

# Outline

- ❏ Digital CMOS Design

- ❏ Arithmetic Operators

- ❏ Sequential Blocs

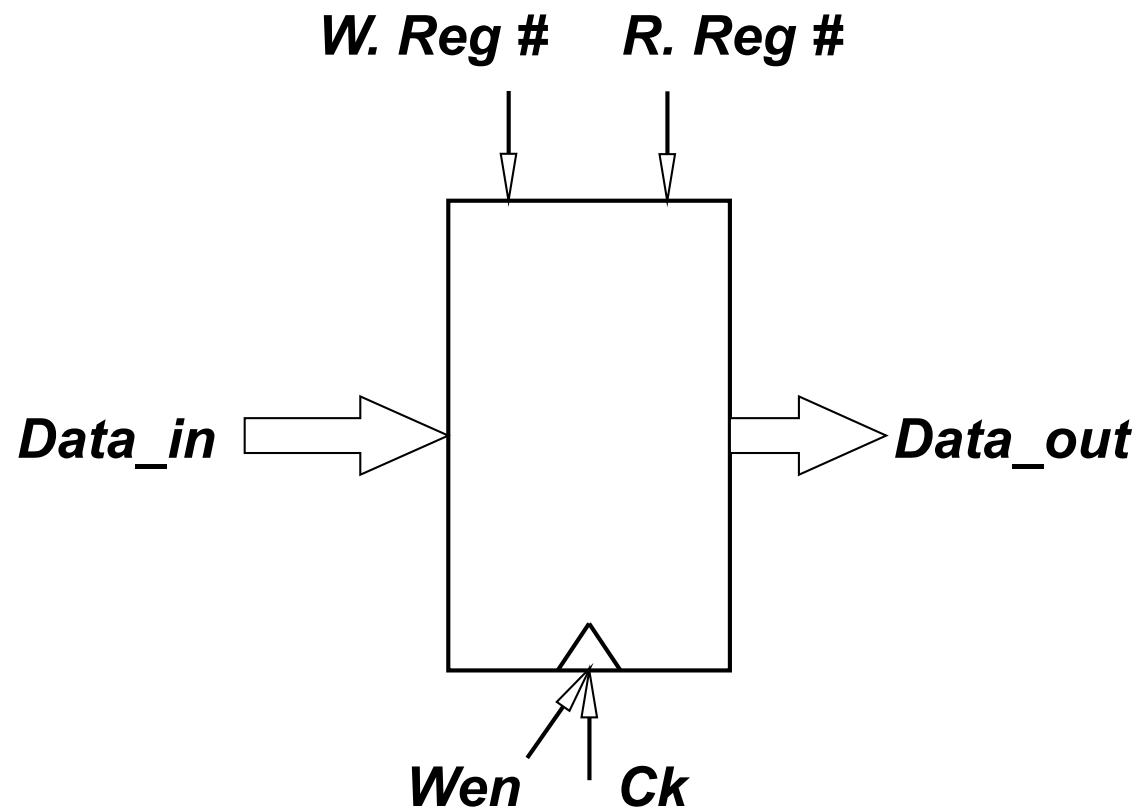
  - Register Files

  - Fifos

## Register files

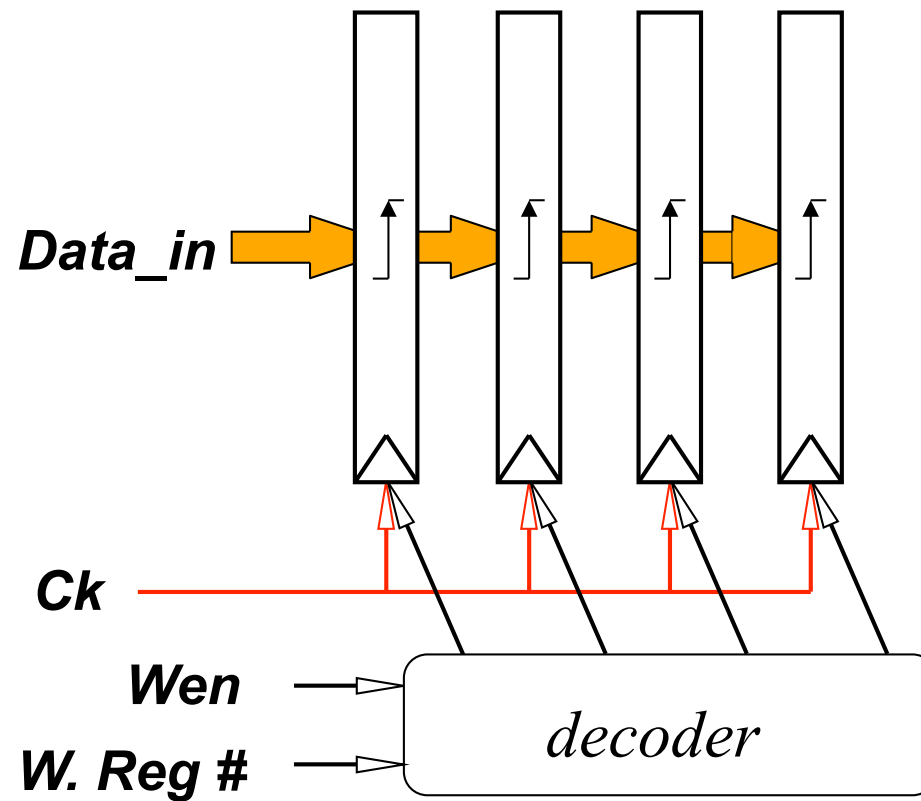
- A set of registers with the same size  $n$ -bit
- At each cycle a data can be written into one register
- At each cycle a data can be read from one register

# Register files



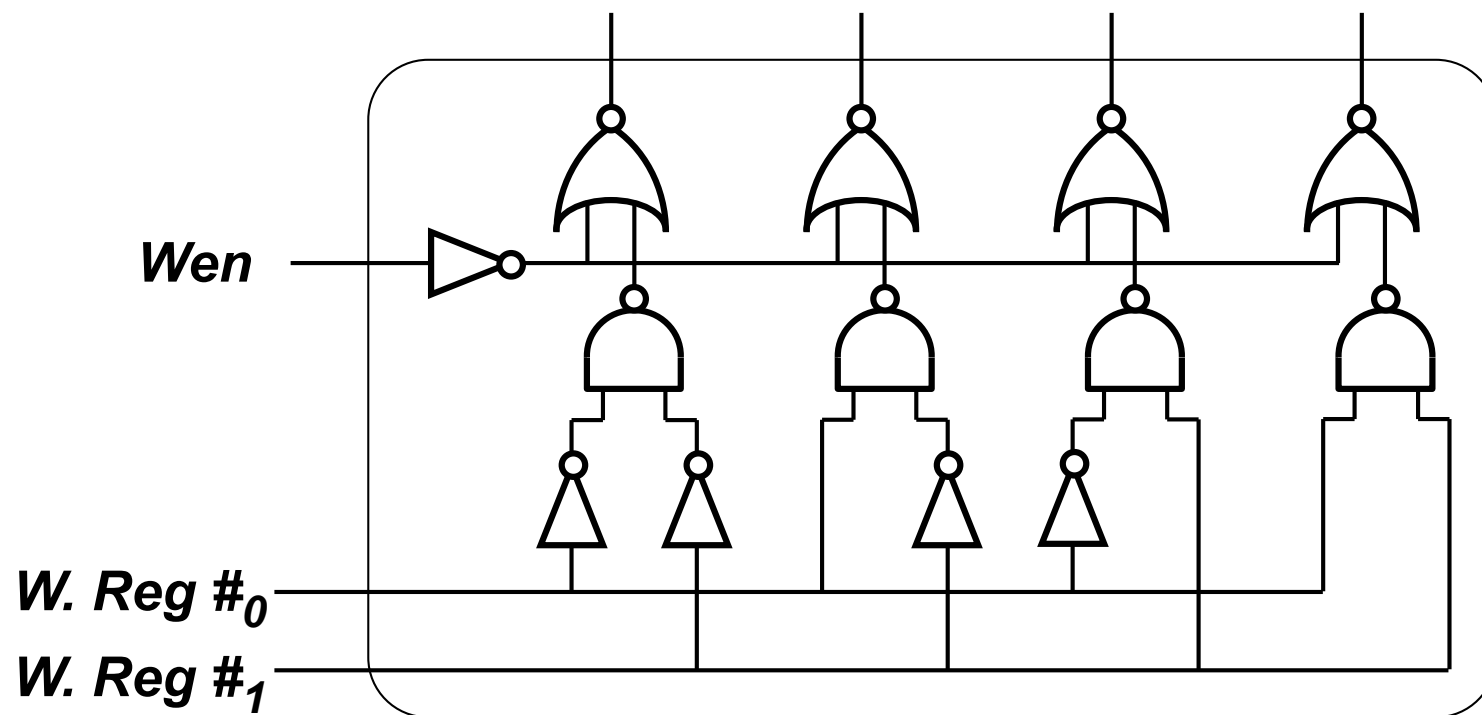
# Register files

Write function



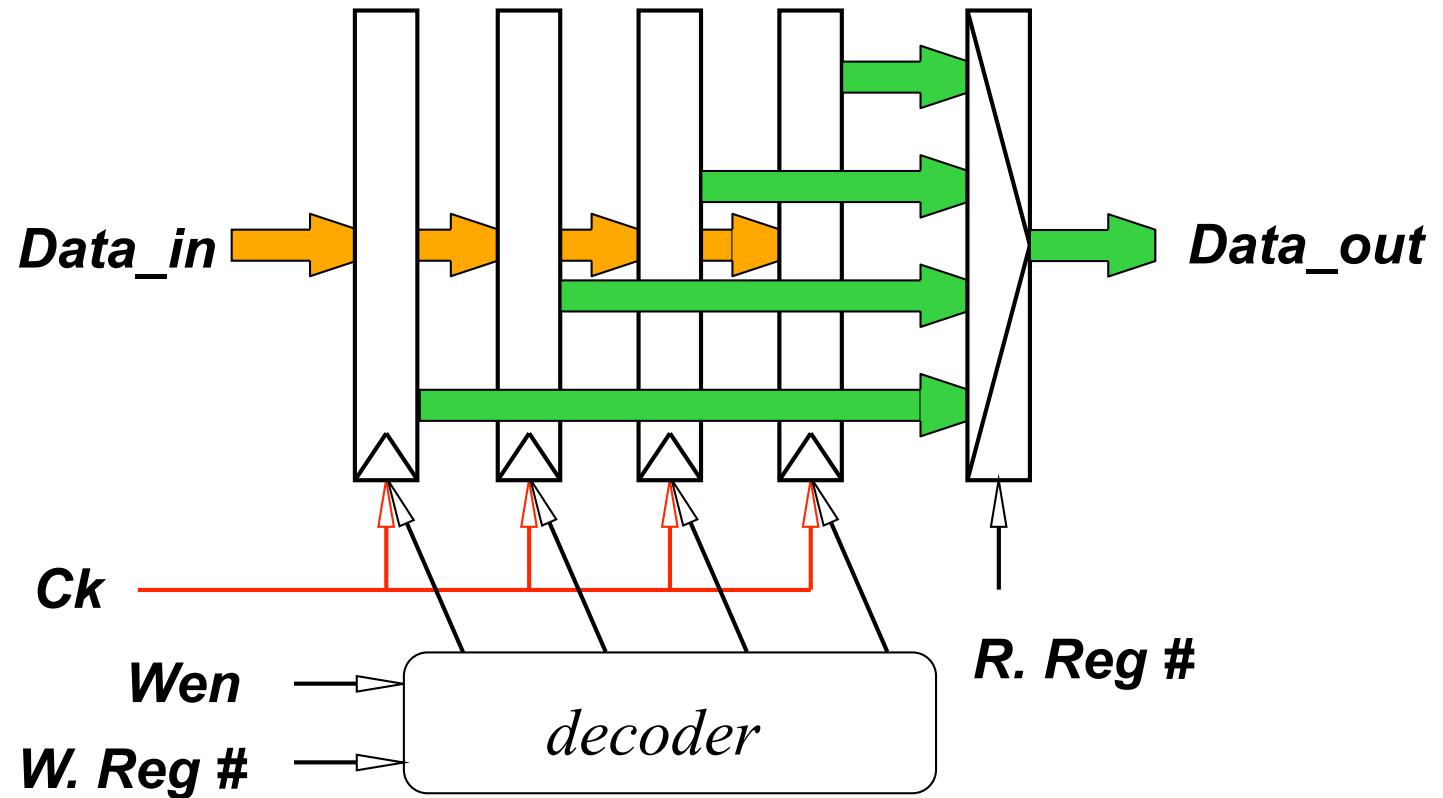
# Register files

Write function



# Register files

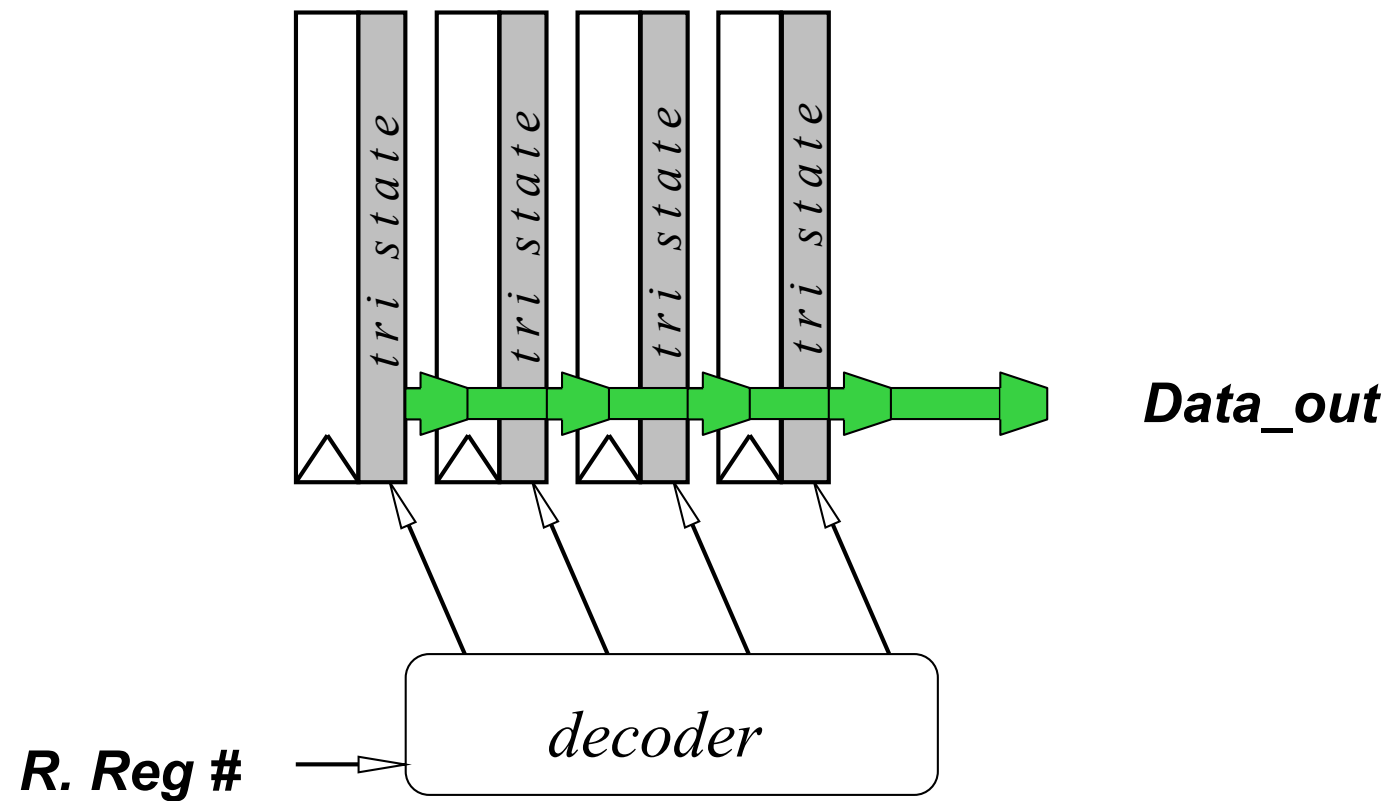
## Read function



Hardware implementation

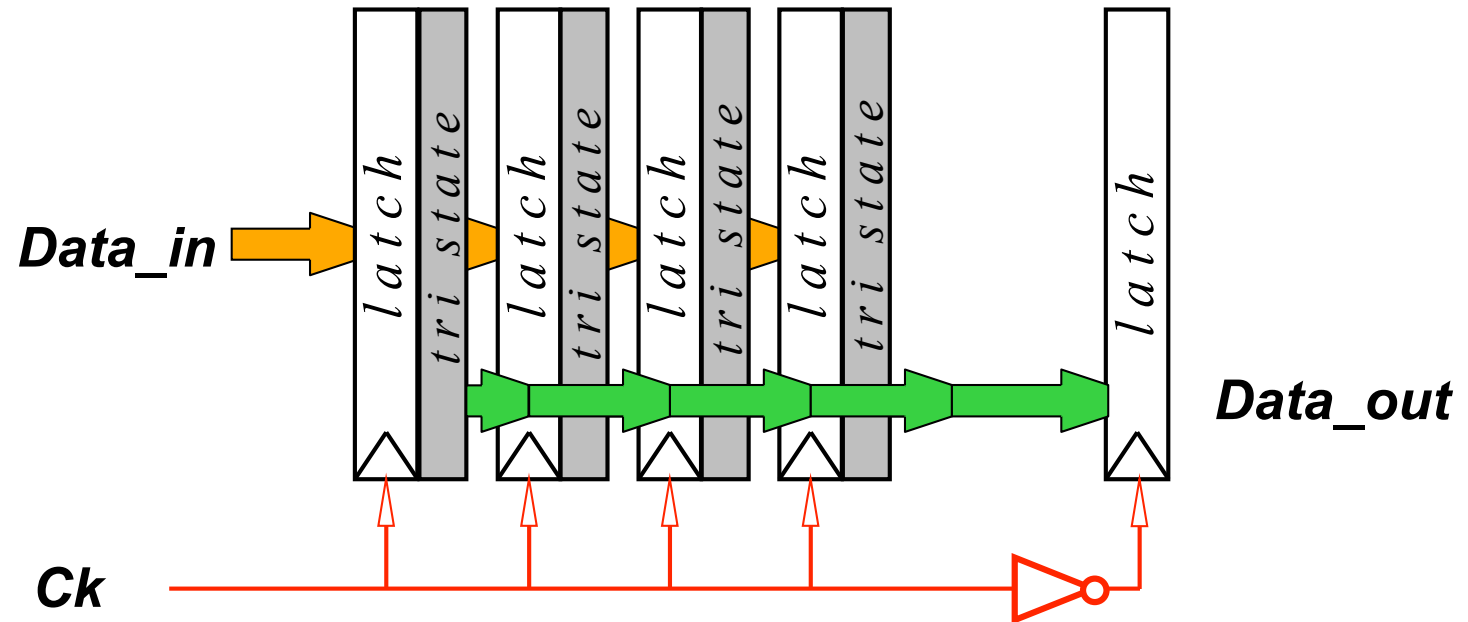
# Register files

Read function



# Register files

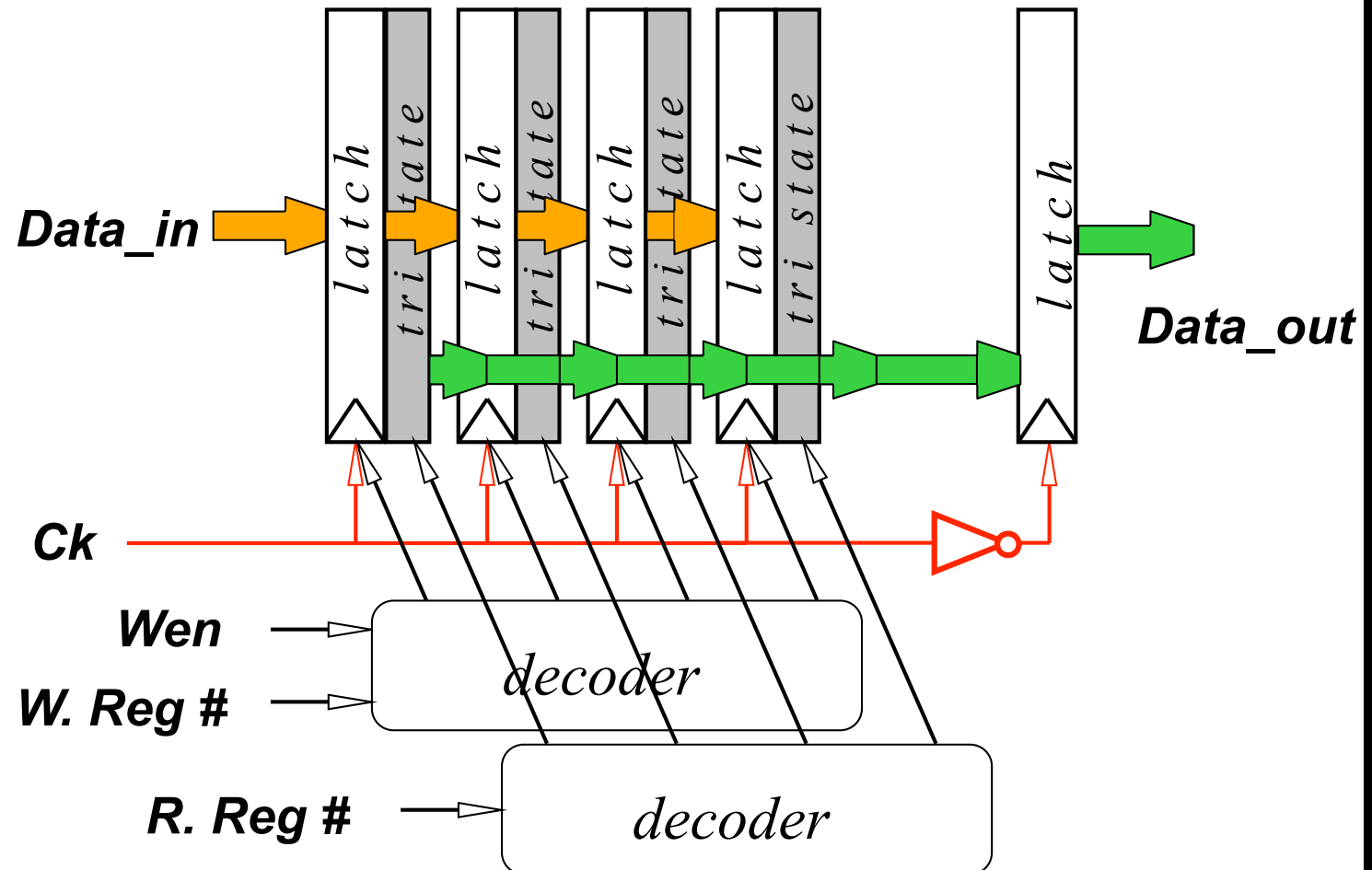
There is no move of data inside the register file





# Register files

Putting all together



# Outline

- Digital CMOS Design

- Arithmetic Operators

- Sequential Blocs

  - Register Files

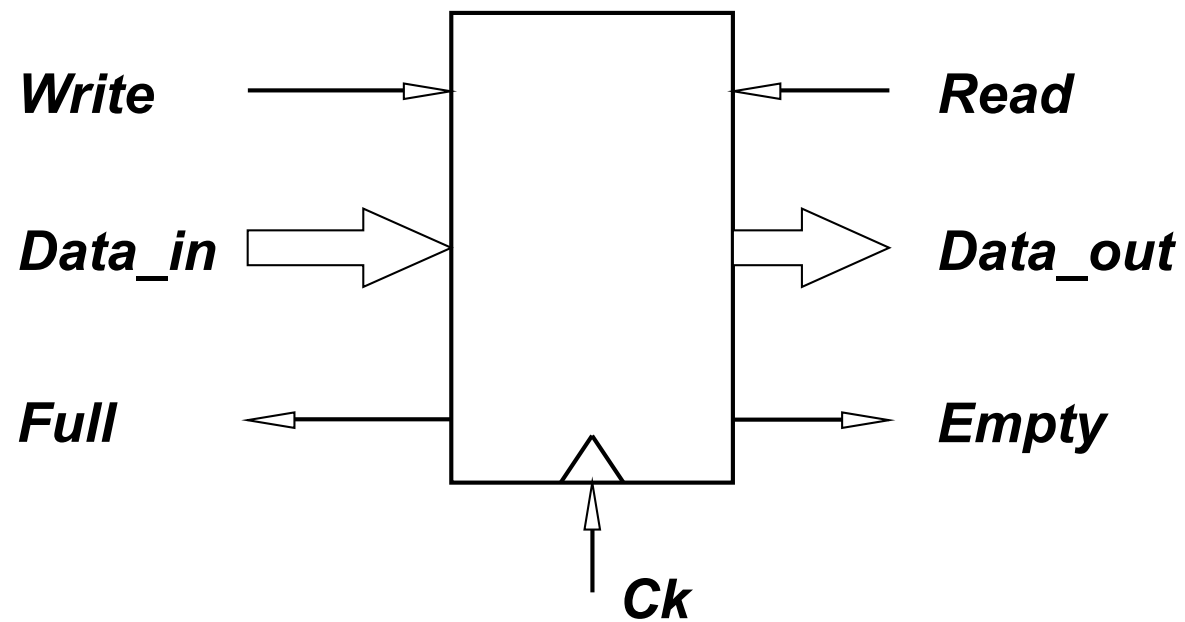
  - Fifos



## FiFos

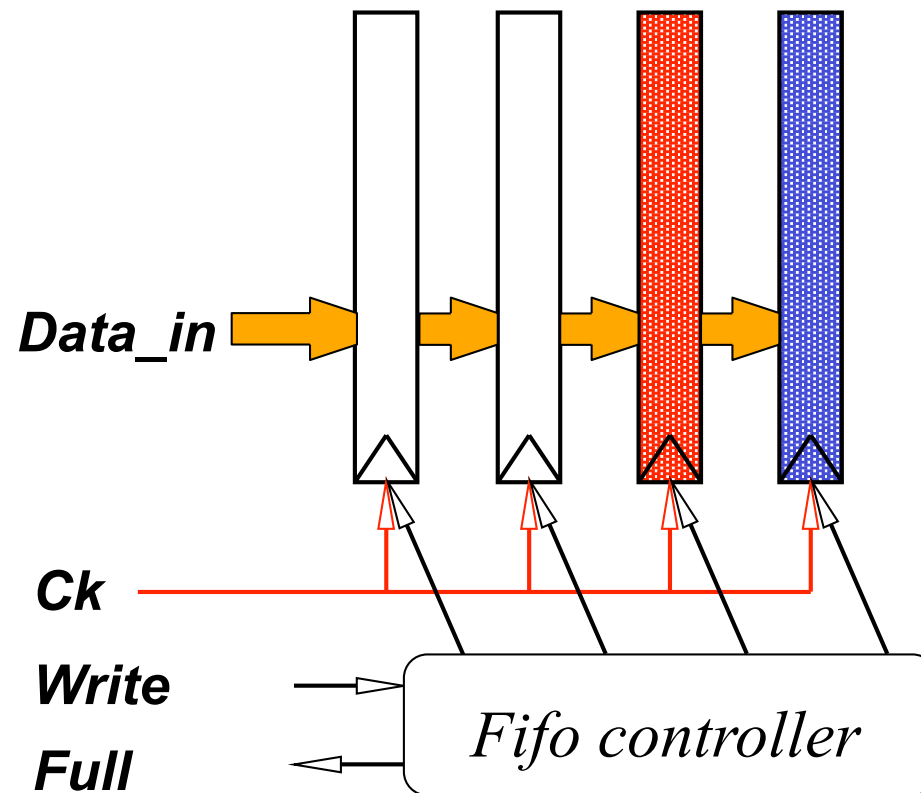
- A set of registers with the same size  $n$ -bit
- At each cycle a data can be written into the Fifo
- At each cycle a data can be read from the Fifo
- Data are read in the same order as they are written

# Fifos



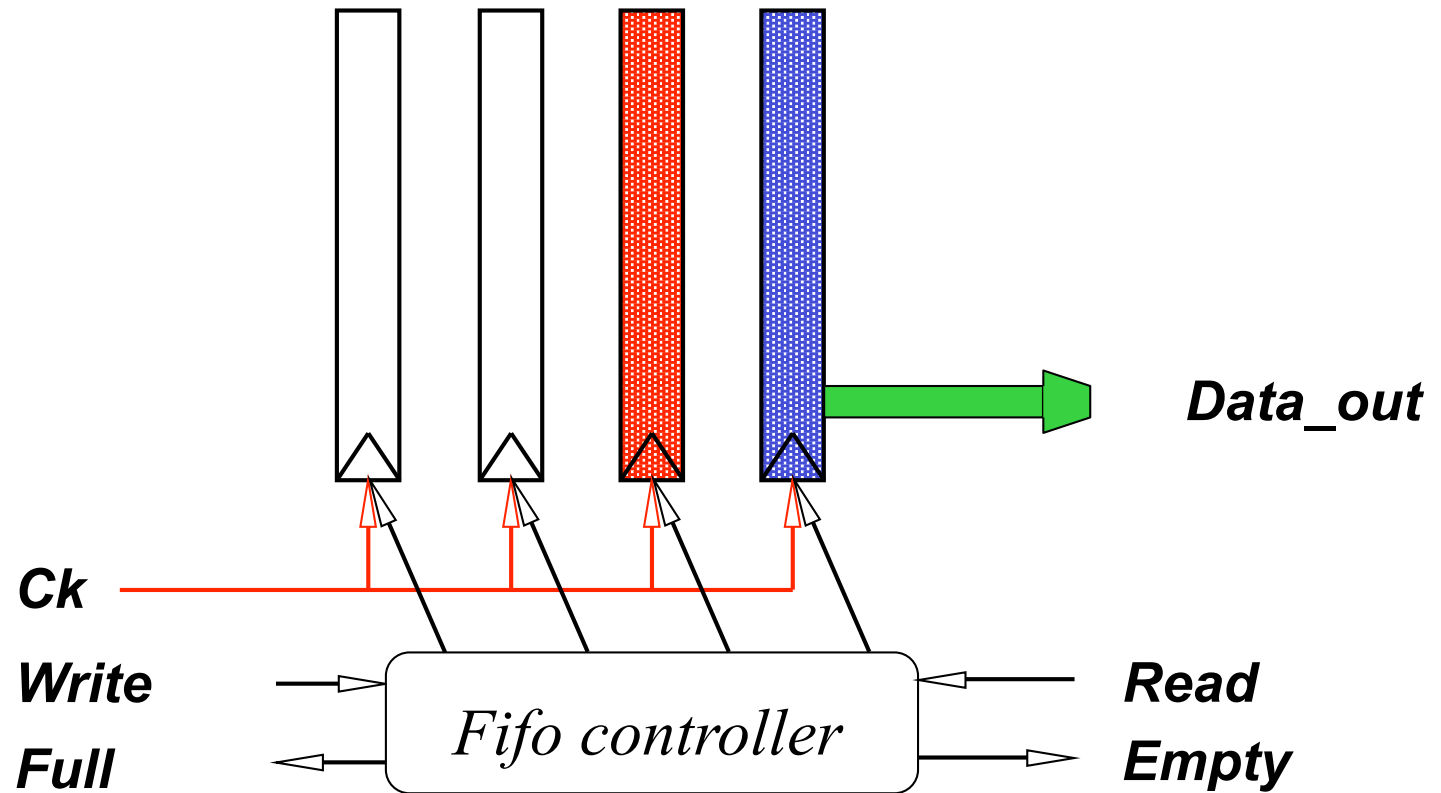
# Fifos

Write function



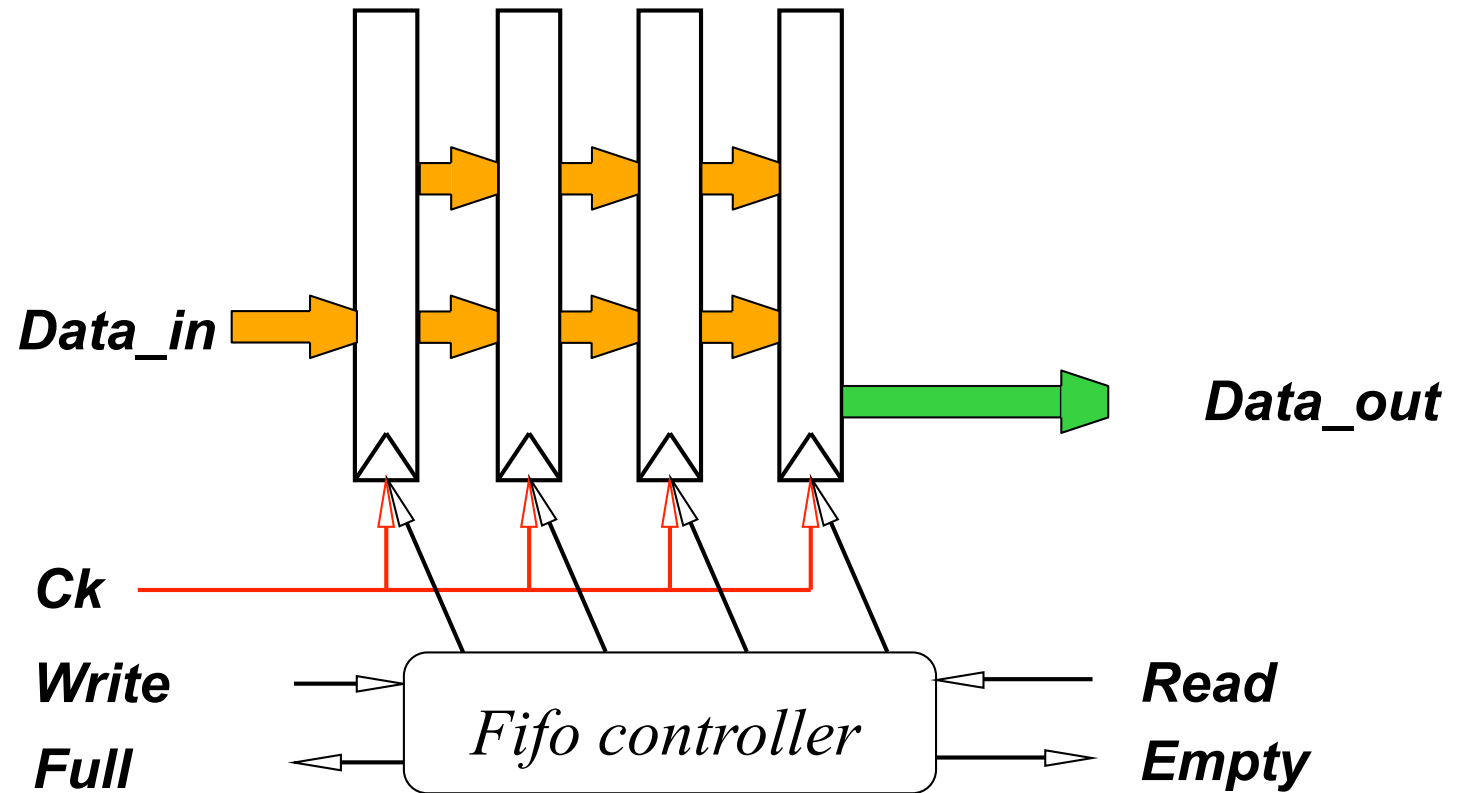
# Fifos

Read function



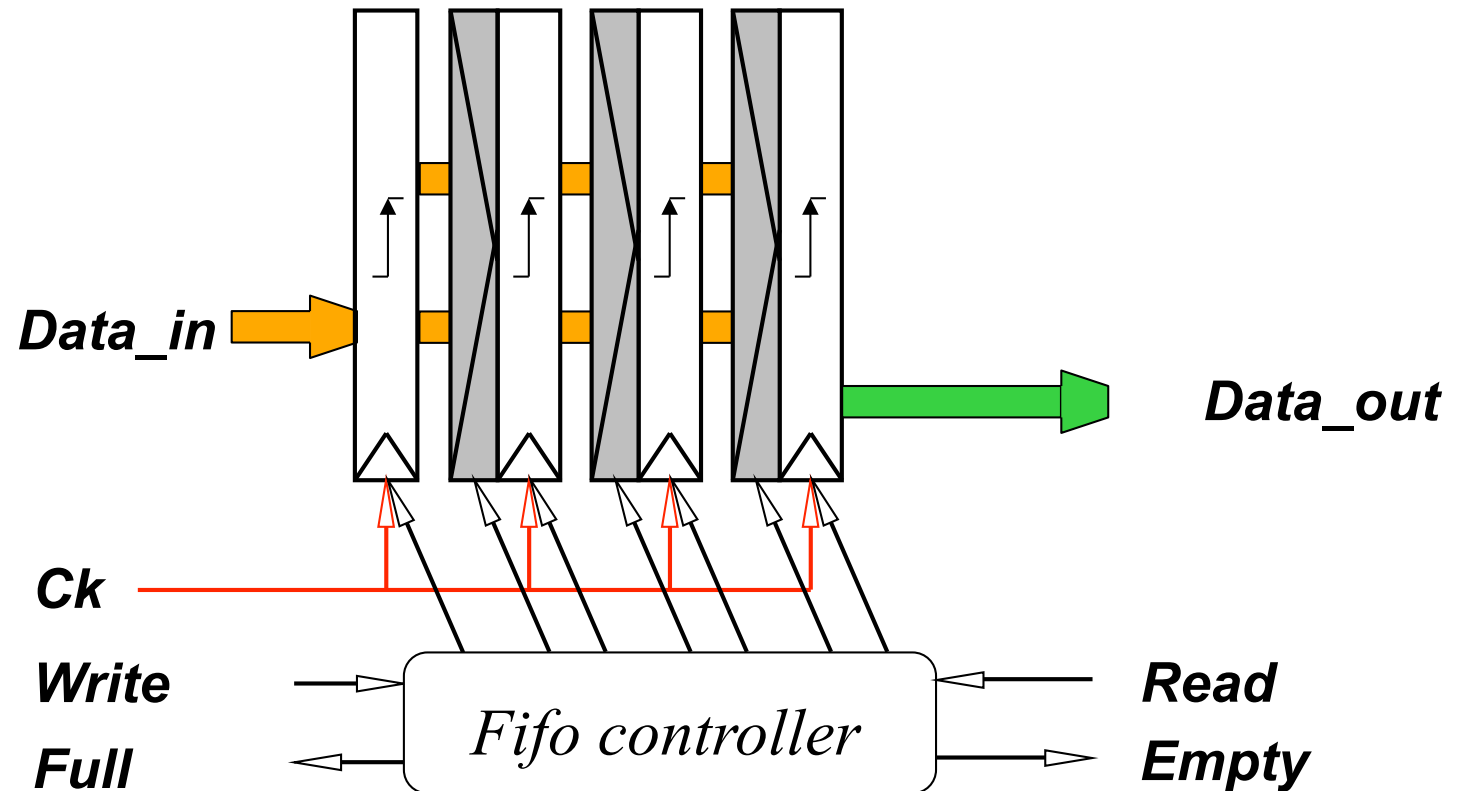
# Fifos

Read function



# Fifos

Read function

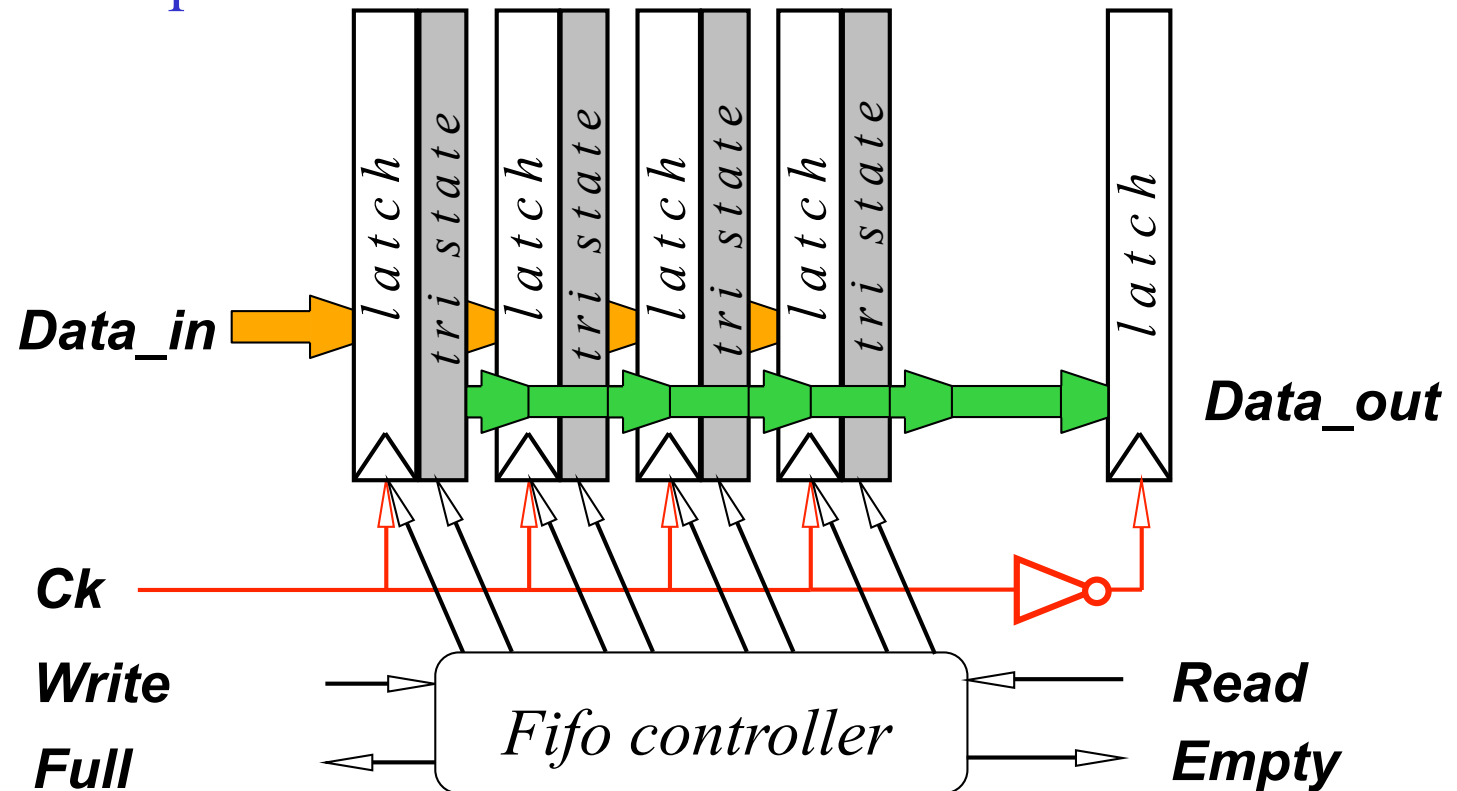


Data are moved inside the Fifo



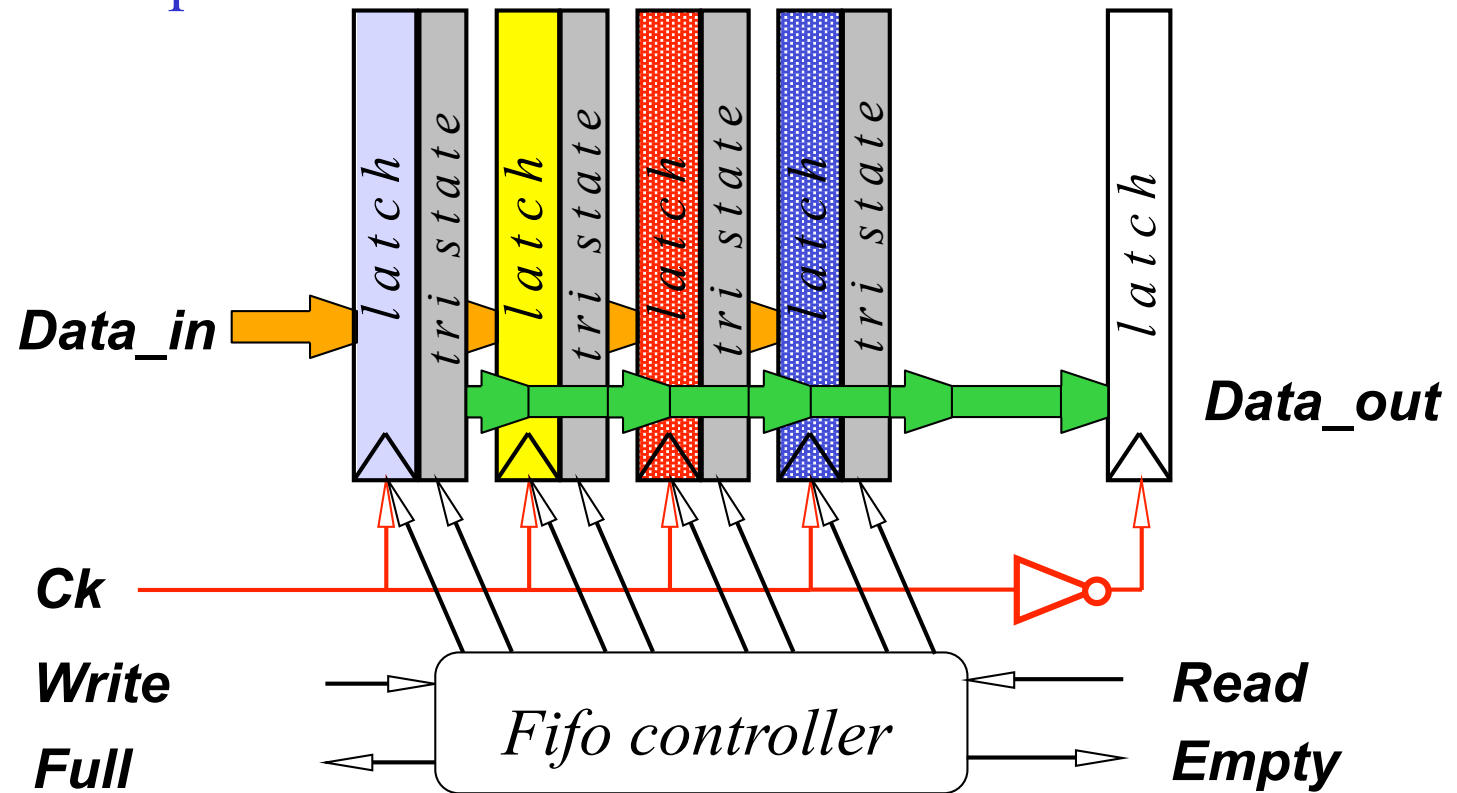
# Fifos

## Improved implementation



# Fifos

## Improved implementation



## Circular Fifo