

# Digital Systems & Microcontrollers

## Tutorial Quiz 5

October 14, 2025

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### Set A

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Design a 4 bit Serial Adder using D Flip-Flops.

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### Set B

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Design a 4 bit Serial Adder using JK Flip-Flops.

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# Digital Systems & Microcontrollers

## Tutorial Quiz 5

October 15, 2025

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### Set A

- a) What is a shift register? What is the difference between unidirectional, bidirectional and universal shift register?
  - b) Draw four-bit universal shift register as a black box with necessary input and output pins.
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### Set B

- a) What is the difference between binary ripple counter and BCD ripple counter?
  - b) Draw a 4-bit Binary ripple counter using T flip-flops as a black box with necessary input and output pins.
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# Digital Systems & Microcontrollers

## Tutorial Quiz 5

October 16, 2025

### Set A

Design a 4-bit Parallel-In Parallel-Out (PIPO) register using D flip-flops.  
Explain how data is loaded and read from the register in a single clock cycle.

### Set B

Design a 4-bit Synchronous Binary Counter using JK flip-flops.  
Show the logic diagram and explain how all flip-flops are triggered simultaneously.

# Digital Systems & Microcontrollers

## Tutorial Quiz 5

October 16, 2025

### Set A

Draw the logic diagram of a four-bit binary ripple countdown counter using flip-flops that trigger on the positive edge of the clock.  
Explain the connections and the sequence of operations that result in a countdown.

### Set B

Draw the logic diagram of a four-bit binary ripple countdown counter using flip-flops that trigger on the negative edge of the clock.  
Explain the connections and the sequence of operations that result in a countdown.