

Pr.1) “Systems Programming and Operating Systems”, by D.M. Dhamdhere, Second Edition ,  
Page No.106 (Exercise 4.4)

Problem statement : Apply PassI of a two-pass Assembler to the following assembly language code and generate Intermediate Code (IC), Symbol Table, Literal Table and POOL Table according to IC VariantI.

	START		100
A	DS		3
L1	MOVER	AREG	B
	ADD	AREG	C
	MOVEM	AREG	D
D	EQU	A+1	
L2	PRINT	D	
	ORIGIN	A-1	
C	DC	'5'	
	ORIGIN	L2+1	
	STOP		
B	DC	'19'	
	END	L1	

Solution : Following tables are used as input along with the above mentioned assembly language code input to solve the problem. While implementing in the laboratory, you can hard code these tables in any suitable data structures.

#### OPTAB

Mnemonic Opcode	Class	Code for mnemonic
STOP	IS	00
ADD	IS	01
SUB	IS	02
MULT	IS	03
MOVER	IS	04
MOVEM	IS	05
COMP	IS	06
BC	IS	07
DIV	IS	08
READ	IS	09
PRINT	IS	10
START	AD	01
END	AD	02
ORIGIN	AD	03
EQU	AD	04
LTORG	AD	05
DC	DL	01
DS	DL	02

#### Registers

AREG	1
BREG	2
CREG	3
DREG	4

### Condition Codes

LT	1
LE	2
EQ	3
GT	4
GE	5
ANY	6

### Solution

#### Intermediate Code (IC)

Source Code (Input to PassI of assembler)				Location Counter (LC)	Intermediate Code (IC) (Output of PassI of assembler)		
Label	Opcode	Operand1	Operand2		IC for Opcode	IC for Operand1	IC for Operand2
	START	100			(AD,01)	(C,100)	
A	DS	3		100	(DL,02)	(C,3)	
L1	MOVER	AREG	B	103	(IS,04)	(1)	(S,03)
	ADD	AREG	C	104	(IS,01)	(1)	(S,04)
	MOVEM	AREG	D	105	(IS,05)	(1)	(S,05)
D	EQU	A+1			No IC, Reflect in SYMTAB)		
L2	PRINT	D		106	(IS,10)	(S,05)	
	ORIGIN	A-1			(AD,03)	(S,01)-1	
C	DC	'5'		99	(DL,01)	(C,5)	
	ORIGIN	L2+1			(AD,03)	(S,06)+1	
	STOP			107	(IS,00)		
B	DC	'19'		108	(DL,01)	(C,19)	
	END	L1			(AD,02)	(S,03)	

#### Symbol Table (SYMTAB)

Symbol	Address
A	100
L1	103
B	108
C	99
D	101
L2	106

Literal Table (LITTAB) and Pool Table (POOLTAB) : NIL (As no literals in the source code)