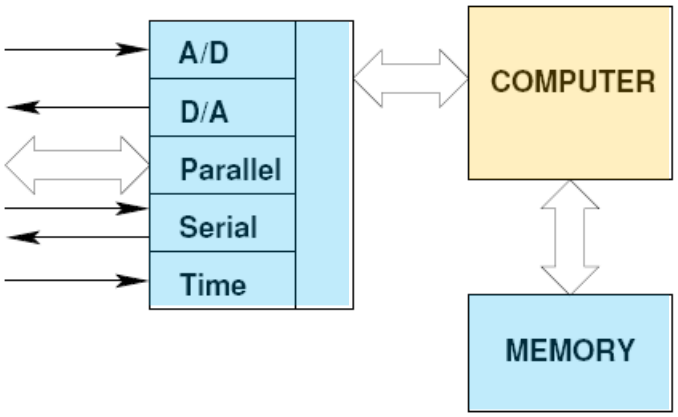
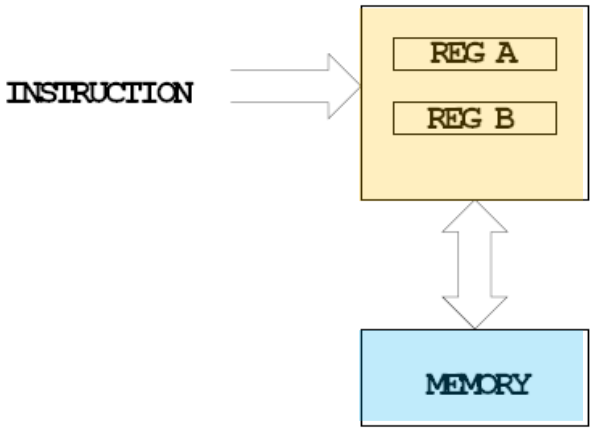
- **Introduction to Microprocessors and Microcontrollers.**

  - Block Diagrams of Simple Microprocessor and Microcontroller
  - Harvard architecture and Princeton architecture microprocessor block diagrams
  - Memory map for a Princeton architecture microprocessor

MICROCONTROLLER



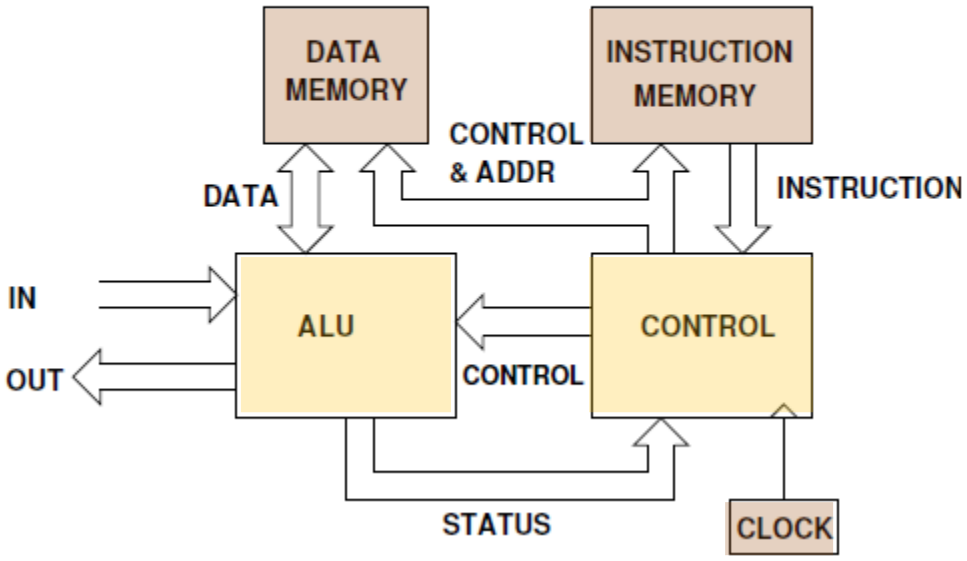
SIMPLE MICROPROCESSOR



INSTRUCTION	ACTION
18 06	(A) + (B) ⇒ A
87	0 ⇒ A
5A 05	(A) ⇒ Address 5

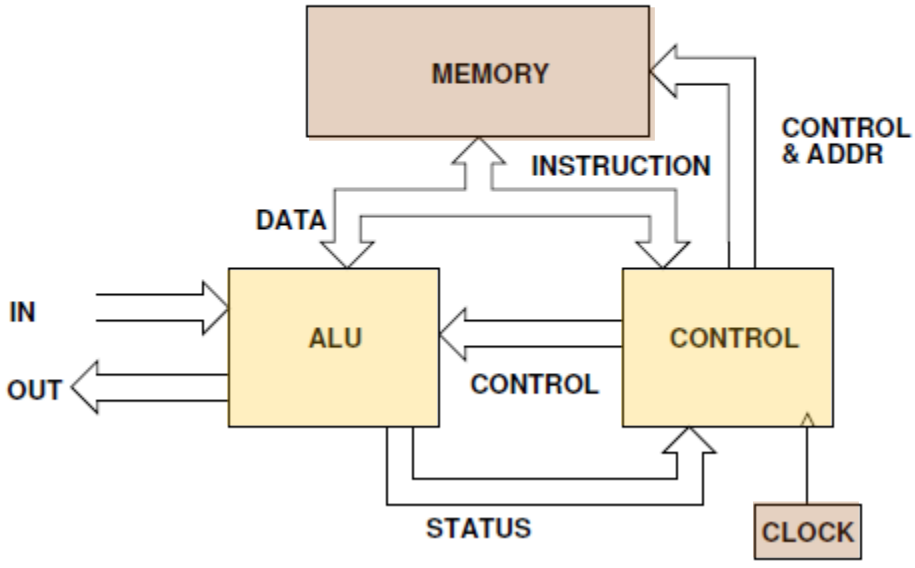
HARVARD ARCHITECTURE

MICROPROCESSOR



PRINCETON (VON NEUMAN) ARCHITECTURE

MICROPROCESSOR



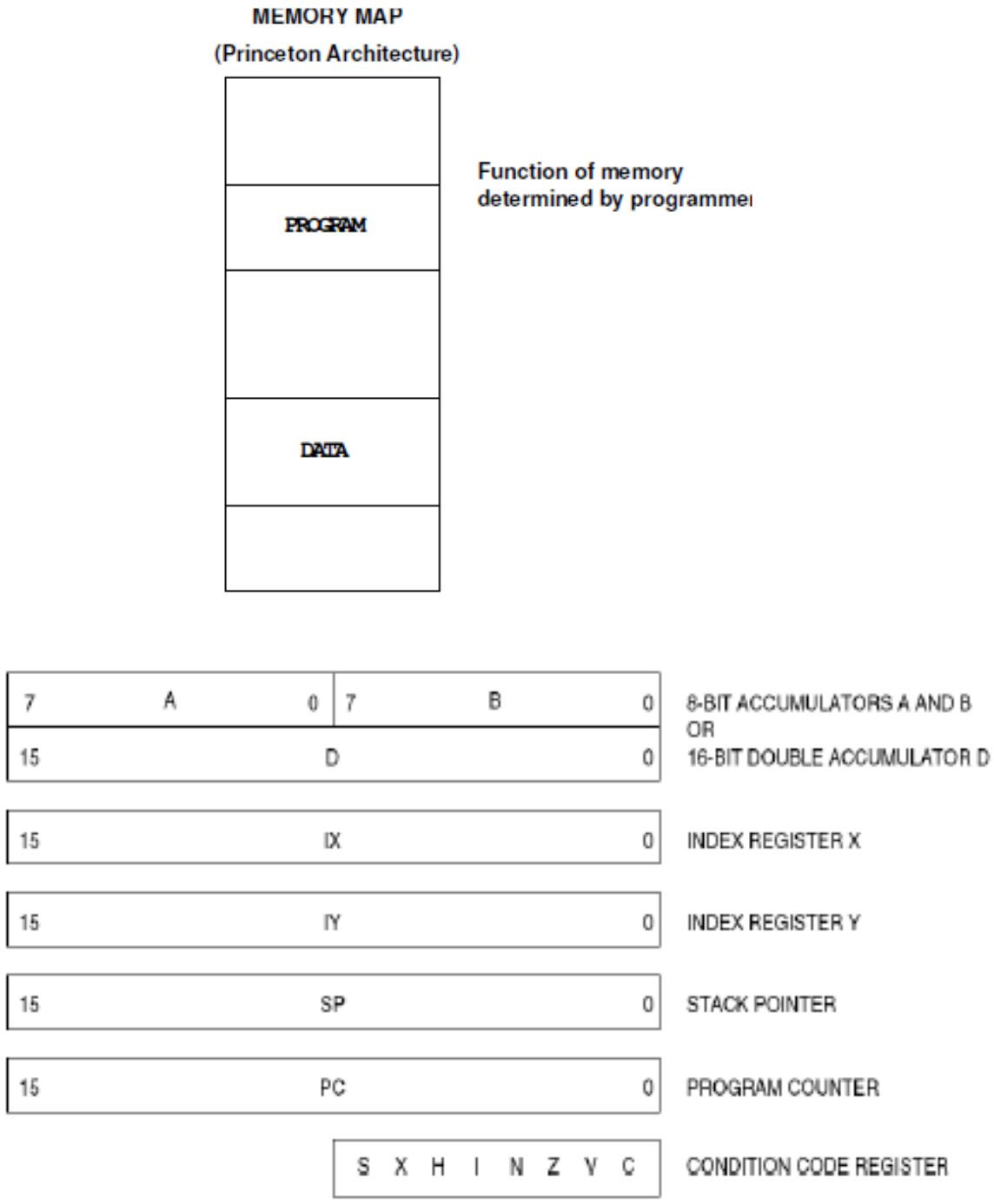


Figure 2-1. Programming Model

Binary	Hex	Decimal
0000	0	0
0001	1	1
0010	2	2
0011	3	3
0100	4	4
…	…	…
1010	A	10
1011	B	11
1100	C	12
1101	D	13
1110	E	14
1111	F	15

Convert Binary to Decimal

1111011_2

$1 \times 2^6 + 1 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$

$1 \times 64 + 1 \times 32 + 1 \times 16 + 1 \times 8 + 0 \times 4 + 1 \times 2 + 1 \times 1$

123_{10}

Convert Hex to Decimal

$82D6_{16}$

$8 \times 16^3 + 2 \times 16^2 + 13 \times 16^1 + 6 \times 16^0$

$8 \times 4096 + 2 \times 256 + 13 \times 16 + 6 \times 1$

33494_{10}