Hardware Assignment

AI1110: Probability and Random Variables

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Random number generators using shift registers

Components:

Component	Value	Quantity
Breadboard		1
Seven Segment Diplay	Common Anode	1
Decoder	7447	1
Flip Flop	7474	2
X-OR Gate	7486	1
555 IC		1
Resistor	1 KΩ	1
Capacitor	100 nF	1
Capacitor	10 nF	1
Jumper Wires		

Working Procedure

1) Connect the 555 timer circuit as shown in fig1. Then the clock signal output is generated.

2) The output generated is connected to 3rd and 11th pins of both 7474 IC's. These 7474IC's contains 2 D-flip flops inside them. It is shown in fig2.

3) The output of 1st and 4th flipflop is connected to input of XOR gate(7486) as in fig 3 and output of XOR is connected to input of 1st flip flop.

4) Connect the Decoder's(7447) A, B, C, D with output of each flip flops(Q_0, Q_1, Q_2, Q_3) decoder is shown in fig4.

5) Then connect the 7-segment display with the decoder. refer fig-5 and fig-6.

Output

7-segment display displays a random number from 0 – 9.

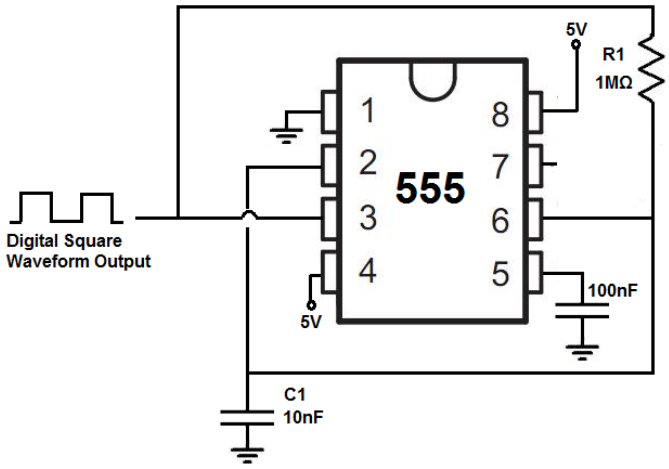

Fig. 1. 555 timer circuit

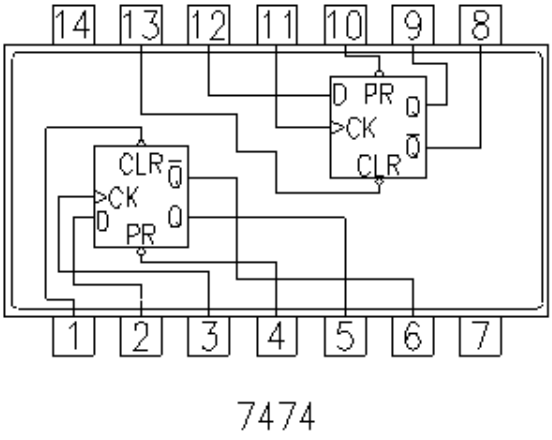

Fig. 2. 7474 containing 2 D-Flipflops

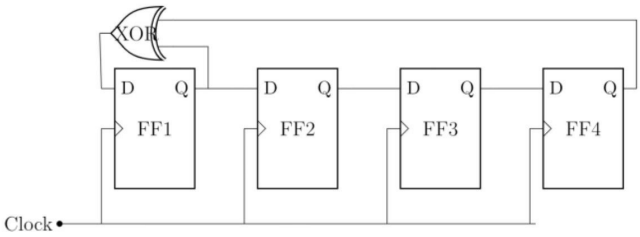

Fig. 3. connections between two 7474's and 7486

Fig. 4. Decoder 7447

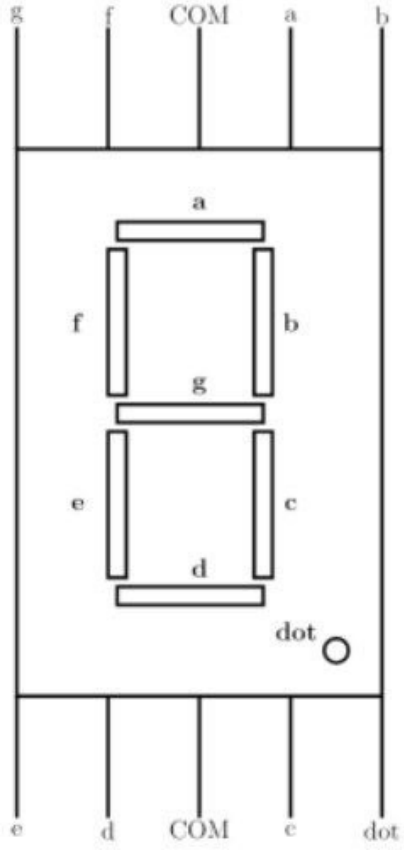

Fig. 5. 7 segment display

7447	$\bar{a}$	$\bar{b}$	$\bar{c}$	$\bar{d}$	$\bar{e}$	$\bar{f}$	$\bar{g}$
Display	a	b	c	d	e	f	g

Fig. 6. table

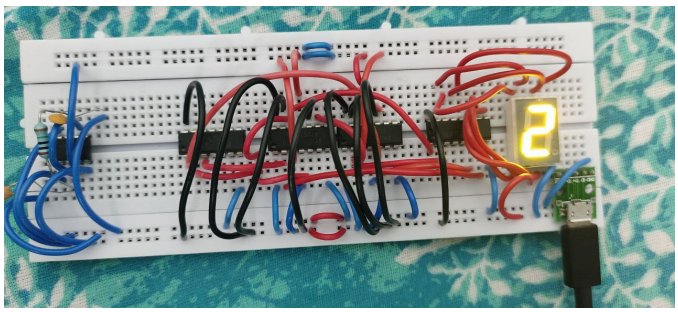

Fig. 7. output