SNS COLLEGE OF ENGINEERING

Kurumbapalayam(Po), Coimbatore – 641 109
Accredited by NAAC-UGC with 'A' Grade
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Department of Information Technology

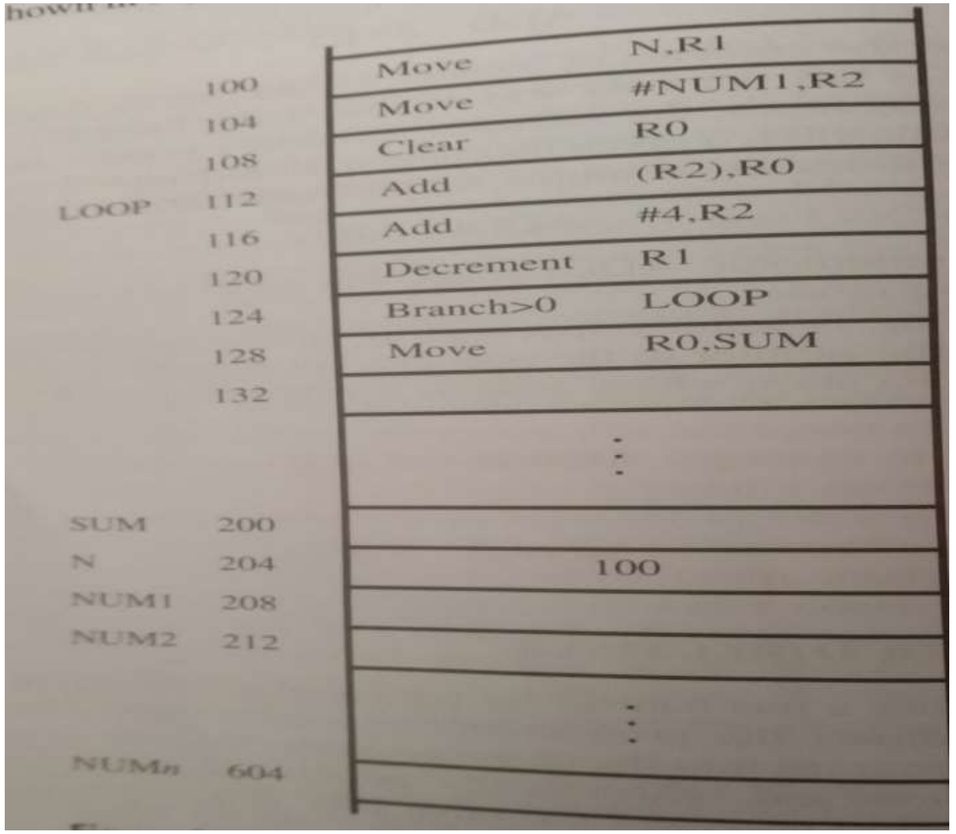
Course Name – 19IT301 Computer Organization and Aechitecture

II Year / III Semester

Unit 1 – Basic Structures of Computers

Topic :Assembly Language

Memory Arrangement of program



	100	Move	N,R1
	104	Move	#NUM1,R2
	108	Clear	R0
LOOP	112	Add	(R2),R0
	116	Add	#4,R2
	120	Decrement	R1
	124	Branch>0	LOOP
	128	Move	R0,SUM
	132		
		⋮	
SUM	200		
N	204	100	
NUM1	208		
NUM2	212		
		⋮	
NUM*n*	604		

Assembly Language Representation

	Memory address label	Operation	Addressing or data information
Assembler directives	SUM	EQU	200
		ORIGIN	204
	N	DATAWORD	100
	NUM1	RESERVE	400
		ORIGIN	100
Statements that generate machine instructions	START	MOVE	N,R1
		MOVE	#NUM1,R2
		CLR	R0
	LOOP	ADD	(R2),R0
		ADD	#4,R2
		DEC	R1
		BGTZ	LOOP
		MOVE	R0,SUM
Assembler directives		RETURN	
		END	START

Data Transfer Instructions

- Data Transfer Instructions

Load	LD
Store	ST
Move	MOV
Exchange	XCH
Input	IN
Output	OUT
Push	PUSH
Pop	POP

Data Transfer Instruction

Direct address	LD ADR	AC ← M[ADR]
Indirect address	LD @ADR	AC ← M[M[ADR]]
Relative address	LD $ADR	AC ← M[PC+ADR]
Immediate operand	LD #NBR	AC ← NBR
Index addressing	LD ADR(X)	AC ← M[ADR+XR]
Register	LD R1	AC ← R1
Register indirect	LD (R1)	AC ← M[R1]
Autoincrement	LD (R1)+	AC ← M[R1], R1 ← R1+1

Data Manipulation Instructions

- Arithmetic
- Logical & Bit Manipulation
- Shift

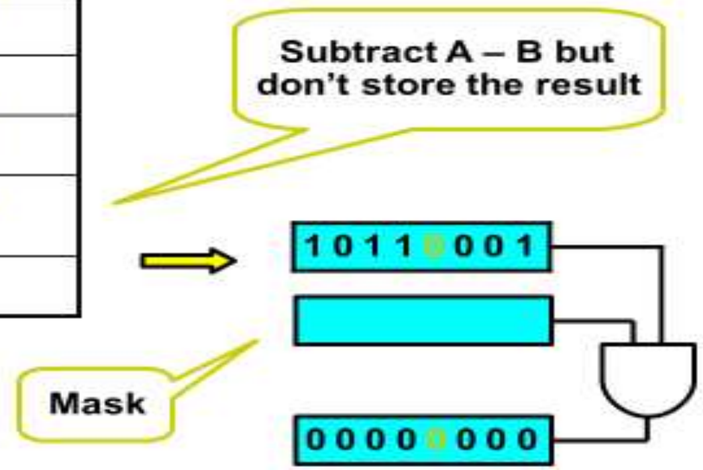
Name	Mnemonic
Increment	INC
Decrement	DEC
Add	ADD
Subtract	SUB
Multiply	MUL
Divide	DIV
Add with carry	ADDC
Subtract with borrow	SUBB
Negate	NEG

Clear	CLR
Complement	COM
AND	AND
OR	OR
Exclusive-OR	XOR
Clear carry	CLRC
Set carry	SETC
Complement carry	COMC
Enable interrupt	EI
Disable interrupt	DI

Name	Mnemonic
Logical shift right	SHR
Logical shift left	SHL
Arithmetic shift right	SHRA
Arithmetic shift left	SHLA
Rotate right	ROR
Rotate left	ROL
Rotate right through carry	RORC
Rotate left through carry	ROLC

Program Control Instructions

Branch	BR
Jump	JMP
Skip	SKP
Call	CALL
Return	RET
Compare (Subtract)	CMP
Test (AND)	TST



Conditional Branch Instructions

BZ	Branch if zero	Z = 1
BNZ	Branch if not zero	Z = 0
BC	Branch if carry	C = 1
BNC	Branch if no carry	C = 0
BP	Branch if plus	S = 0
BM	Branch if minus	S = 1
BV	Branch if overflow	V = 1
BNV	Branch if no overflow	V = 0

THANK YOU