

Chapter 9 Summary

~~The~~ Instruction Set Architecture.

9-1. ~~Assem~~

Assembly language replaces the binary opcodes and addresses with symbolic names.

The logic structure of computer is normally described in the ~~an~~ assembly reference manuals.

This ~~manua~~ manual lists all the implemented ~~instructions~~ instructions for the hardware and provide precise definition for every instruction on the list.

The implementation was separated into two parts:

~~the~~ The organization and the hardware.

The organization consists of: datapaths, control units, memories and the buses that inter-connect them.

Hardware consists of: logic, the electronic technologies employed and the various physical design aspects of the computer.

The control unit in the computer plays the role of decoding ~~var~~ variety of instructions and multiple instruction format.

The basic computer operation cycle consists of 7 steps. The register set consist of all registers in the CPU that are accessible to the programmer. SP and PSR are the two registers that we used so far.

9-2.

There are 7 addressing ~~to~~ modes, they decide how the operand ~~execute~~ are selected during the program execution.

Computer use addressing-mode ~~to~~ technique to accommodate one or both of the following provisions:

1. To give programming flexibility to the user via pointers to memory, counters for loop control, indexing ~~of~~ of data, and ~~to~~ relocation of programs.

9-4 Instruction Set Architectures.

Different Computers has different instruction sets. There's two major ~~type~~ types of instructions: sets: Complex instruction set Computers, reduced instruction set computers: (CISCs and RISCs)

RISC: (properties:

1. only load and store instructions available for memory access, data manipulated between Register to registers.
2. Addressing modes are limited by numbers.
3. Instruction formats are all of the same length
4. Instructions perform elementary operations.

CISC:

1. Memory access is available to most type of instructions
2. Addressing mode are substantial in number
3. Instruction formats are of different lengths.
4. Instructions perform both elementary and complex operations.

9-5 Data-Transfer ~~Instructions~~ Instructions.

The data-transfer instructions move data from one place in computer to other place. for example: memory to register, register to register, ..

The stack operation use push and pop ~~operations~~ instructions to ~~stack with~~ manage data.

It follows the last-in-first-out principle (LIFO). The I/O ~~do~~ instructions transfer data between the I/O device and processor register.

The ~~Port~~ Port addresses are assigned in 2 ways:
~~the~~ The Independent I/O system and
isolated I/O system.

The Independent method assigns ~~into~~ the addresses that are independent from each other, in contrast, the isolated method assigns ~~into~~ a submerge of the memory addresses for the I/O ports.

9-6

There's three basic types of data-manipulation instructions:

1. Arithmetic instructions
2. Logic and bit-manipulation instructions.
3. Shift instructions.

9-8.

The instructions of computer are stored in successive memory locations, it read from consecutive memory locations and executed one by one. The program counter does increment ~~into~~ when each time an instruction is fetched from memory.

A Conditional branch instruction tests @ different combination of status bits for a condition.

A procedure is a self contained sequence of instructions, it maybe called many ~~time~~ times by the program to perform its function.

9-9 The program interrupt interrupt the Control and the current executing program for ~~many~~ different purpose, ~~once~~ once the Control detect interrupt signals, the control goes to a hardware interrupt the cycle.