Microprocessors

TE 258

WEEK 2: BASIC COMPUTER ORGANIZATION

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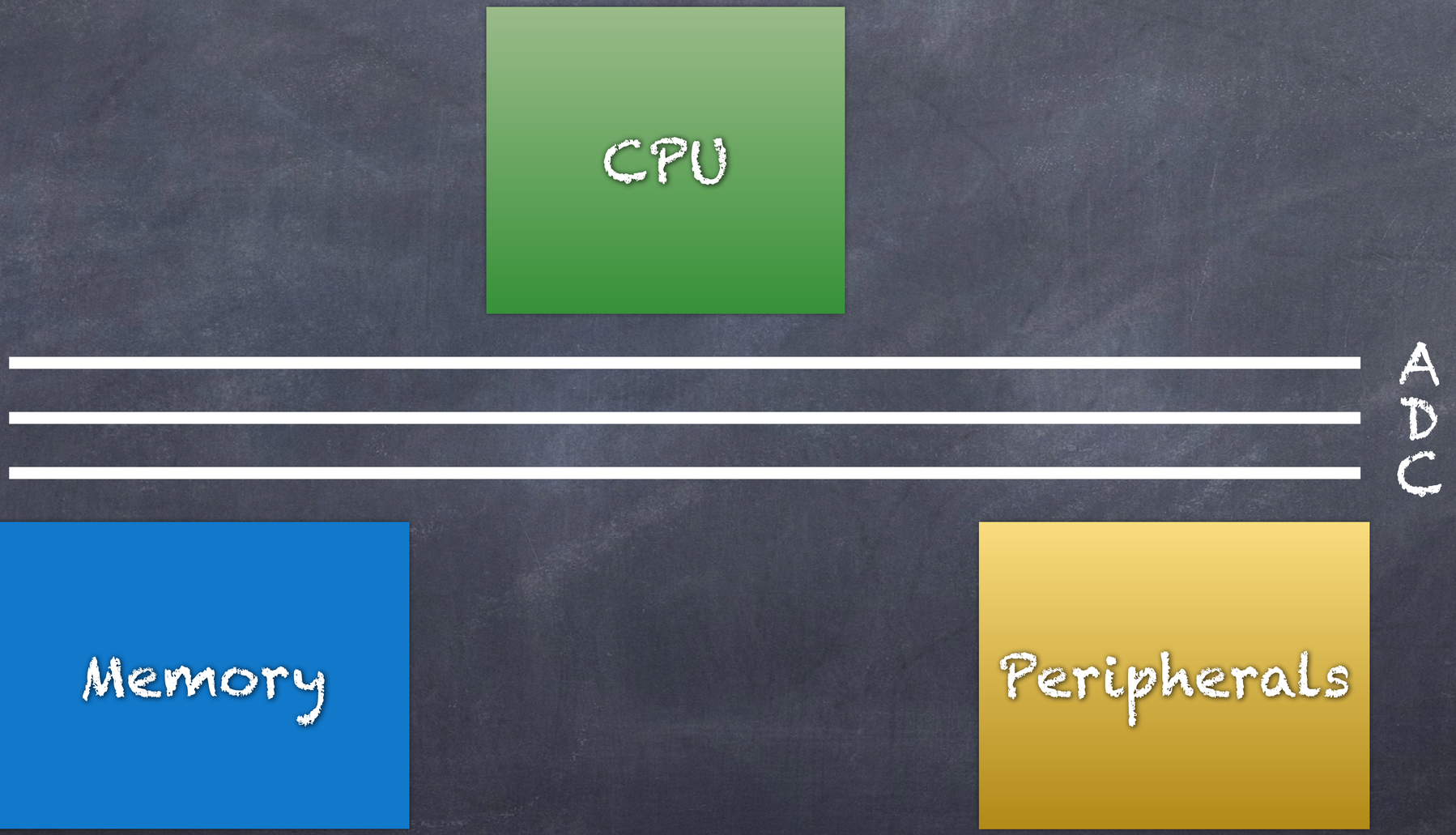
Microprocessors & Microcontrollers

Basic Computer Organization



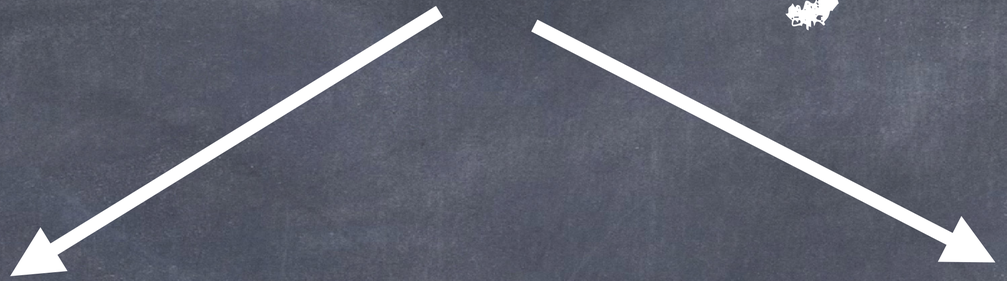
Memory Interfacing Problem

Example (Design):

Consider a CPU with a 16 bit address bus and an 8-bit data bus.

How do you interface 8 memory chips (2K x 4 bit) with it?

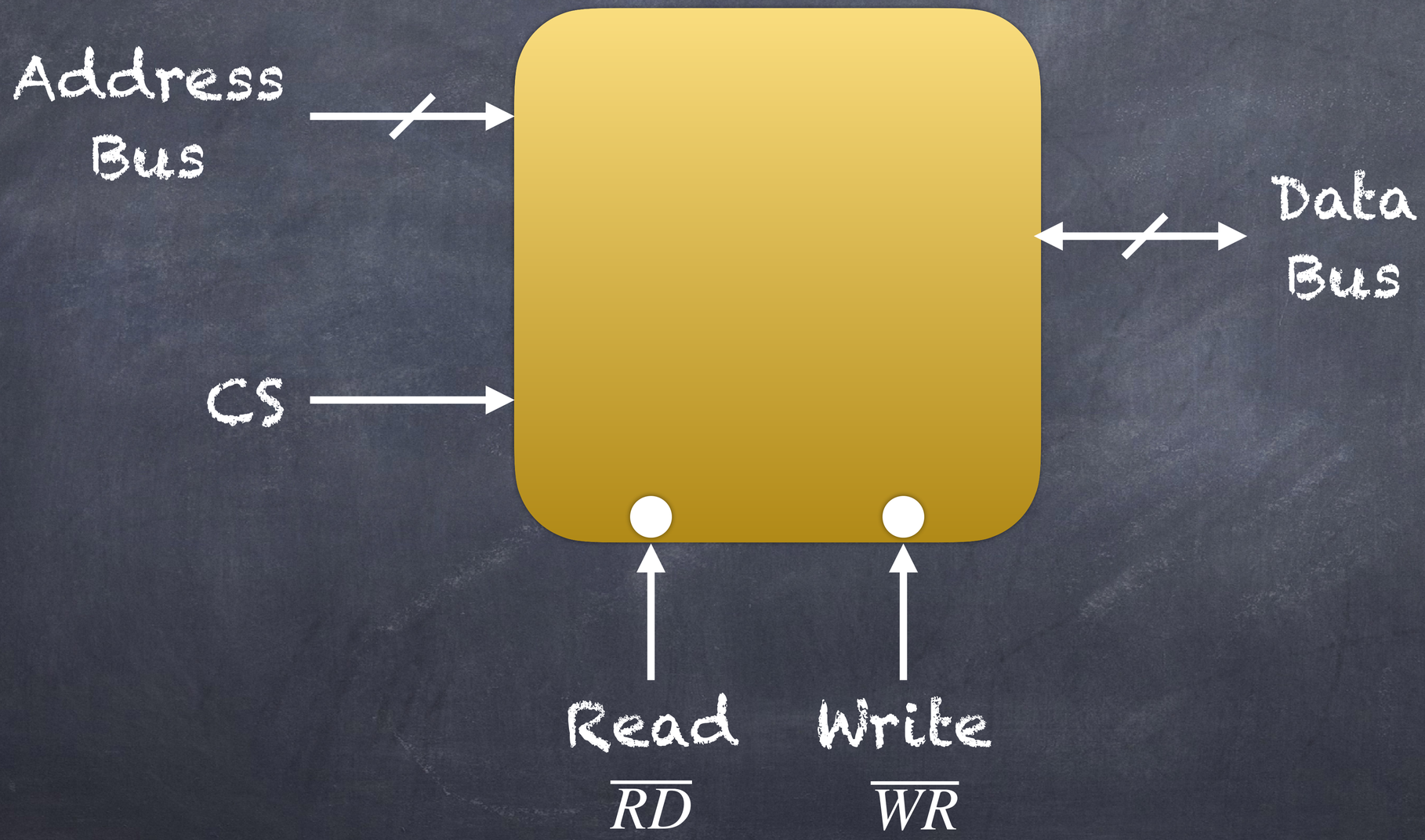
Memory



RAM

ROM

Memory



Memory Interfacing: ROM & RAM

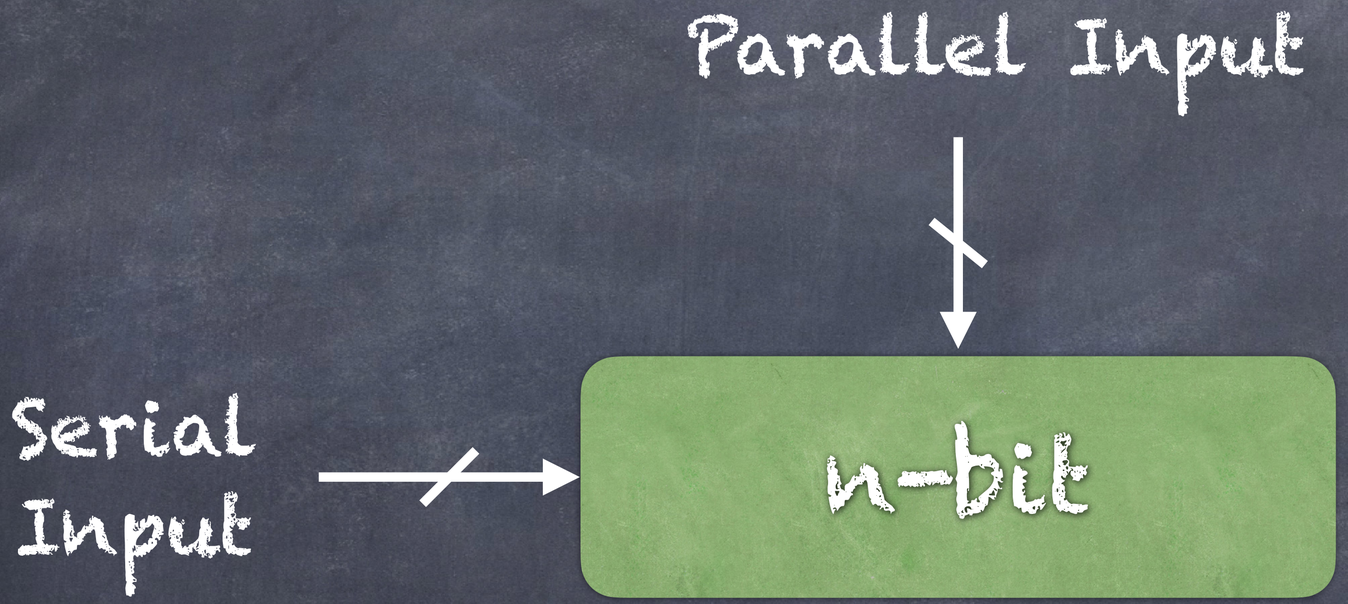
Example (Design):

8KB ROM, 16KB RAM.
CPU => 16 bit Address Bus, 8 bit Data Bus.

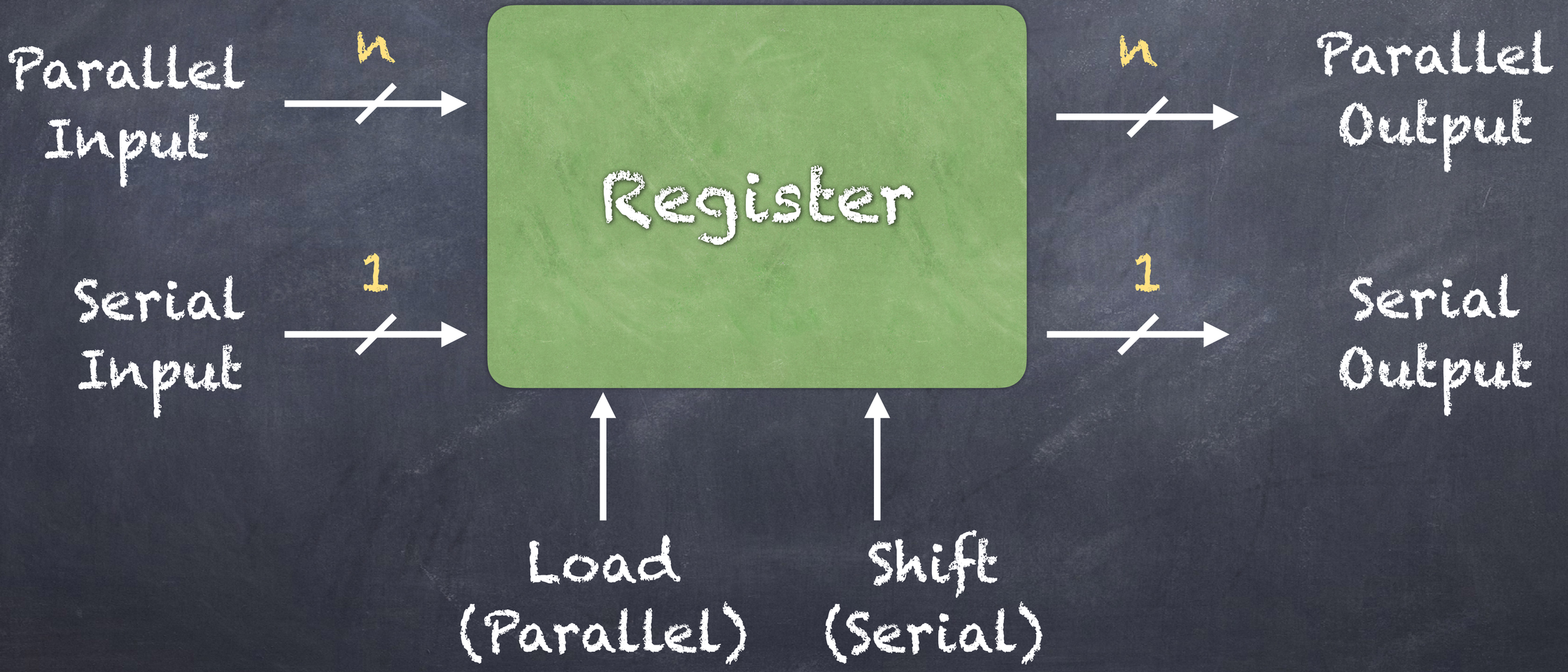
ROM Starting Address = 0000H
RAM Starting Address = 8000H

ROM/RAM Size = 4KB x 8 bit

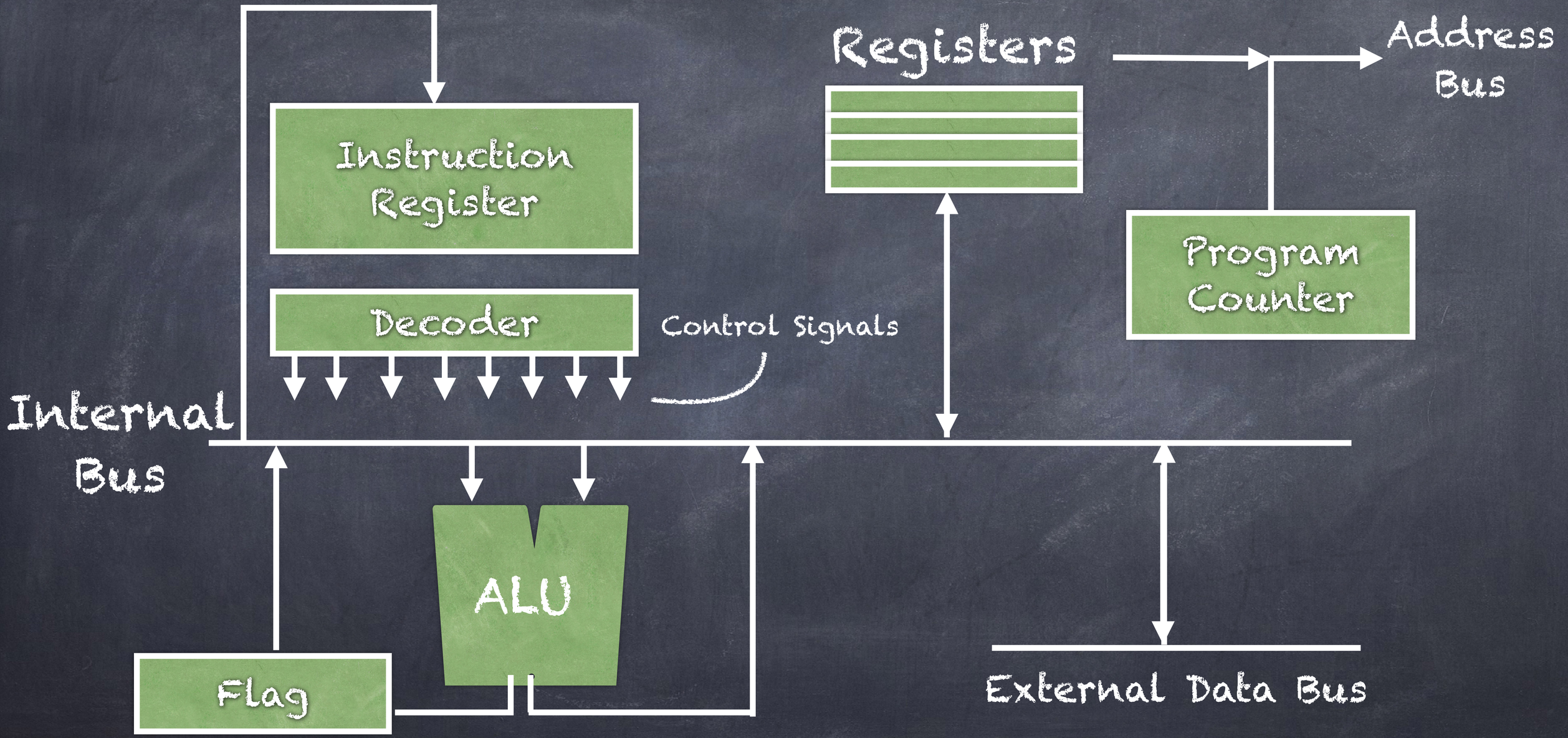
Register



Register

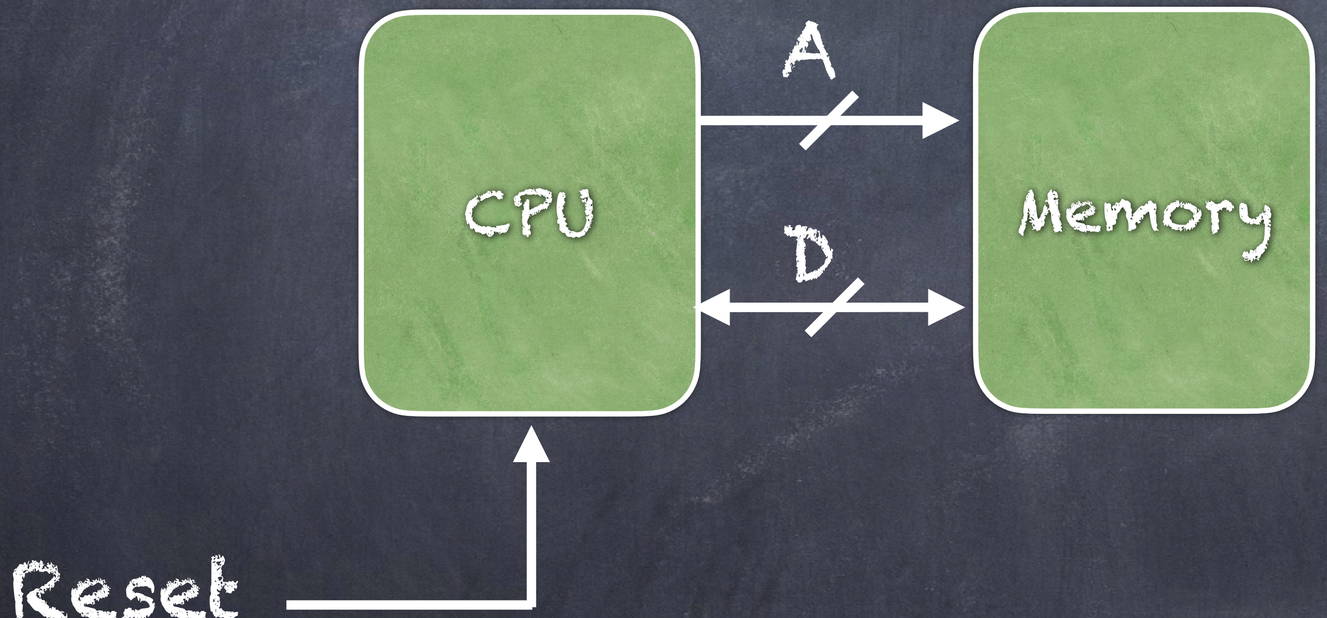

Parallel Input
n
Serial Input
1
Register
n
Parallel Output
1
Serial Output
Load (Parallel)
Shift (Serial)

Processor Internals

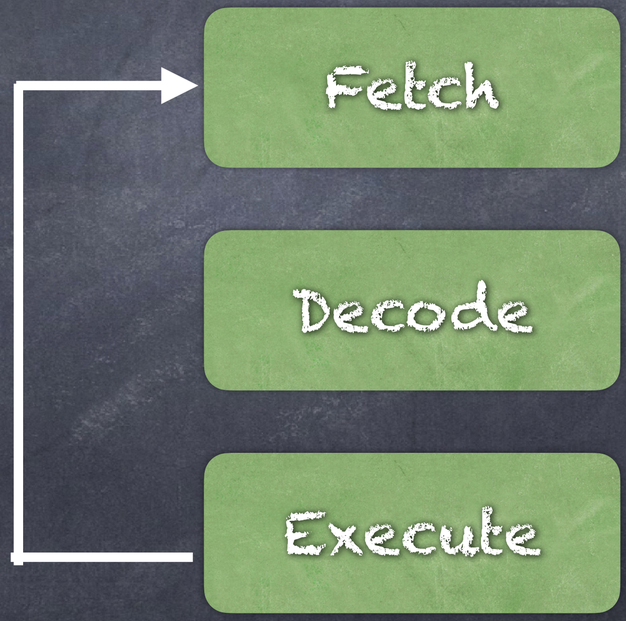


Processor Internals

How the Control Part works



CPU Execution Cycle

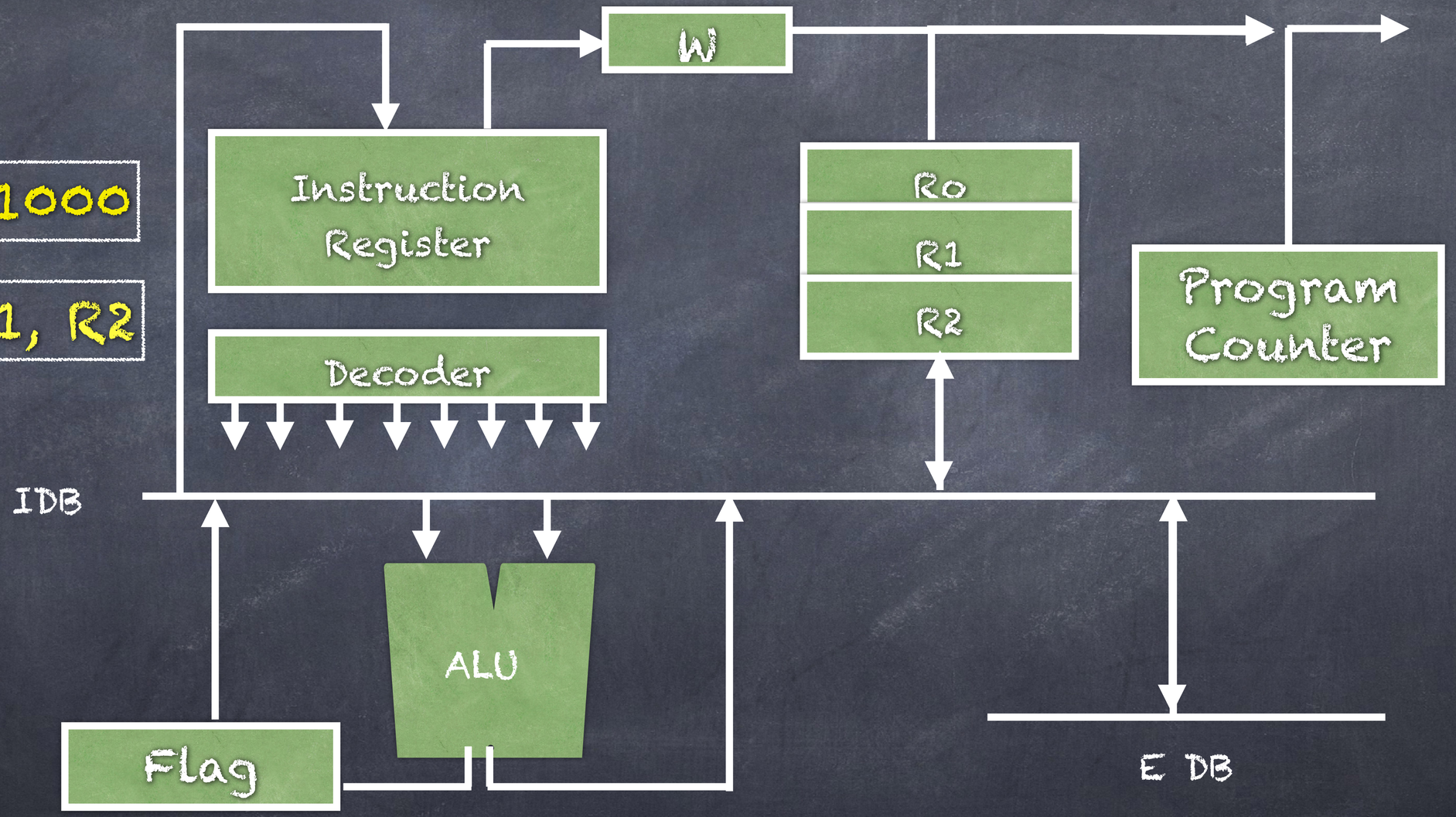


Processor Internals

Example:

1. LOAD Ro, 1000

2. ADD Ro, R1, R2



Processor Internals

Example: LOAD R0, 1000

T1: Enable PC, Memory RD
T2: Load IR
T3: Decode, Increment PC
T4: Load W, Enable IR
T5: Enable W, Memory RD, Load R0

Processor Internals

Example: ADD R0, R1, R2

T1: Enable PC, Memory RD
T2: Load IR
T3: Decode, Increment PC
T4: Enable R0, Enable R1, ADD ALU, Load R2

8085 MICROPROCESSOR

Next...

- 8085 Microprocessor