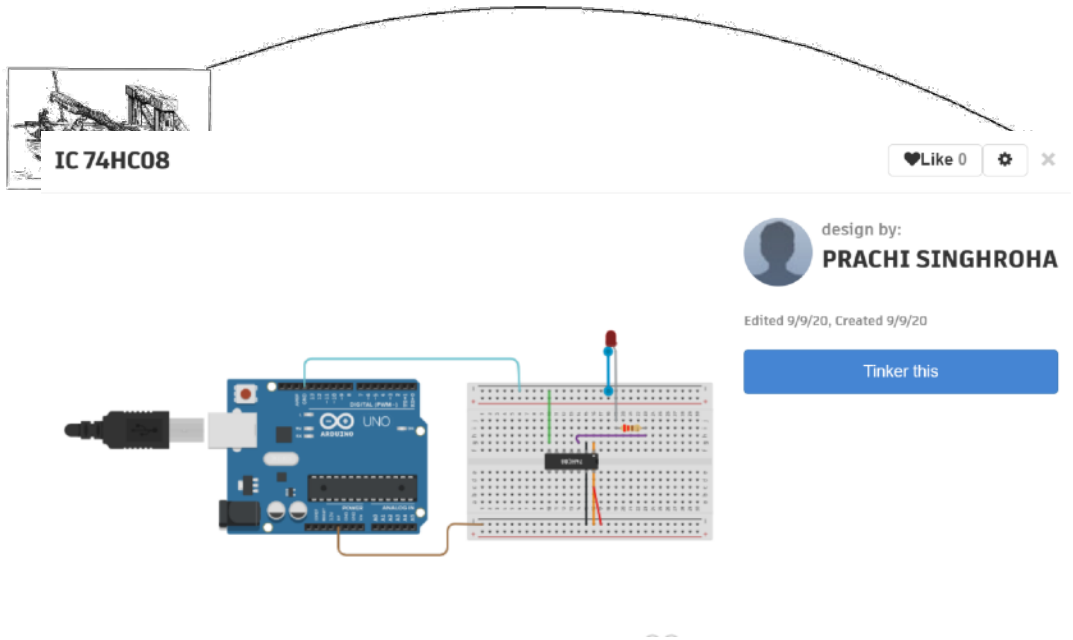
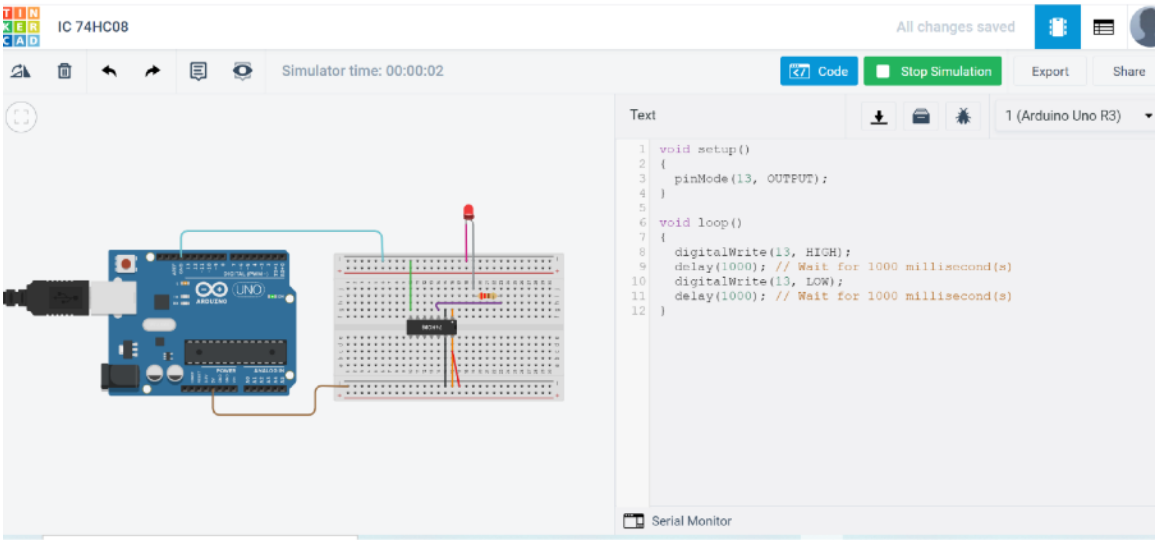


Assignment Tasks - Using Tinkercad:

1. Illustrate the pin configuration and verify the truth table of IC 74HC08.
   PIN Configuration







2. Illustrate the pin configuration and verify the truth table of IC 74HC73.

PIN Configuration

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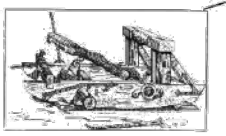
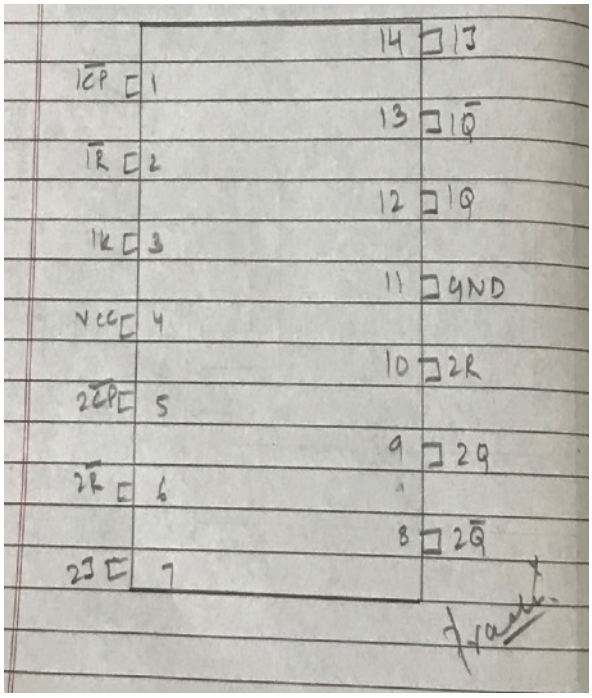
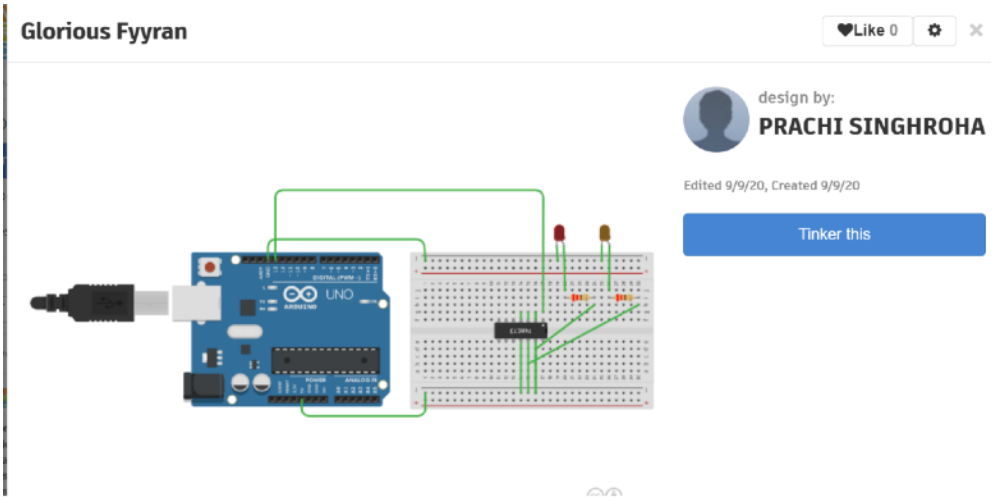
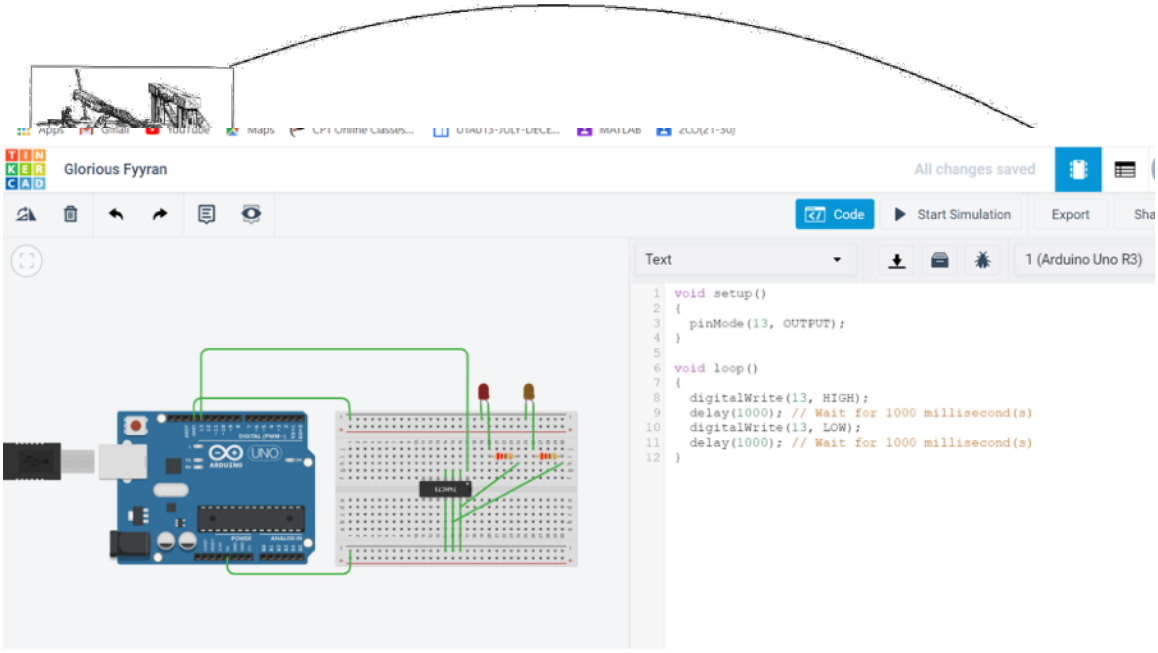


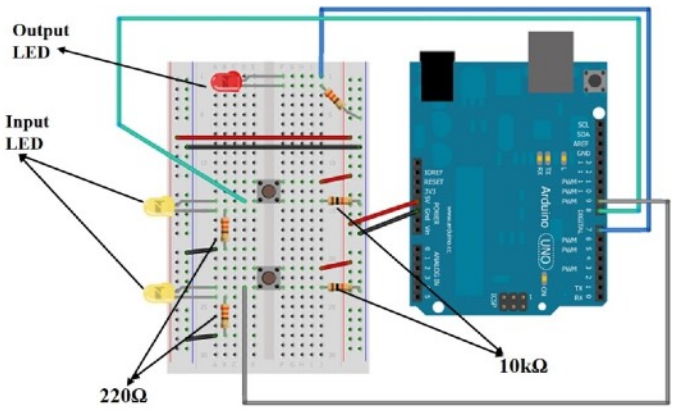






3. Use Arduino to simulate the behaviour of listed logic gates with the help of push buttons (Without using ICs of logic gates)
   a) Logic gates: AND, NAND, XOR for students with odd numbered Roll Number.
   b) Logic gates: OR, NOR, XNOR for students with even numbered Roll Number.

Hint:

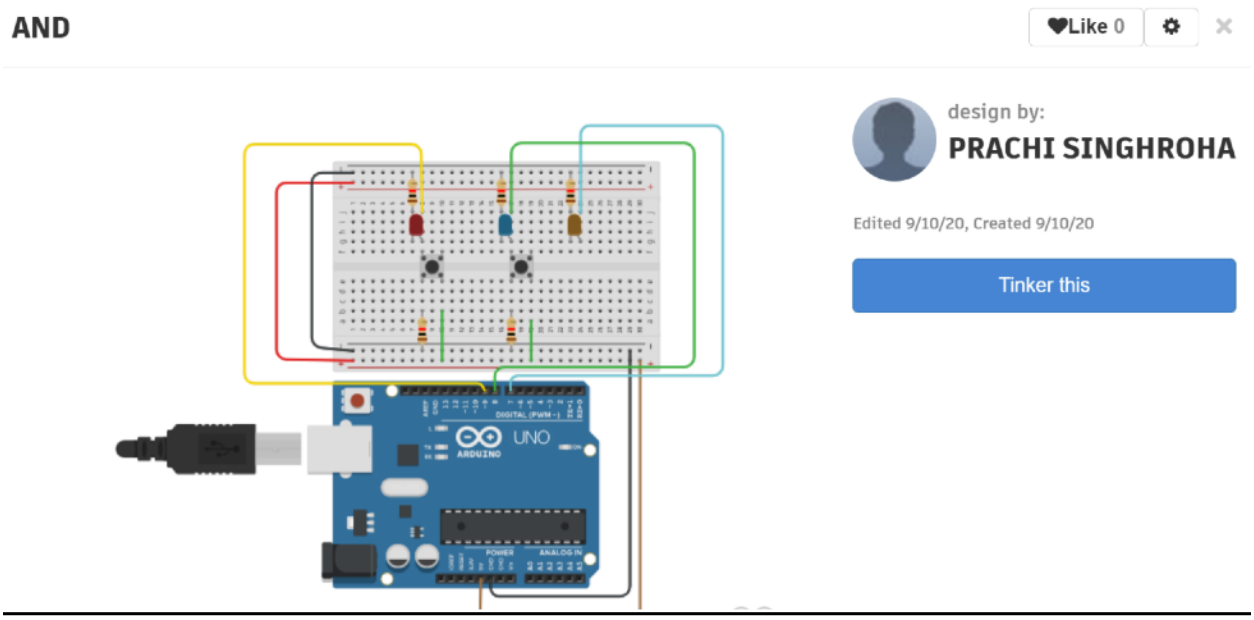


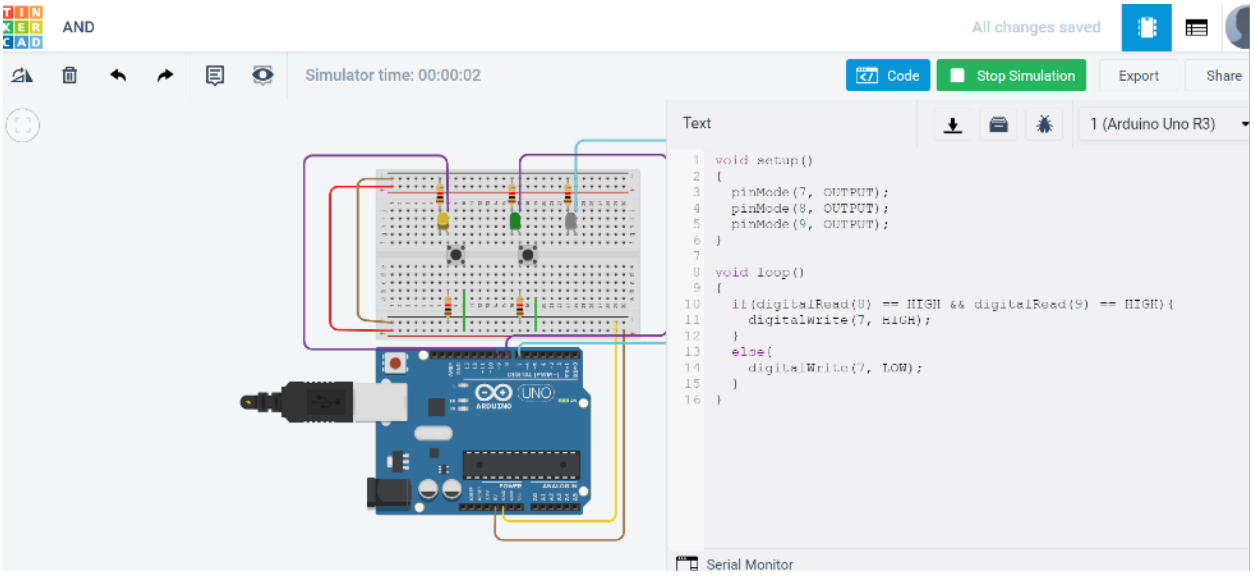
My Roll number: 101903545. Hence I'll use Arduino to simulate the behaviour of listed logic gates with the help of push buttons.

Name: Prachi Singhroha Roll No.: 101903545 Group: 2CO21

Logic gates: AND, NAND, XOR

AND





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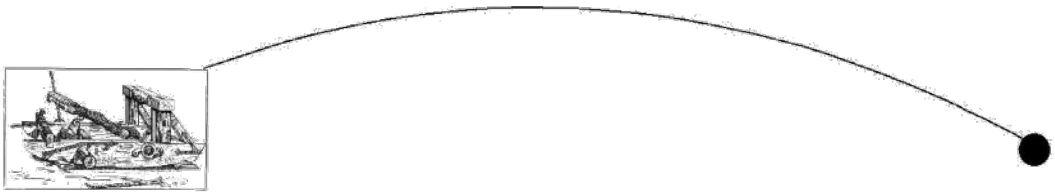
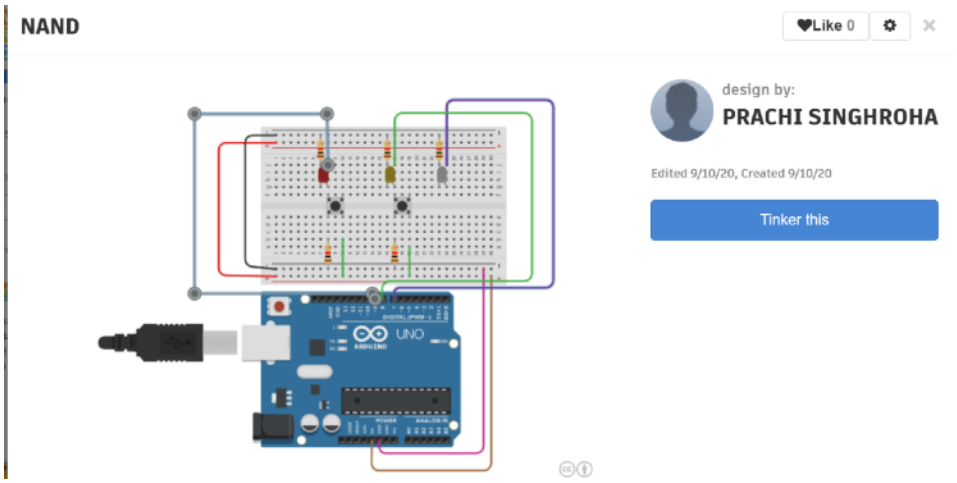
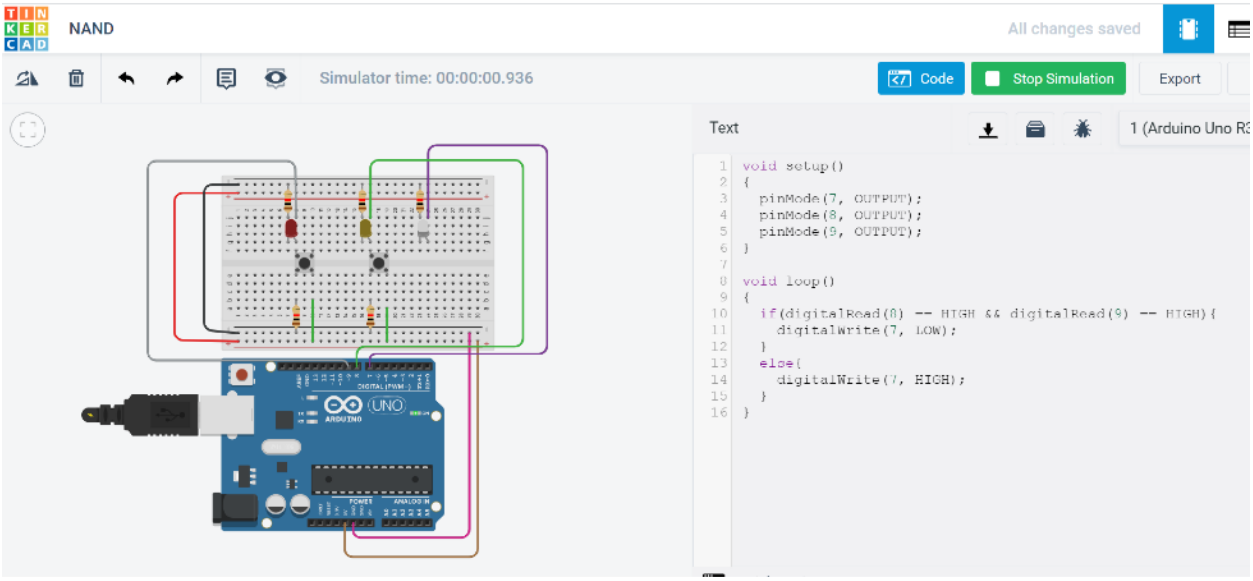


NAND





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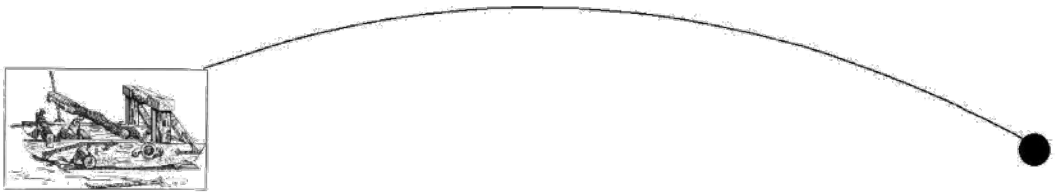
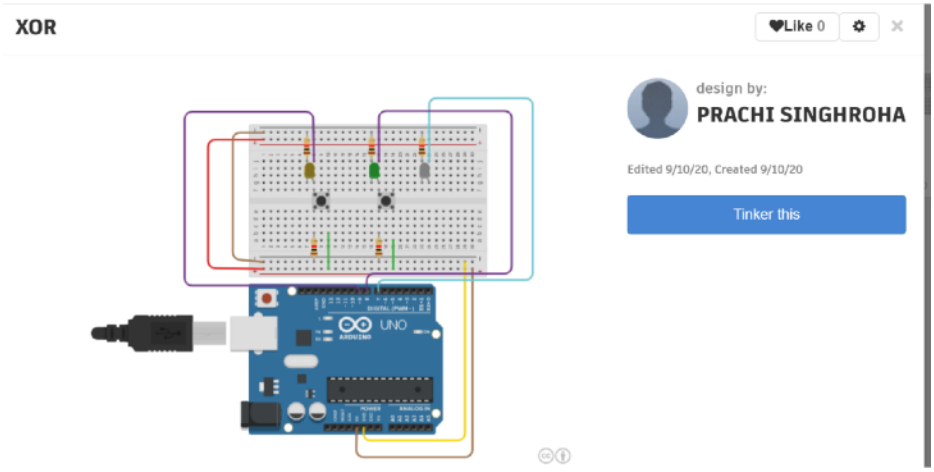
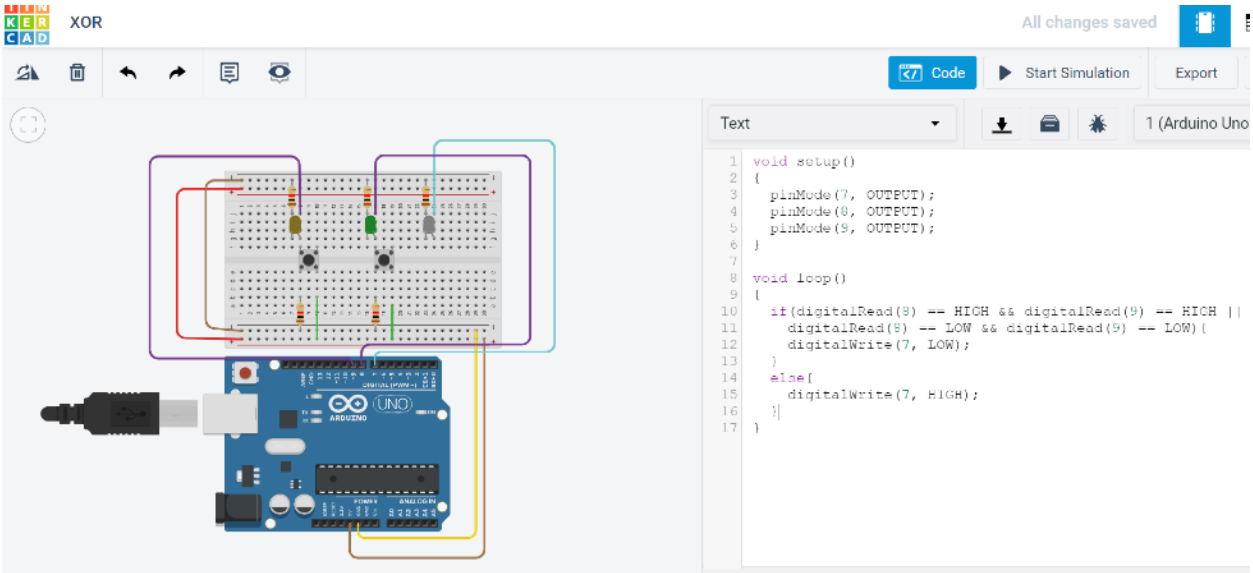


XOR





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