Assignment 3 : Macro Processor

* Aim : Study assignment for macro processor

* Objective : i) To understand macro facility, features and its use in assembly language programming
ii) Study how macro definition is processed and how macro call results in expansion of code.

* Outcomes : i) Understood macro facility, features and its use in assembly language programming
ii) Understood macro definition processing and macro call results in the expansion of code.

* Theory :

- An Assembly language macro facility is to extend the set of operations provided in an assembly language.

- In order that programmers can repeat identical parts of their program, macro permits the programmer to define an abbrieviation for a part of program & use this abbreviation in the program.

- For all occurences (macro call) macro processor substitutes the definition.

- Macro definition :

  - macro prototype statement : declares the name of the macro & types of parameters.

  - model statement : assembly language statement is generated during expansion.

  - preprocessor statement : used to perform auxiliary function during macro expansion

- Macro expansion : macro call replaces such statements by sequence of statement comprising the macro

- Macro facilities :

  - Use of AIF & AGO allows us to alter the flow of control
  - Loops can be implemented using expansion time variables.

- Data Structures

  i) Macro Definition Table (MDT)
  ii) Macro Name Table (MNT)
  iii) Parameter Name Table (PNTAB)
  iv) Expansion Time Variable Name Table (EVNTAB)
  v) Keyword parameter default table (KPDTAB)

vi) Sequencing Symbol Table Name (SSNTAB)
vii) Sequencing Symbol Table (SSTAB)

* Algorithm

1) Initialise SSNTAB & PNTAB ptr to 0 & fields of MNT

2) For macro prototype statement from MNT entry
   a. Entry name into name field
   b. For each position parameter field
      i. Enter name in parameter name table
      ii Increment PNTAB
      iii Increment pp by 1

   c. KPDTP ← KPDTP - ptr d

3) do
   begin
   read statement
   a. if a label has SS then
      if SS in SSNTAB get index
      else
      begin
      enter SS in SSNTAB
      SSNTAB ptr++
      Store MDT ptr in SSTAB
      if model statement then
      begin
      increment MDT ptr

if preprocessor statement
begin
if AIF & AGO then if SS is already present SS
retrieve index

* Conclusion - Thus we have studied macro processor in C.