

Module 1

→ Difference b/w system software and application software.

System software is a type of computer that is designed to run a h/w and application f

SYSTEM SOFTWARE	APPLICATION SOFTWARE
<ul style="list-style-type: none">• System software is used for operating computer hardware• System softwares are installed on the computer when OS is installed.• In general, the user doesnot interact with system software. Because, it works in the background.• System software can run independently. It provides platform for running application software.	<ul style="list-style-type: none">• Application software is used by users to perform specific tasks.• Application softwares are installed according to users requirement.• In general, the users interacts with application software.• Application software can't run independently. They can run without the presence of system software.

Eg: compiler
Assembler
debugger
Device Driver

Eg: word processor
web browsers
Media player.



Simplified Instruction Computer (SIC) Architecture

- Hardware Consists of

1. Memory
2. Register
3. Data formats
4. Instruction Sets
5. Addressing Modes
6. Instruction formats
7. Input & output.

SIC is a hypothetical computer that has been carefully designed to include the hardware features of most often found on real machines.

1. Memory

- It consists of bytes (8 bits), word (24 bits), which are consecutive 3 bytes. Address by the location of their lower numbered byte.
- All SIC addresses are byte addresses.
- There are totally 2^{15} bytes in memory.

2. Register

There are 5 registers in SIC machine architecture.

1. Accumulator
2. Index register
3. Linkage register
4. Program counter
5. Status word.

3. Data Formats

- Integers are stored as 24 bit binary numbers.
- 2's complement representation is used for negative values.

- characters are stored using ^{the 4} 8 bit ASCII codes.
- it doesnot support floating point data items.

4. Instruction Sets



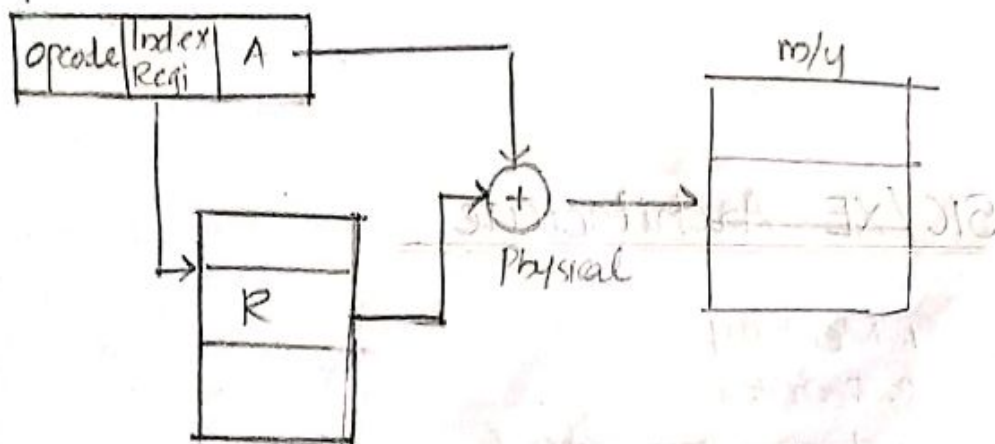
MOV R, 1000

5. Addressing Modes

1. Direct Addressing Mode
2. Index Addressing Mode

1. Direct Addressing Mode

2. Index Addressing Mode



6. Instruction formats

1. Data movement instructions

* LDA	* LDX	* STRI	* STA	* STX
Load to	Load to		Store to	Store to
Accumulator	index reg		Accumulator	index reg

2. Arithmetic operating instructions

~~- Add~~

~~- Sub~~

* ADD

* SUB

* MUL

* DIV

3. Comparison instructions

* COMP

4. Conditional jump instructions

* JLT - It jump according to time

* JEQ

* JGT

5. Subroutine linkage

* JSUB - Jump subro

* RSUB - Return subro

7. Input & output

SIC/XE Architecture

1. Memory

2. Register

3. Instruction format

~~4. Addressing Modes~~

4. Instruction set

5. Addressing Modes

~~6. Instruction~~

6. Data format

7. Input & output

1. Memory

- 8 bit
- 2^{160} bytes

2. Register

- Accumulator (A)
- Index register (IR)
- linkage regi (LR)
- Base Reg (BR)
- Floating Point Register (F)
- Program Counter (PC)
- Status word (S)
- SW

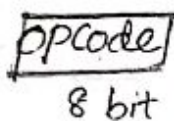
3. Data format

- 24 bit of binary numbers
- 2's complement is used for -ve values
- It support floating point data items
- ~~48 bit~~
- floating point store 48 bit.

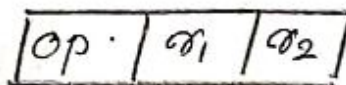
S data	exponent	function
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4. Instruction format

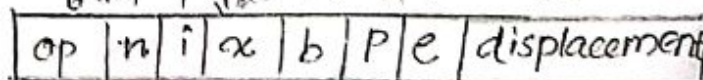
i) Format 1



ii) Format 2



iii) Format 3
6 index, 3 PM, 1 immediate, 1 base PM, 1 program counter, 2



IV) format 4

op	n	i	n	b	p	e	address
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5. Addressing Modes

1. Base Relative AM

2. Program Counter AM

1. Base Relative to know current location

- $b=0$ and $p=0 \Rightarrow$ Direct Addressing Mode.
- $b=0$ and $p=1 \Rightarrow$ Program Counter Relative AM
- $b=1$ and $p=0 \Rightarrow$ Base Relative AM
- $n=0$ and $i=1 \Rightarrow$ Immediate AM
- $n=1$ and $i=0 \Rightarrow$ Indirect AM
- $n=0$ and $i=0 \Rightarrow$ Simple AM