

Instruction Cycle

INSTRUCTION FETCH

$MAR \leftarrow PC$

$MDR \leftarrow \text{memory}[MAR]$

$IR \leftarrow MDR$

$PC \leftarrow PC + 1$

DECODE

Opcode in IR[15:12] interpreted by Control Unit

Operand fields in IR[11:0] interpreted

EVALUATE ADDRESS (Data Move Instructions)

Calculate memory address from instruction

OPERAND FETCH (Operate & Data Move Instructions)

Output source registers to ALU inputs

Operate

Read data from memory into MDR

Load

Transfer data from source register to MDR

Store

EXECUTE (Operate & Control Instructions)

Required ALU operation is performed

Operate

PC overwritten with branch address

Control

STORE RESULT (Operate & Data Move Instructions)

Store ALU output into destination register

Operate

Write data from MDR into memory

Store

Transfer data from MDR to destination Register

Load