Switching Circuits Laboratory (CS29002)

Assignment 3

January 28, 2025

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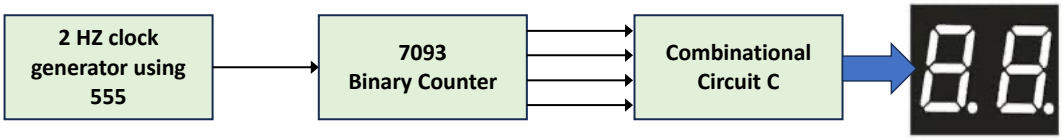
Overall Assignment Plan



Part-a: Design of combinational circuit C and display the output

Part-b: Design a rectangular wave generator using 555 timer

Part-c: Use a 7093 4-bit counter and realize the above diagram

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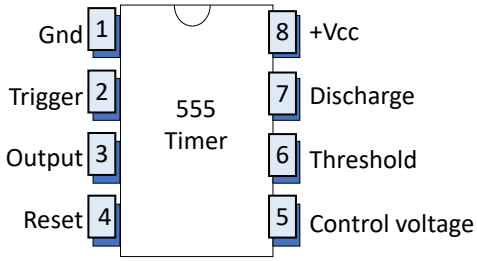
555 Timer IC Timer

- The 555 timer has essentially two modes of operation:
  - Astable (free running) multivibrator and
  - Monostable (one shot) multivibrator



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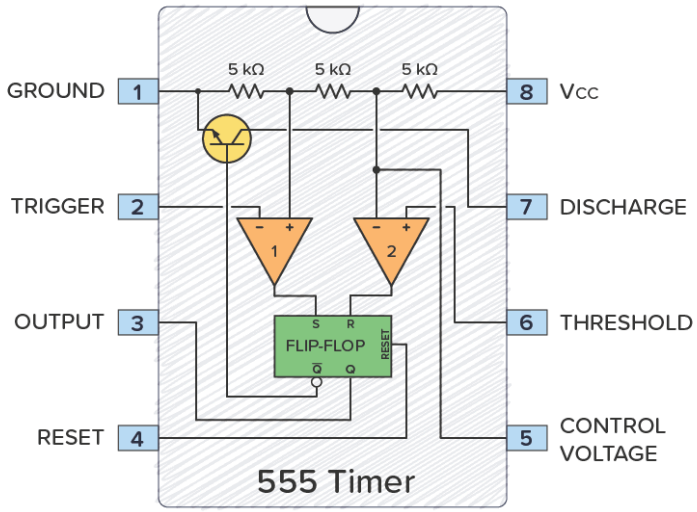

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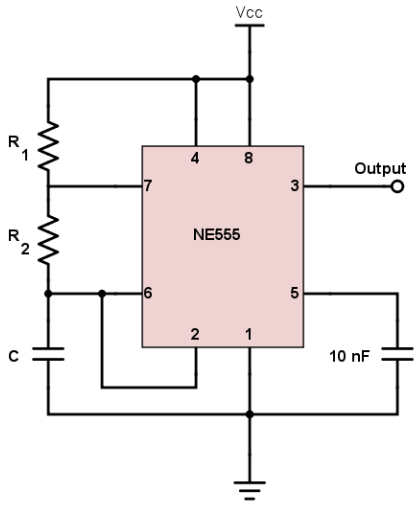
Astable Multivibrator using 555 Timer

- The astable multivibrator refers to a free-running oscillator that outputs a rectangular waveform and requires no trigger input.



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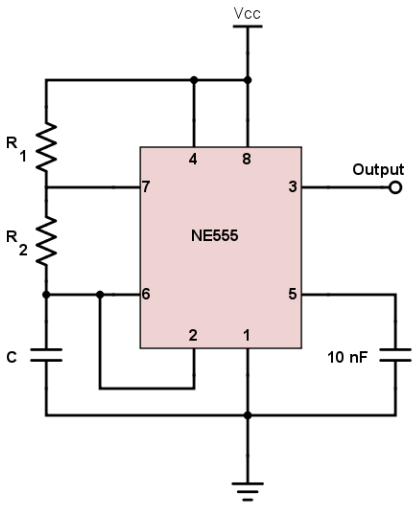

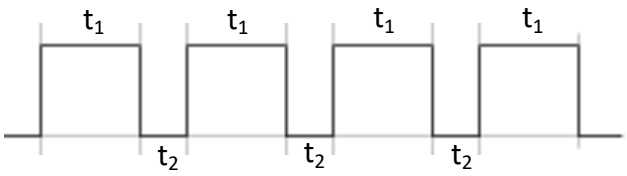

ON period	$t_1 = 0.693 (R_1 + R_2) C$
OFF period	$t_2 = 0.693 R_2 C$
Time period	$T = t_1 + t_2$ $= 0.693 (R_1 + 2R_2) C$
Frequency	$f = 1 / T = 1.44 / ((R_1 + 2R_2) C)$
Duty Cycle	$DC = t_1 / T \times 100\ \%$

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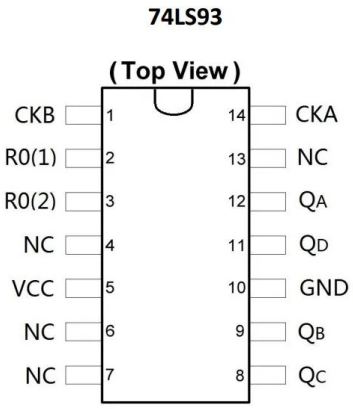
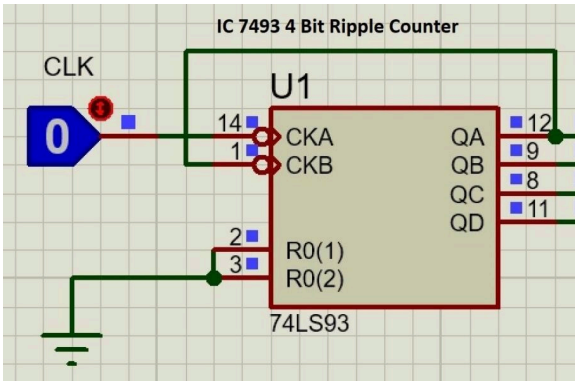
TTL 7493 Binary Counter





Q_D is the MSB, and Q_A is the LSB

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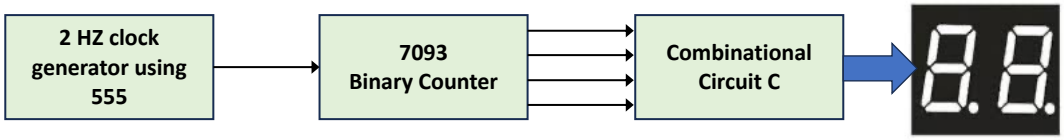

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