



United International University
QUEST FOR EXCELLENCE



CSE 1326: Digital Logic Design Lab Registers

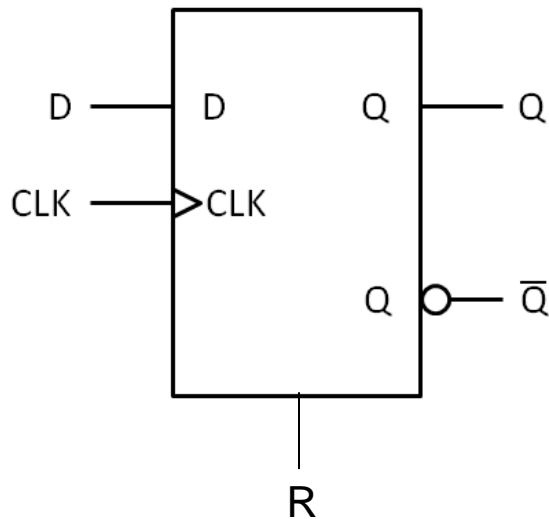
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Objective

- Implement Registers
 - Regular Registers
 - Select from multiple registers
 - Shift Registers
 - Registers with multiple functions

Flip Flop (FF)

- A circuit that stores 1-bit.
- There are different types of flip-flops, one of them is d FF.



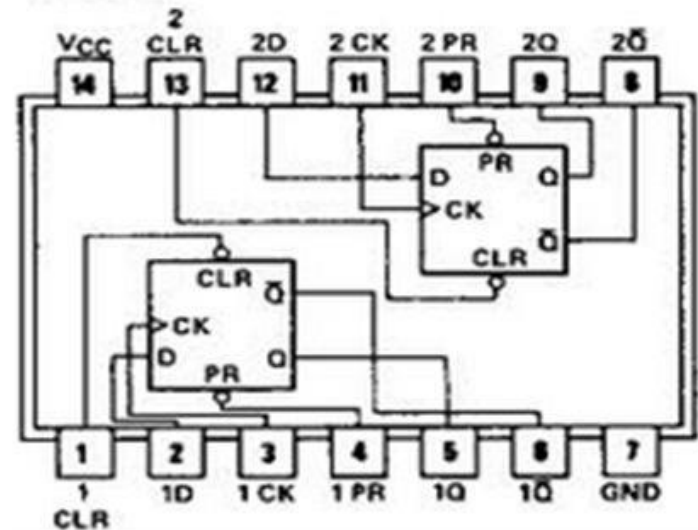
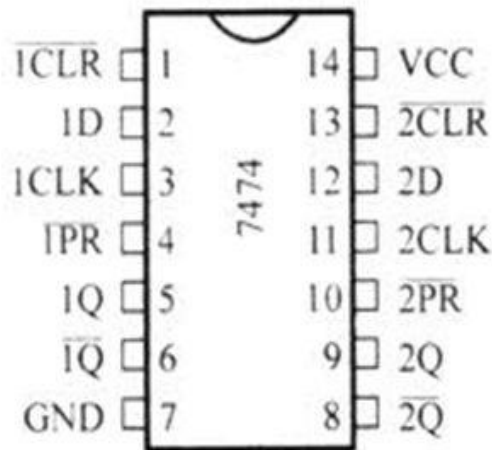
Symbol of D FF

R	Clk	D	Q	Q'
1	X	X	0	1
0	↑	0	0	1
0	↑	1	1	0

Functional Table of D FF

74AHC74-Dual D Flip-flop

Pin Diagram



Truth Table

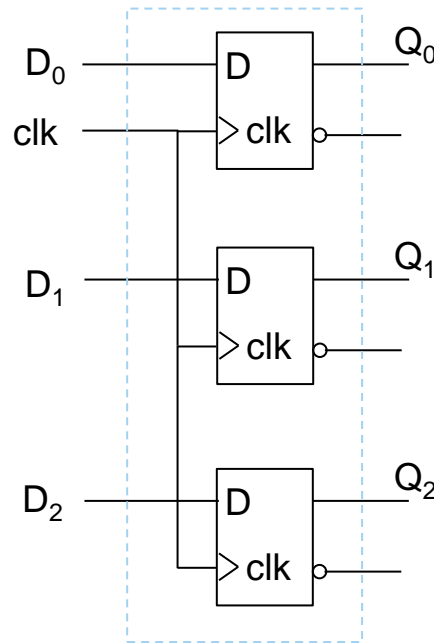
ENTREES				SORTIES	
PRESET	CLEAR	CLOCK	D	Q	\overline{Q}
0	1	X	X	1	0
1	0	X	X	0	1
0	0	X	X	1	1
1	1	\uparrow	1	1	0
1	1	\uparrow	0	0	1
1	1	0	X	Q_0	\overline{Q}_0
1	1	1	X	Q_0	\overline{Q}_0



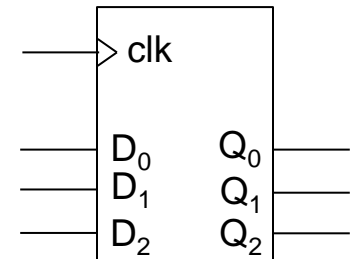
- Question:
 - If we want to store, say 3 bits, what should we do?

Register

- Use 3 FFs. An array of flip flops – called a register.
- What to do (1) Construct a 3-bit register - Logisim

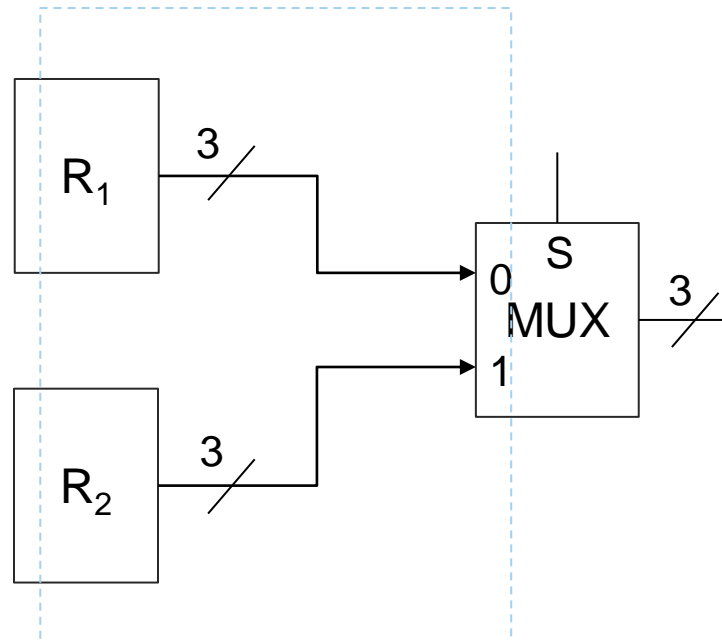


3-bit Register



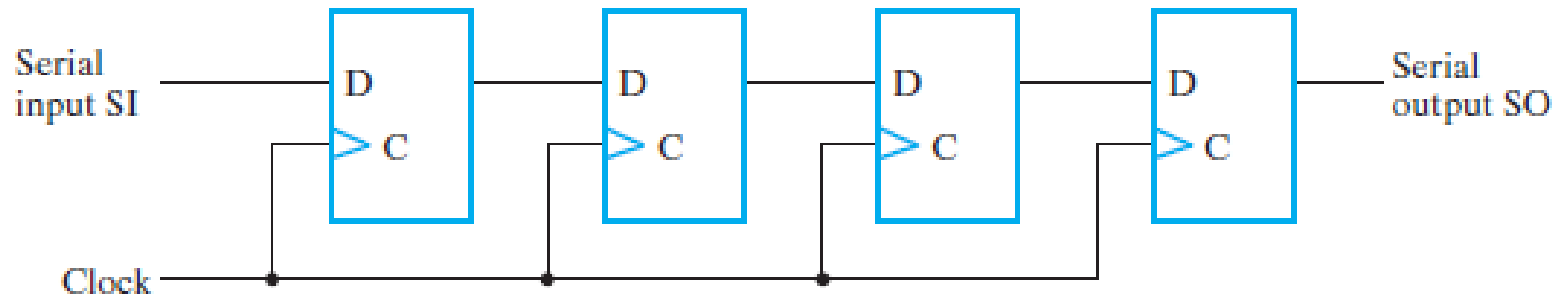
What to do

- (2) Select between two registers using a MUX - Logisim



What to do

- (3) Construct a 4-bit right shift register – Trainer board



- (4) Construct a left shift register - Logisim

What to do

- (5) Construct a 3-bit register with the functions given in the function table below – Trainer board

Mode Control		Register Operation
S_1	S_0	
0	0	No change (Hold)
0	1	Shift left
1	0	Shift right
1	1	Parallel load

Writing report

- ICs being used
- Logic diagram
 - (1) Construct a 3-bit register
 - (2) Select between two 4-bit registers using MUX
 - (3) Construct a right shift register
 - (4) Construct a left shift register
 - (5) Construct a 3-bit register with the functions given in the function table in the previous slide.