Computer Organization & Architecture (Instruction Set Architecture)

Dr. Sonu Lamba

Department of Computer Science and Engineering
The LNM Institute of Information Technology Jaipur

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Register Transfer Notation

Register Transfer Notation – RTN

- Transfer of information from one location in a computer to another, such transfers are memory locations, processor registers, or registers in the I/O subsystem.
- Locations are represented symbolically with convenient names.
  - LOC, PLACE, VAR2, R0, R5, DATAIN, OUTSTATUS etc. . .
- The contents of any location are denoted by placing square brackets around its name – transfer of information.

Instructions and Instruction Sequencing

Assembly Language Notation

- Represents machine instructions and programs.
- Instructions specifies operation to be performed and the operand.
- These operations are represented through mnemonics such as LD and STR or ST.
- Assembly language for different processors often use different mnemonics for a given operation.

Types of Instructions in General Purpose Computer

1. Data Transfer Instructions
2. Data Manipulation Instructions
   - Arithmetic
   - Logical
   - Shift/ Conversion
3. Program Control Instriuctions

Data Transfer Instructions

- MOVE
- LOAD
- STORE
- EXCHANGE
- INPUT
- OUTPUT
- PUSH
- POP

Data Manipulation Instructions

- Arithmetic
  - ADD
  - SUB
  - MUL
  - DIV
  - INC
  - DEC
  - ADD with Carry
  - SUB with Borrow
  - Negate

Data Manipulation Instructions

- Logical Instructions
  - Complement (COM & NOT)
  - Clear CLR
  - Logical-AND (AND)
  - Logical-OR (OR)
  - Ex-OR (XOR)
  - Clear Carry (CLRC)
  - Set Carry (STC)
  - Complement Carry (CMC)
  - Enable Interrupt (EI)
  - Disbale Interrupt (DI)

Data Manipulation Instructions

- Shift Instructions
  - Logical Shift Left
  - Logical Shift Right
  - Arithmetic Shift Right
  - Arithmetic Shift Left
  - Rotate Left
  - Rotate Left
  - Rotate Right through Carry
  - Rotate Left through Carry

Program Control Instructions

- BRANCH
- JMP
- SKIP
- CALL
- RETURN