Pr.1) "Systems Programming and Operating Systems", by D.M. Dhamdhere, Second Edition , Page No.91 (Fig. 4.5)

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 VarientI.

	START	101	
	READ	N	
	MOVER	BREG	ONE
	MOVEM	BREG	TERM
AGAIN	MULT	BREG	TERM
	MOVER	CREG	TERM
	ADD	CREG	ONE
	MOVEM	CREG	TERM
	COMP	CREG	N
	BC	LE	AGAIN
	DIV	BREG	TWO
	MOVEM	BREG	RESULT
	PRINT	RESULT	
	STOP		
N	DS	1	
RESULT	DS	1	
ONE	DC	'1'	
TERM	DS	1	
TWO	DC	' 2'	
	END		

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			Location	Intermediate Code (IC)			
(Input to PassI of assembler)			Counter	(Output of PassI of assembler)			
				(LC)			
Label	Opcode	Operand1	Operand2		IC for	IC for	IC for
					Opcode	Operand1	Operand2
	START	101			(AD,01)	(C,101)	
	READ	N		101	(IS,09)	(S,01)	
	MOVER	BREG	ONE	102	(IS,04)	(2)	(S,02)
	MOVEM	BREG	TERM	103	(IS,04)	(2)	(S,03)
AGAIN	MULT	BREG	TERM	104	(IS,03)	(2)	(S,03)
	MOVER	CREG	TERM	105	(IS,04)	(3)	(S,03)
	ADD	CREG	ONE	106	(IS,01)	(3)	(S,02)
	MOVEM	CREG	TERM	107	(IS,05)	(3)	(S,03)
	COMP	CREG	N	108	(IS,06)	(3)	(S,01)
	BC	LE	AGAIN	109	(IS,07)	(2)	(S,04)
	DIV	BREG	TWO	110	(IS,08)	(2)	(S,05)
	MOVEM	BREG	RESULT	111	(IS,05)	(2)	(S,06)
	PRINT	RESULT		112	(IS,10)	(S,06)	
	STOP			113	(IS,00)		
N	DS	1		114	(DL,02)	(C,1)	
RESULT	DS	1		115	(DL,02)	(C,1)	
ONE	DC	'1'		116	(DL,01)	(C,1)	
TERM	DS	1		117	(DL,02)	(C,1)	
TWO	DC	'2'		118	(DL,01)	(C,2)	
	END				(AD,02)		

Symbol Table (SYMTAB)

Symbol	Address
N	114
ONE	116
TERM	117
AGAIN	104
TWO	118
RESULT	115

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