Hard ware assignment report

AI22BTECH11015

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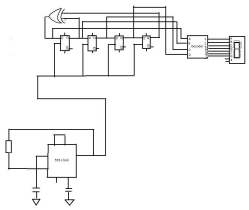
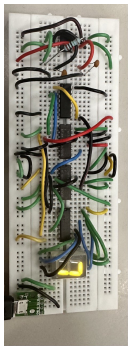
COMPONENTS:

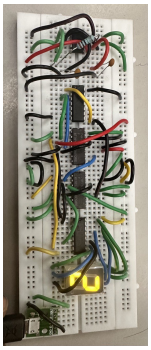
Components	Value	Quantity
Breadboard		1
Seven Segment Display	Common Anode	1
Decoder	7447	1
Flip Flop	7474	2
X-OR GATE	7486	1
555 IC		1
Resistor	1K \omega	1
Resistor	1M \omega	1
Capacitor	$100nF$	1
Capacitor	$10nF$	1
Jumper Wires		20

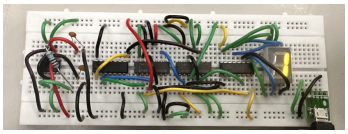
Description:
Breadboard: It is basically a plastic board with grid holes where holes are connected in a specific manner. This breadboard allows us to connect different components like resistors,capacitors,IC's..etc.Here, holes are arranged typically in a group of 5 called node.Holes in a row are electrically connected and in column are isolated.
Seven Segment Display: It is an output device which genarates the numbers between 0 and 9. In our experiment it is used to display the generated random number.
Decoder: It acts as a bridge between the IC's and the output device ***Display*** which helps to convert the binary code into corresponding signals to display , to give the output.
Two Flip Flops 7474: These flip flops are used to create the shift registers, which is used to store and shift the data bits one by one.
X-OR gate 7486: It is used to give feedback connections between the flipflops in the shift register,enabling the shifting of data bits.
555 timer: It is used as a clock generator to provide a clock signal that controls the shifting of data in shift register.
Resistors: It is used in cojunction with 555 IC to set the timing and frequency of the clock signal.
Capacitors: It is used with 555 IC timer to stabilize the voltage and providing the timing control.
PROCEDURE:

- First, we need to setup the 555 timer as shown in the above image in the breadboard.
- Next, we need to use the jumper wires to give the connection in the grids to all the IC's in the breadboard , just exactly how they are connected in the above figure.









- Connect the CLOCK output of the 555 timer circuit to CLOCK signal of the D-Flip Flops.
- Now make the circuit for shift registers using 4 D Flip Flops (by using two 7474 IC's) and one X-ORgate)(7486 IC).
- Connect the output of each D Flip flop to decoder IC (7447 IC), The pinout of 7447 IC.
- As per the pin out of IC 7474 $[2, 12]$ pins of both IC's need to connected to the $[7, 1, 2, 6]$ of decoder IC respectively.
- Make connections between the seven segment display and the 7447 IC.
- Additionally make connections like Vcc and GND to every IC as per the respective IC pinout for IC's 7474,7447,7486.

CONCLUSION: The experiment shows that shift registers can succesfully produce random variables. A random sequence can be convereted into a random variable with the correct probability distribution by carefully designing the shit register circuit and choosing the right feedback tap places.