

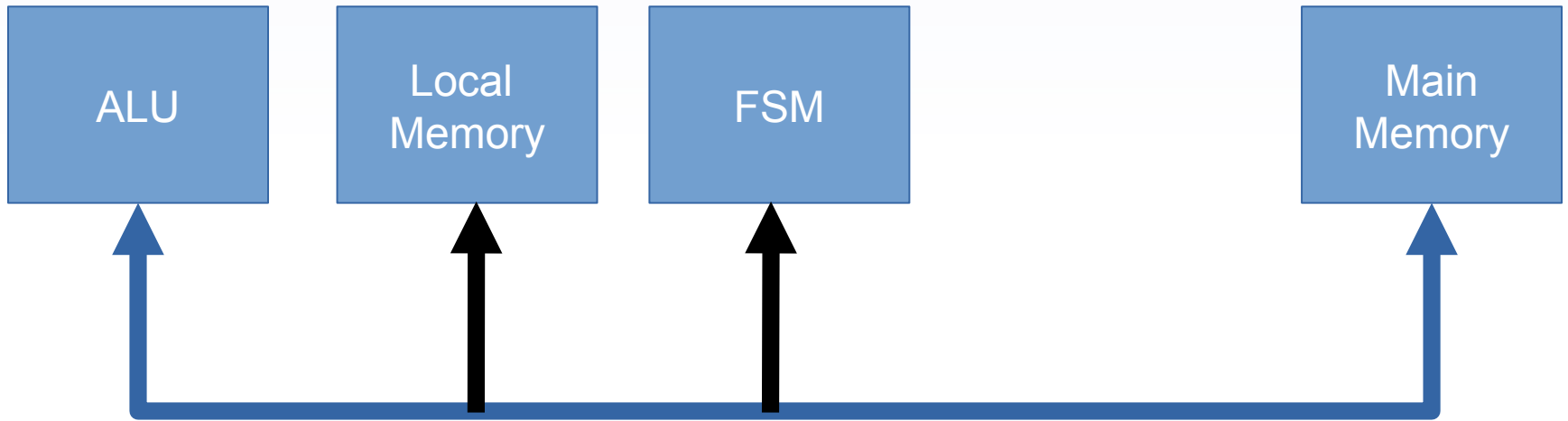
# Multiple Digital Systems

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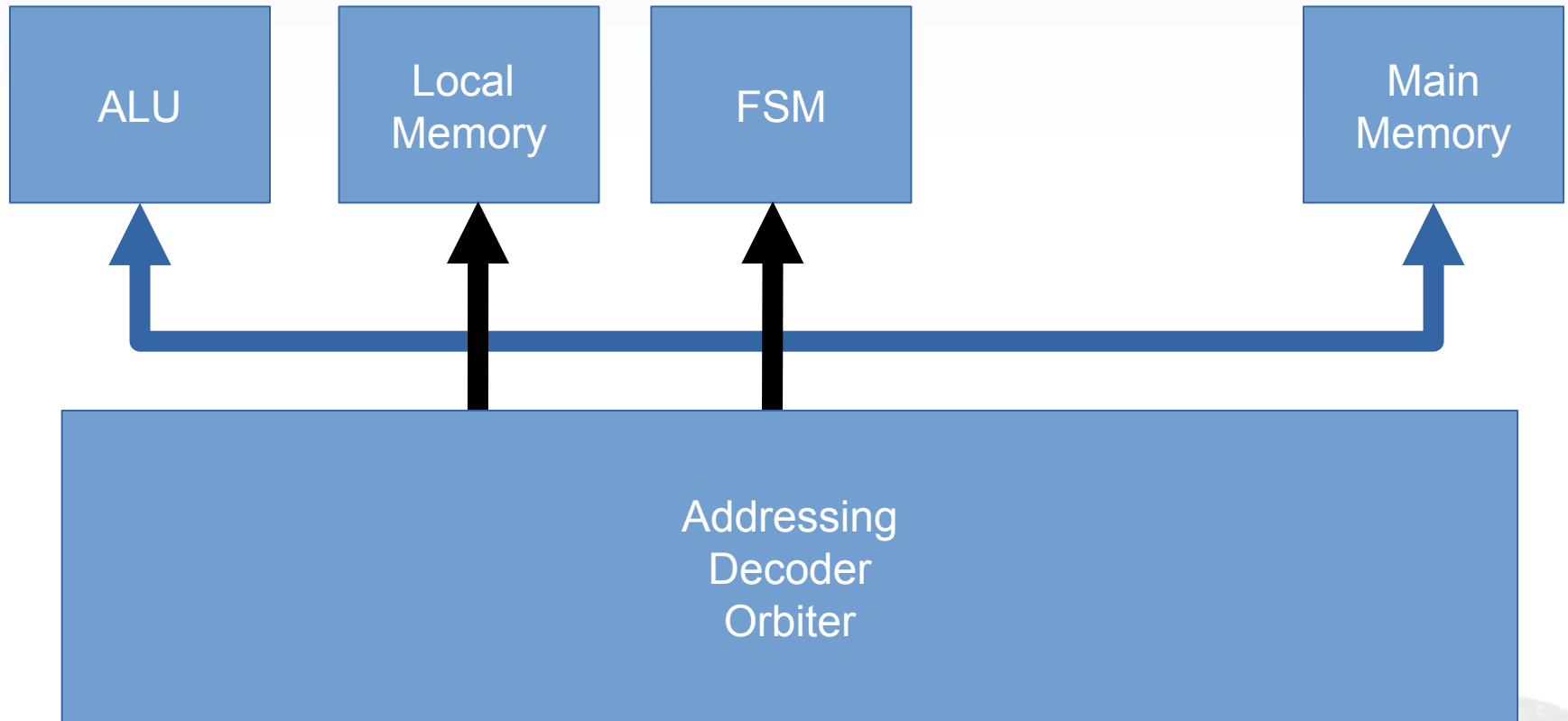
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# Multi System Architecture



# Multi System Architecture



# Address Space

An address space defines a range of discrete addresses, each address space of which may correspond to different digital systems, such as peripheral device, disks, memories or other logical or physical entity.

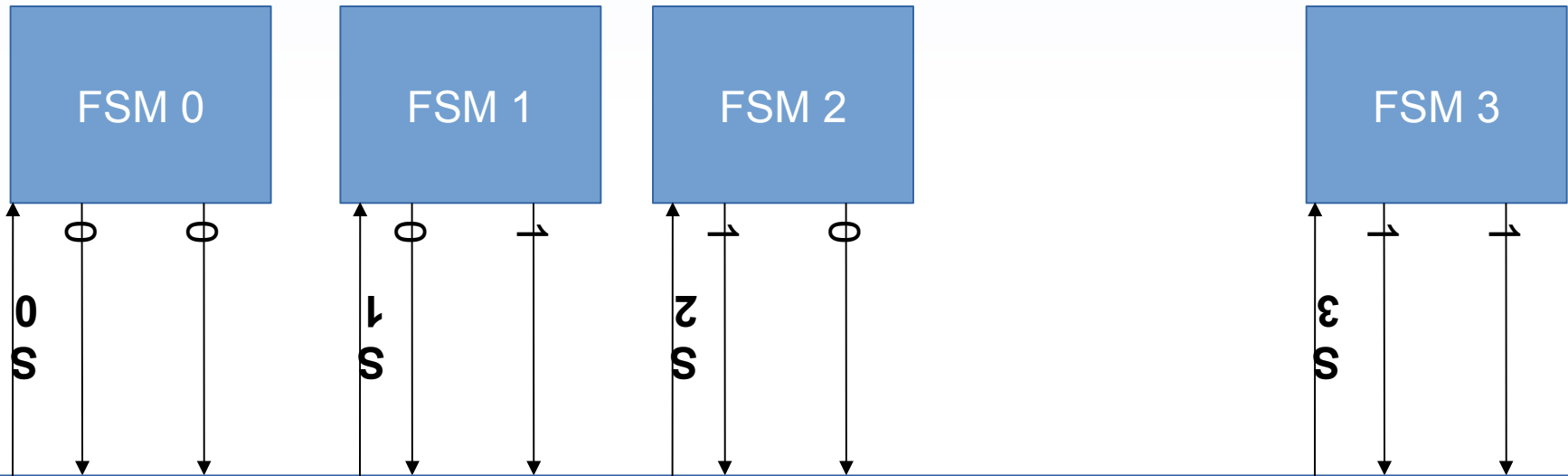
# Example

A system has 8 bit address bus.

How many components can be accessed by the system.

$$2^{\text{address bus}} = 256$$

# Address Bus = 2 bit



Addressing  
Decoder  
If address = 00  
FSM = Enable  
Else.....

# Address Mapping

For 8 bit address bus we have Address range  
from

$$0\ 0\ 0\ 0\ 0\ 0\ 0\ 0 = 0x00 = 0$$

$$1\ 1\ 1\ 1\ 1\ 1\ 1\ 1 = 0xFF = 256$$

# Address Allocation

- Depending upon requirement we allocate addresses.
- Suppose we have an I/O interface which controls 8 LEDs, 64 Byte Memory, Stepper Motor having 4 inputs and 64 Byte Main Memory.
- How many addresses are required to these components?



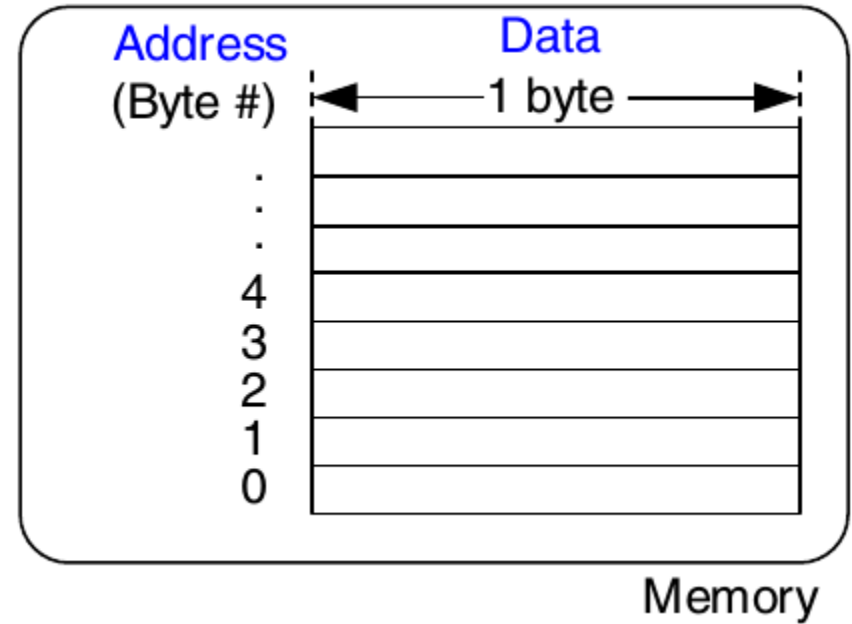
**8 Bit LED      =>    8 Addresses      =>    0000000 – 0000 0111**

**Local Memory   =>    64 Addresses   =>    0000000 – 0011 1111**

**Stepper            =>    4 Addresses      =>    0000000 – 0000 0011**

**Main Memory     =>    64 Addresses   =>    0000000 – 0011 1111**

# Memory



# Arbitration

An arbiter is a device used in a multi-system to decide which core/system is allowed to control the data transfer.

