# Instruction Cycle

## INSTRUCTION FETCH

- $\text{MAR} \leftarrow \text{PC}$
- $\text{MDR} \leftarrow \text{memory}\{\text{MAR}\}$
- $\text{IR} \leftarrow \text{MDR}$
- $\text{PC} \leftarrow \text{PC} + 1$

## DECODE

- Opcode in $\text{IR}[15:12]$ interpreted by Control Unit
- Operand fields in $\text{IR}[11:0]$ interpreted

## EVALUATE ADDRESS (Data Move Instructions)

- Calculate memory address from instruction

## OPERAND FETCH (Operate & Data Move Instructions)

- Output source registers to ALU inputs
- Read data from memory into MDR
- Transfer data from source register to MDR

## EXECUTE (Operate & Control Instructions)

- Required ALU operation is performed
- PC overwritten with branch address

## STORE RESULT (Operate & Data Move Instructions)

- Store ALU output into destination register
- Write data from MDR into memory
- Transfer data from MDR to destination Register