Problem 2

Relatively Simple Microprocessor ISA

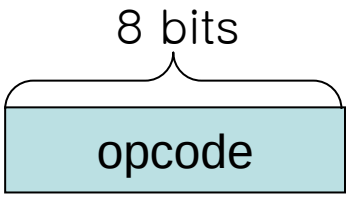
- **Memory Model**
  - **8 bits x 64KBytes of memory(16-bits memory address)**
  - **I/O device is also accessed as a part of memory (Memory Mapped I/O)**

Problem 2

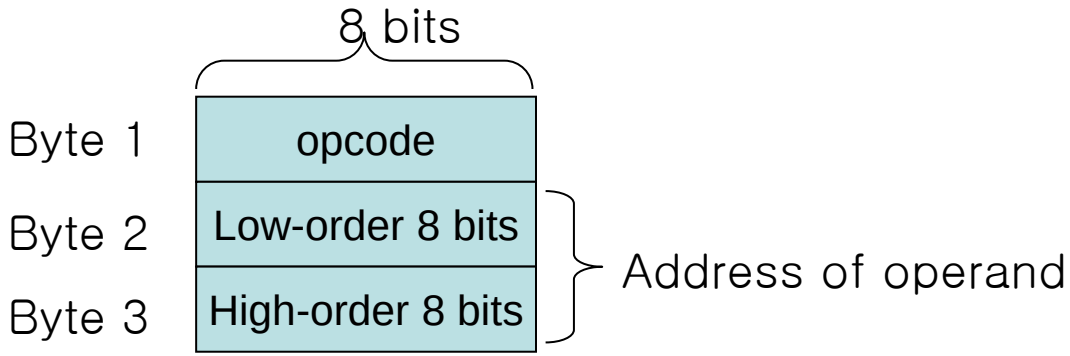
- **Register Set**
  - **AC (8-bits accumulator)**
  - **R (8-bits general purpose register)**
  - **Z (1-bit register indicating zero flag)**
    - **Set whenever the arithmetic/logical Instruction result is 0**

Problem 2

- **Instruction Format : 2 Types**
  - **8 bits**



  - **24 bits : LDAC, STAC, JUMP, JMPZ, JPNZ**



Problem 2

Classify the following instructions as arithmetic/logic, data transfer, or control transfer instruction

Instruction	Instruction Code	Operation
NOP	0000 0000	No Operation
LDAC	0000 0001 T	AC ← M[T]
STAC	0000 0010 T	M[T] ← AC
MVAC	0000 0011	R ← AC
MOVR	0000 0100	AC ← R
JUMP	0000 0101 T	GOTO T
JMPZ	0000 0110 T	IF Z = 1 GOTO T
JPNZ	0000 0111 T	IF Z = 0 GOTO T
ADD	0000 1000	AC←AC+R; If AC=0 Z←1else Z←0
SUB	0000 1001	AC←AC-R ; If AC=0 Z←1 else Z←0
INAC	0000 1010	AC←AC+1; If AC=0 Z←1 else Z←0
CLAC	0000 1011	AC←0; Z←1
AND	0000 1100	AC←AC AND R; If AC=0 Z←1 else Z←0
OR	0000 1101	AC←AC OR R; If AC=0 Z←1 else Z←0
XOR	0000 1110	AC←AC XOR R; If AC=0 Z←1 else Z←0
NOT	0000 1111	AC ← ~ AC; If AC=0 Z←1 else Z←0

T means more 2 bytes for 16 bit address of operands

Problem 3

Represent following sequence of instructions in C-like language.