



Microprocessors

COE 381

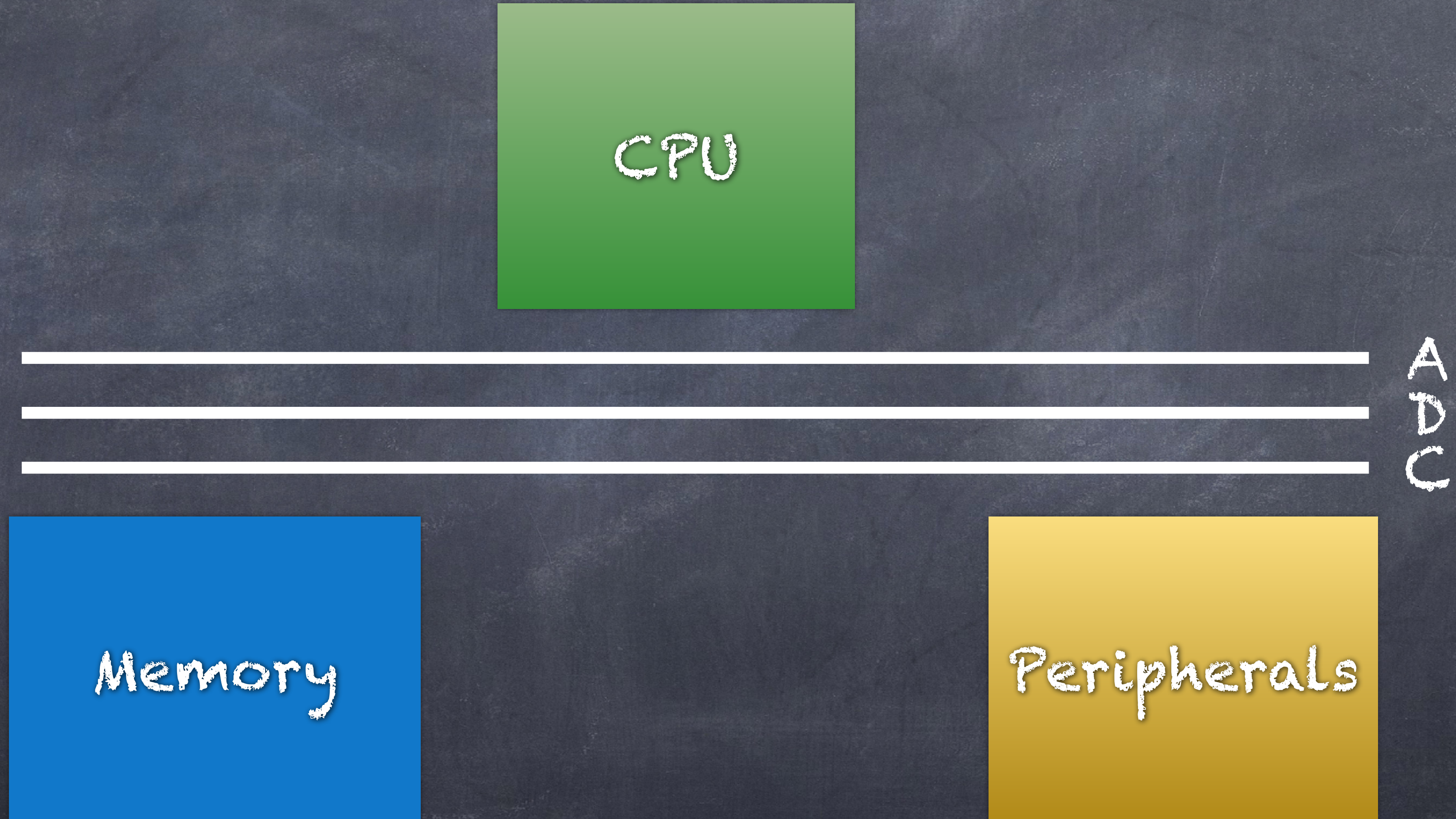
WEEK 2: BASIC COMPUTER ORGANIZATION



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





Memory

Address
Bus



CS



Data
Bus



Read
 \overline{RD}

Write
 \overline{WR}



Memory Interfacing: ROM & RAM

Example (Design):

8KB ROM, 16KB RAM.

CPU \Rightarrow 16 bit Address Bus, 8 bit Data Bus.

ROM Starting Address = 0000H

RAM Starting Address = 8000H

ROM/RAM Size = 4KB x 8 bit



Register

Parallel Input



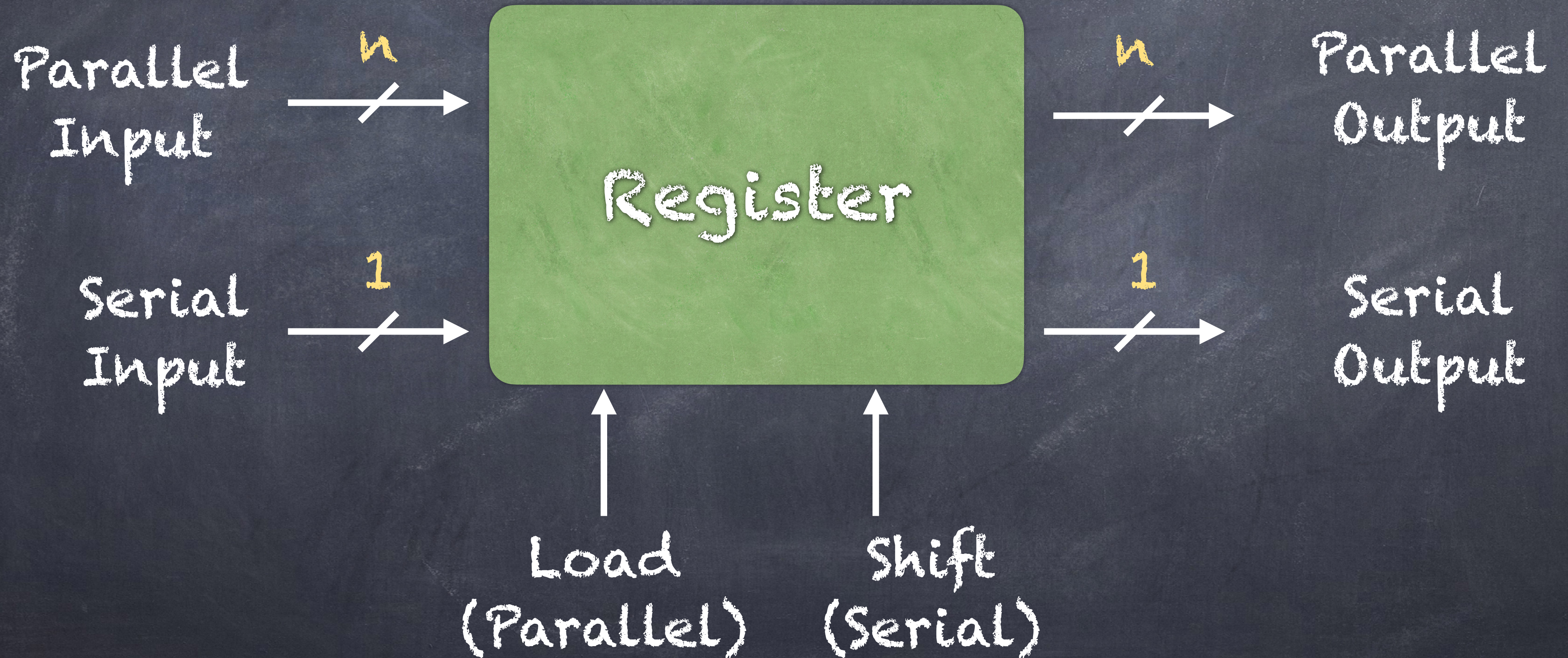
Serial
Input



n-bit

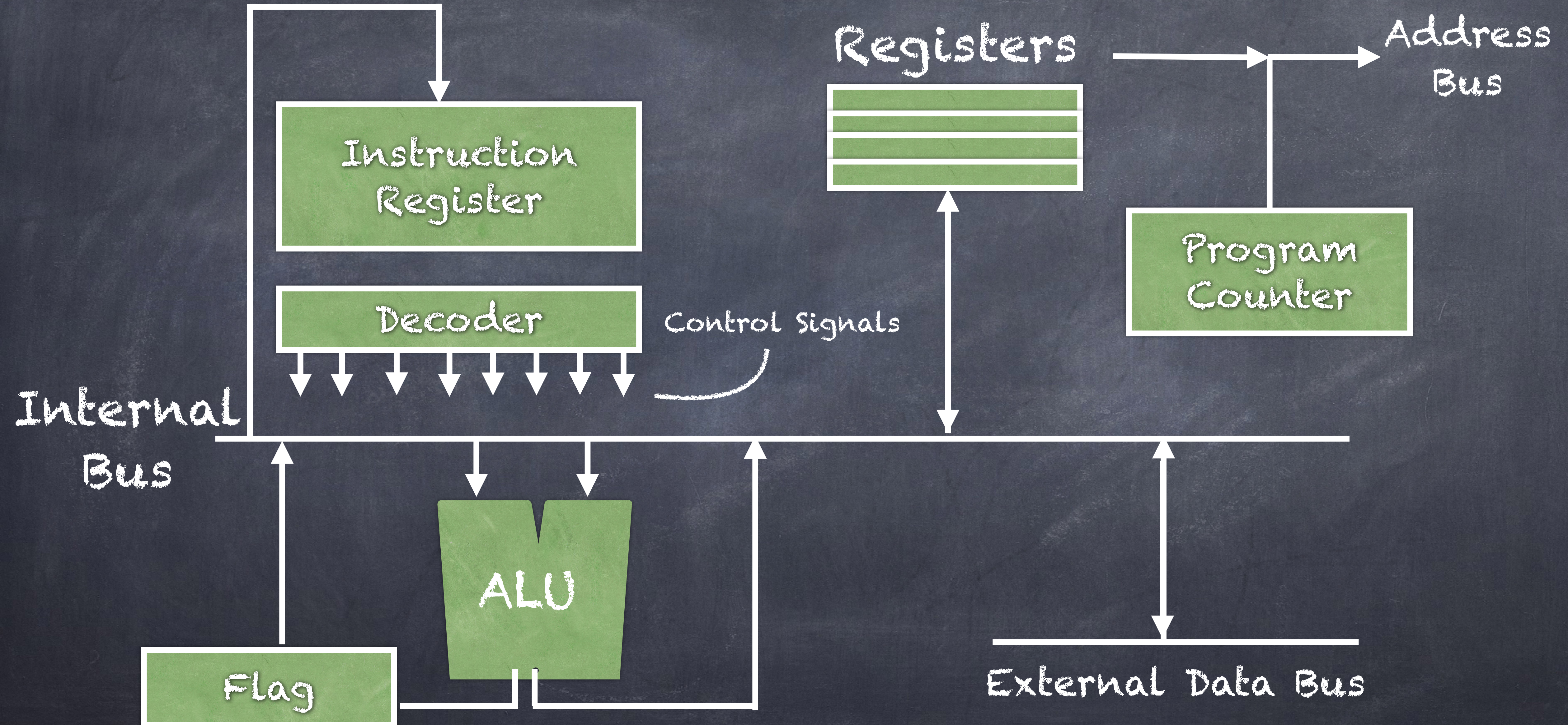


Register





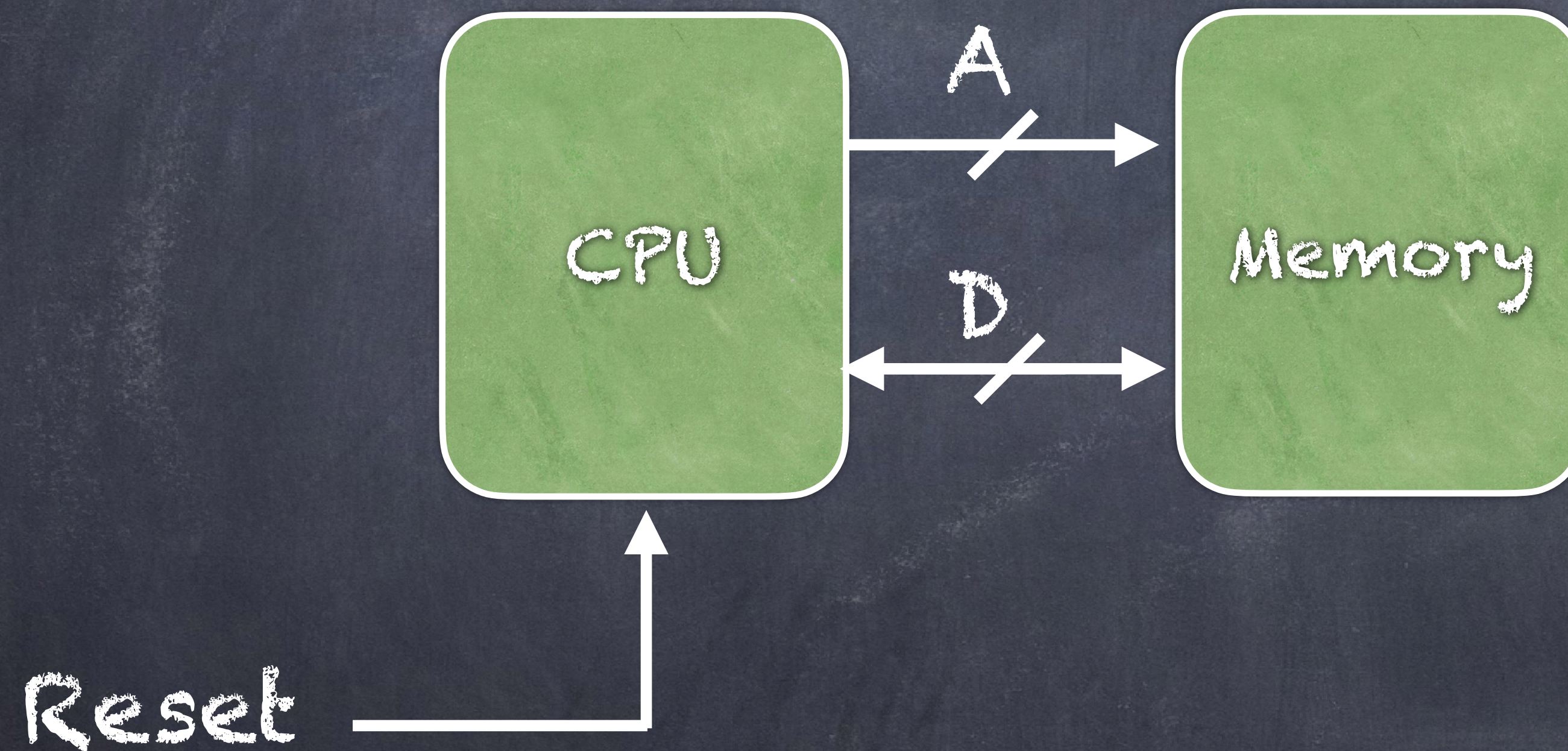
Processor Internals



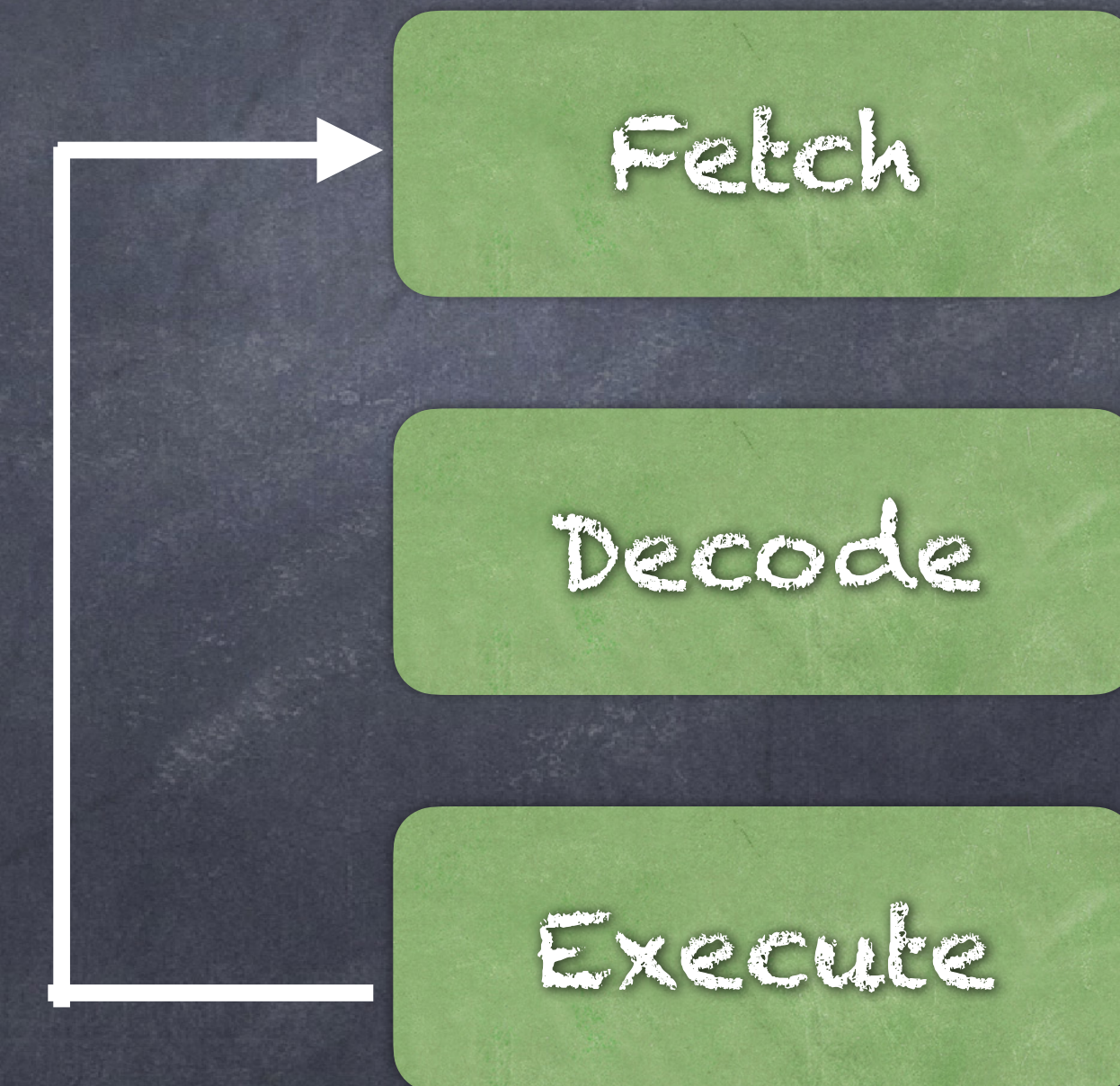


Processor Internals

How the Control Part works



CPU Execution Cycle



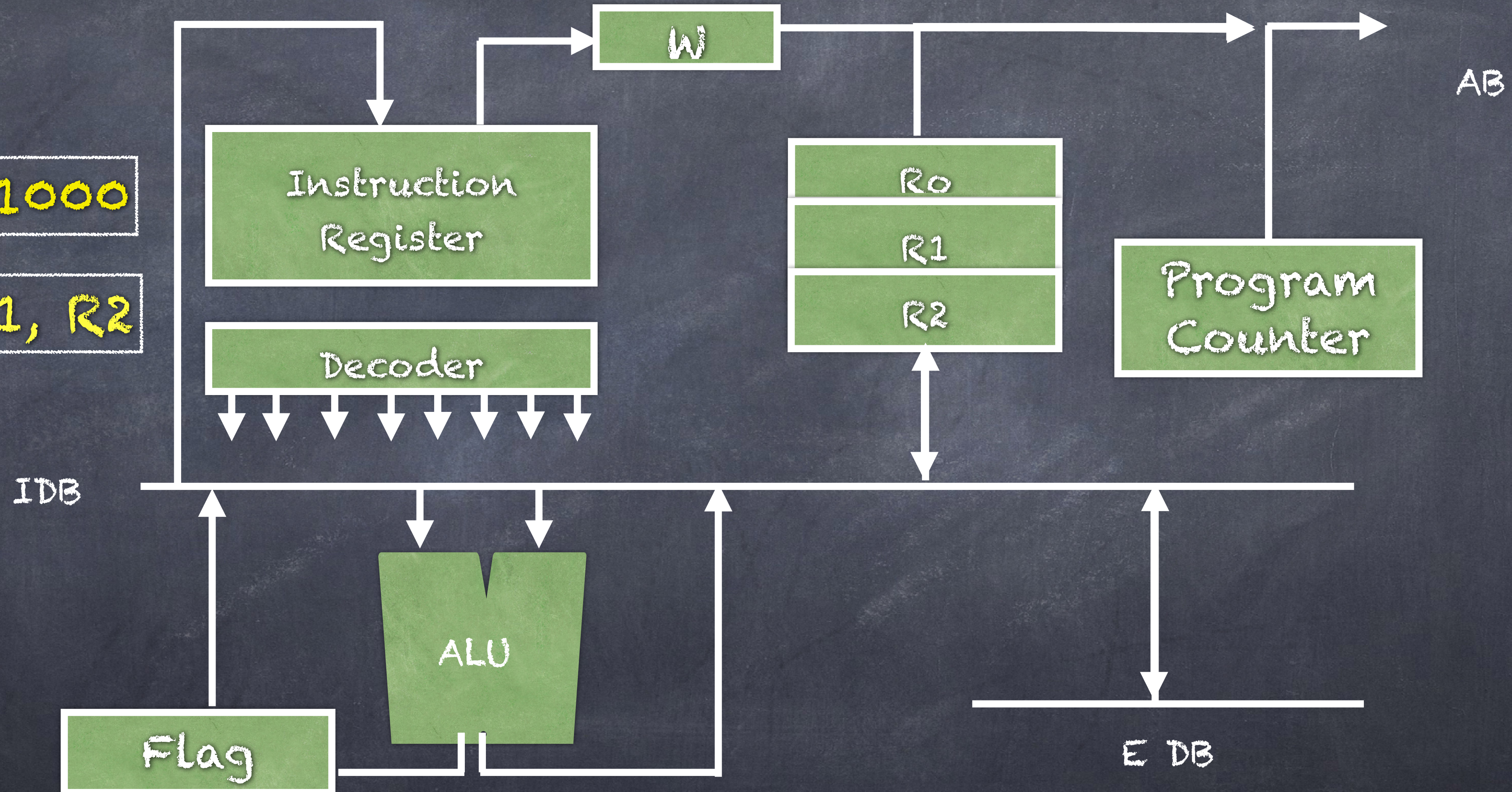


Processor Internals

Example:

1. **LOAD R0, 1000**

2. **ADD R0, 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