Master of Computer Applications

CAPOL403R01: Computer Organization & Architecture

Unit II: Lecture 1 – Part 2
Types of operations

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Types of operations

- Data transfer
- Arithmetic
- Logical
- Conversion
- I/O
- System control
- Transfer of control

Data transfer instructions

Operation name	Description
Move	Transfer data from one location to another location
Load	Processor register ← Memory
Store	Memory ← Processor register
Exchange	Source ⇋ Destination
Clear	Destination ← “000….00”
Set	Destination ← “111….11”
Push	ST ← Source
Pop	Destination ← ST

Arithmetic instructions

Operation name	Description
Add	Compute sum of two operands
Subtract	Compute difference of two operands
Multiply	Compute product of two operands
Divide	Compute quotient of two operands
Absolute	Replace operand by its absolute value
Negate	Change sign of operand
Increment	Add 1 to operand
Decrement	Subtract 1 from operand

Logical instructions

Operation name	Description
AND	Perform logical AND
OR	Perform logical OR
NOT	(complement) Perform logical NOT
Exclusive-OR	Perform logical XOR
Test	Test specified condition; set flag(s) based on outcome
Compare	set flag(s) based on outcome
Set Control Variables	Instructions to set controls for protection purposes, interrupt handling, timer control
Shift	Left (right) shift operand, introducing constants at end
Rotate	Left (right) shift operand, with wraparound end

Conversion

Operation name	Description
Translate	Translate values in a section of memory based on a table of correspondences
Convert	Convert the contents of a word from one form to another (e.g., packed decimal to binary)

I/O

Operation name	Description
Input (read)	Transfer data from specified I/O port or device to destination (e.g., main memory or processor register)
Output (write)	Transfer data from specified source to I/O port or device
Start I/O	Transfer instructions to I/O processor to initiate I/O operation
Test I/O	Transfer status information from I/O system to specified destination

System control

Transfer of control

Operation name	Description
Jump (branch)	Unconditional transfer; load PC with specified address
Jump Conditional	Test specified condition; either load PC with specified address or do nothing, based on condition
Jump to Subroutine	Place current program control information in known location; jump to specified address
Return	Replace contents of PC and other register from known location
Execute	Fetch operand from specified location and execute as instruction; do not modify PC
Skip	Increment PC to skip next instruction
Skip Conditional	Test specified condition; either skip or do nothing based on condition

Thank you