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## Lab Assignment - 2

Assignment Title: Design of Pass 2 of Two Pass Assembler

Sim: Study design of suitable data structure and algorithm of Pass 2 of Two Pass Assembler pseudo machine

Objective: Study suitable data structure and algorithm of pass 2 of Two Pass Assembler pseudo machine. Subset should consist of a few instruction from each category & few assembler directive.

### Theory:

→ Design of a Two Pass Assembler

The 1<sup>st</sup> pass separate label, opcode & operand builds symbol table, performs LC processing & constructs IC. 2<sup>nd</sup> pass synthesizes target from using address from symbol table. 1<sup>st</sup> pass in effect performs analysis of source program while 2<sup>nd</sup> pass performs synthesis of target program.

→ Algorithm for Pass 2

+ Code-area-address = address of code area  
locctr = 0

↳ while next statement is not an END statement

(a) Clear machine-code-buffer

(b) If a START or ORIGIN statement then

(i) locctr = value specified in operand field

(ii) size = 0;

(c) If a declaration statement

(i) If a DC statement then

Assembler the constant in machine-code-buffer.

(ii) size = size of memory area req. by DC/DS



(d) If an imperative statement

(i) Get operand address from SYMTAB or LITTAB

(ii) Assemble instruction in machine-code-buffer

(iii)  $size = size \text{ of instruction}$

(e) If  $size \neq 0$  then

(i) Move contents of machine-code-buffer to the address  
 $code\_area\_address + locctr$ :

(ii)  $locctr = locctr + size$

Input:

START 400

MOVER AREG, A1

LOOP SUB BREG, A1

MOVER BREG, B1

ORIGIN 300

MOVER BREG, A1

A1 DS 3

B1 DC 3

END

Output - M/C Code

400 04 1 301

401 02 1 301

402 04 2 304

300 04 2 301

301 02 3

304 01 3

305

Conclusion: The function of Pass II in an assembler are studied.