

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 Display	Common Anode	1
Decoder	7447	1
Flip Flop	7474	2
X-OR Gate	7486	1
555 IC		1
Resistor	1 K Ω	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.

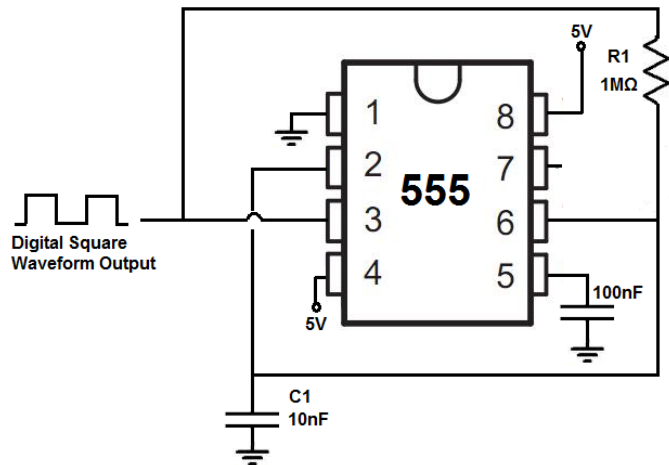


Fig. 1. 555 timer circuit

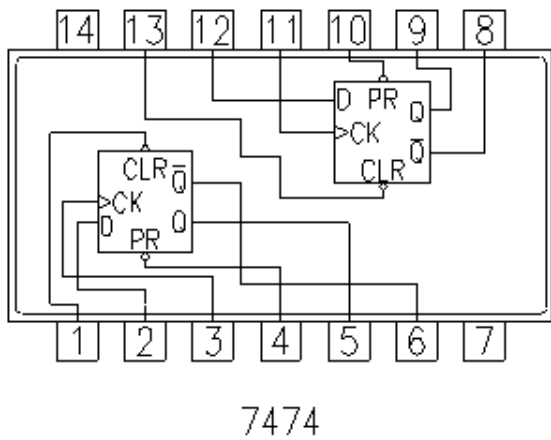


Fig. 2. 7474 containing 2 D-Flipflops

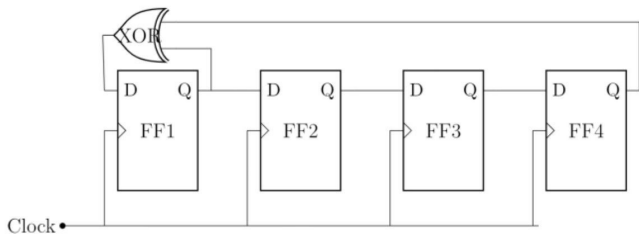


Fig. 3. connections between two 7474's and 7486

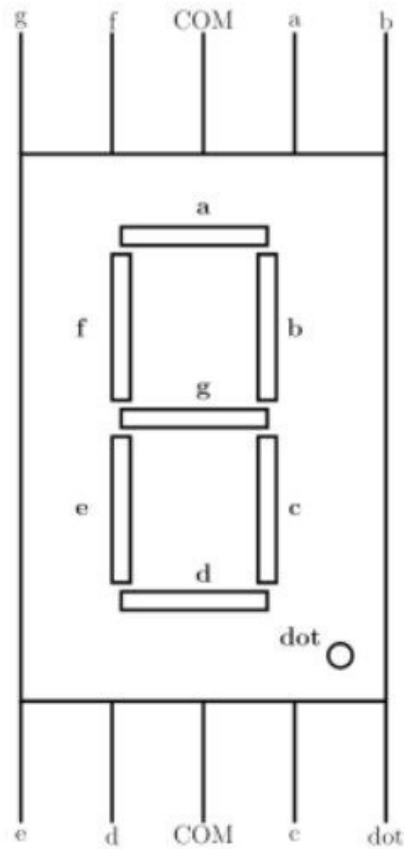


Fig. 5. 7 segment display



Fig. 4. Decoder 7447

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

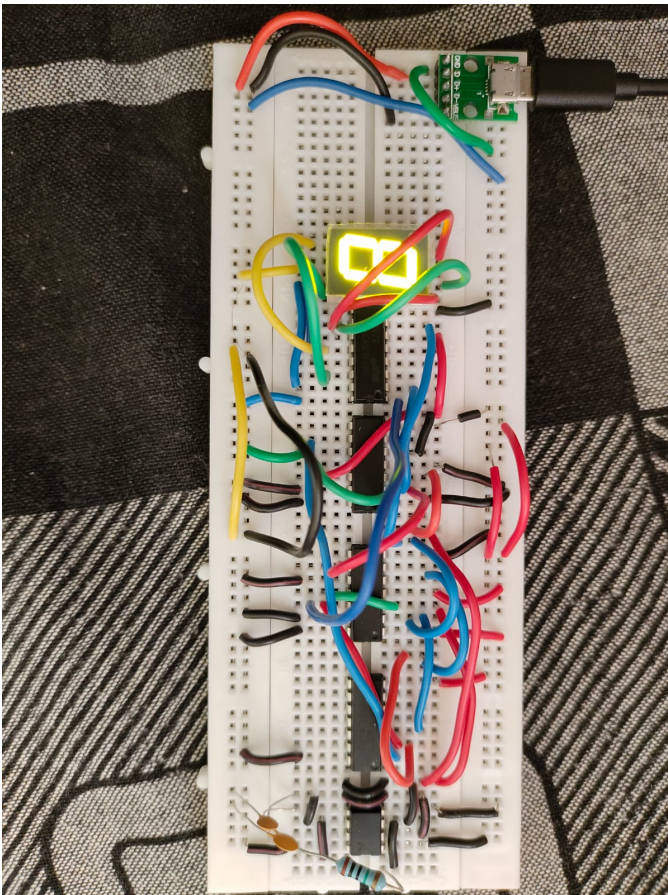


Fig. 7. output