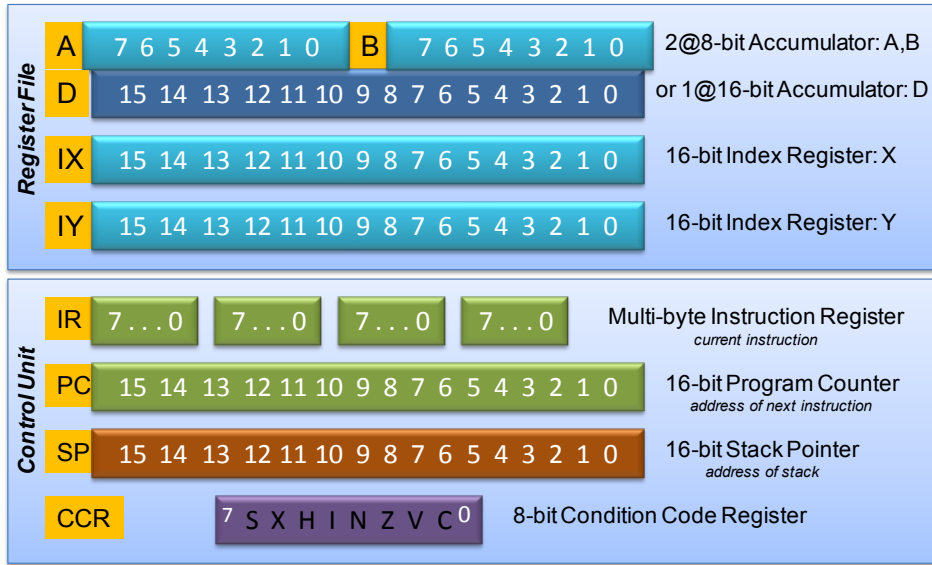


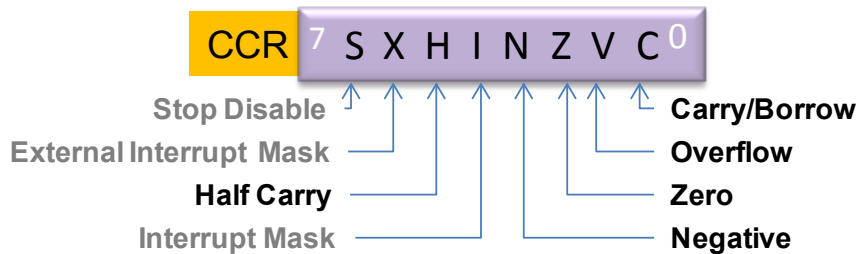
# ECE 331 Handout 2: ASM Instruction Execution

## 68HC12 Programmer's Model

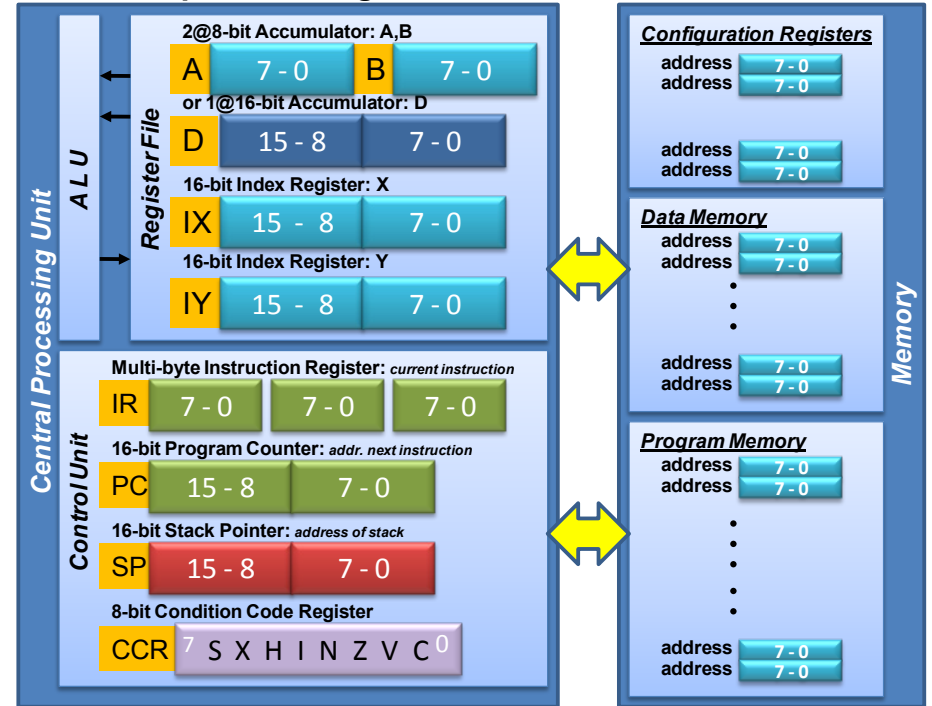
CPU Registers important to instruction execution



## 68HC12 Condition Code Register



## 68HC12 Expanded Programmer's Model

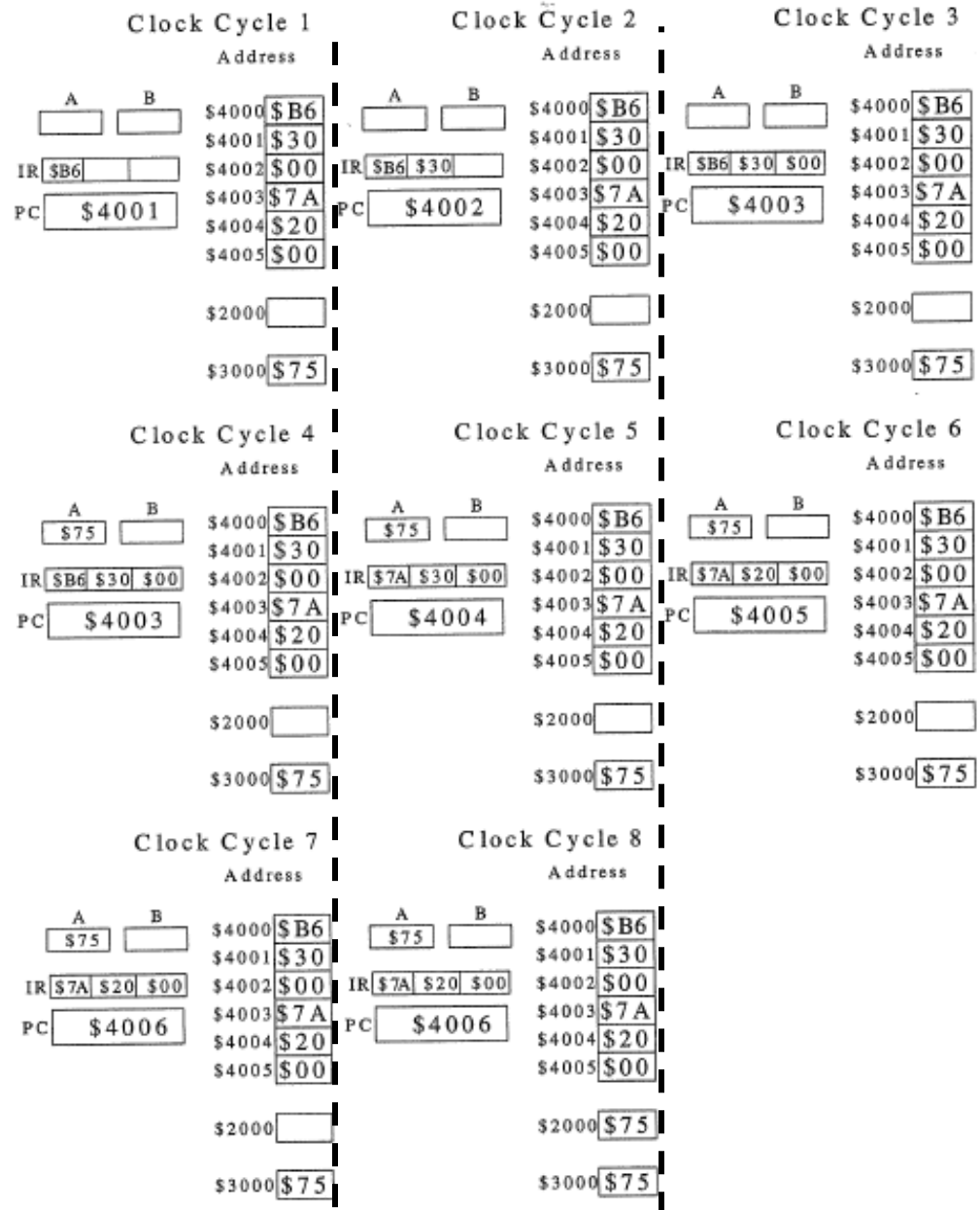


## Microcontroller Program Execution: from concept to action

- Write program to complete task
  - check syntax; test functionality (*Simulator*)
- Assemble program (*Assembler*)
  - ASM code → Machine code (op-codes and operands)
- Upload program to **program memory**
- Run program on *Microcontroller*
  - set PC to start of **program memory**
  - 1. **fetch** instruction to IR from **program memory**
  - 2. **decode** instruction: set ALU to perform instruction
  - 3. **execute** instruction: load/store to **data memory**
  - advance PC to next instruction in **program memory**
  - repeat step 1 until commanded to stop

## Cycle-by-cycle Instruction Execution Example

CODE  
 LDAA \$3000  
 STAA \$2000



**Code Executed:**  
 LDAA \$3000 (load from \$3000)  
 STAA \$2000 (store to \$2000)

**Legend:**  
 IR = Instruction Register  
 PC = Program Counter  
 Data Memory: \$2000, \$3000  
 Program Memory: \$4000-4005