



DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

Title: Implement Macro in Assembly Language Programming

MICROPROCESSORS AND MICROCONTROLLERS LAB
CSE 304



GREEN UNIVERSITY OF BANGLADESH

1 Objective(s)

- To understand 8086 instructions related to Macro using Assembly Language Program.

2 Problem analysis

A macro is a symbolic name given to one or more assembly language statements. A macro may be used to generate instructions or data definitions.

Syntax for Declaring MACRO:

```
macroName MACRO d1, d2, . . . , dn
Statement 1
Statement 2
. . .
Statement k
ENDM
```

Where d1, d2, . . . ,dn is an optional list of dummy parameters. Dummy parameters are temporary variables; they are not declared by data definition directives (DB, DW). They can be used as input as well as output parameters.

A macro definition can appear anywhere in an assembly language program before the END directive. It is usual to place all macro definitions at the beginning of a program before the segment definitions.

The difference between macro and procedure is that procedure requires separate memory location to store, where as macro uses the same memory location of the code where the macro actually is being called. Furthermore, in macro parameter values can be passed.

3 Assembly Language Program Example for Macro

```
1
2 MDSPLY_STRING MACRO STRING ; Declaration of MACRO
3
4 MOV DX, OFFSET STRING
5
6 MOV AH, 09H
7 INT 21H
8
9 ENDM
10
11 ORG 100H
12
13 .DATA
14 MESSAGE1 DB 'Microprocessors and', 0DH, 0AH, '$'
15 MESSAGE2 DB 'Microcontrollers Lab$'
16
17 .CODE
18 MAIN PROC
19 MOV AX, @DATA
20 MOV DS, AX
21
22 MDSPLY_STRING MESSAGE1 ; 1st Call of the MACRO
23 MDSPLY_STRING MESSAGE2 ; 2nd Call of the MACRO
24
25 MOV AH, 4CH ; Return to DOS
26 INT 21H
```

```
27  
28 MAIN ENDP  
29 END MAIN
```

4 Sample Input/Output (Compilation, Debugging & Testing)

The program will print two string using macro named MDSPLY_STRING.

Microprocessors and Microcontrollers Lab

5 Discussion & Conclusion

Based on the focused objective(s) to understand about macro in assembly language programming, the additional lab exercise made me more confident towards the fulfilment of the objectives(s).

6 Lab Task (Please implement yourself and show the output to the instructor)

1. Write an Assembly Language code that takes an input ARRAY and passes the array values and address to a MACRO. Using the array, address and one procedure separate out the ODD digits and EVEN digits.

Input: 2 0 4 7 1 9 Output: ODD Digits: 7 1 9 EVEN Digits: 2 0 4

7 Lab Exercise (Submit as a report)

- Write an Assembly Language code that takes an input ARRAY and passes the array values and address to a MACRO. Now produce the summation of odd digits and even digits as output.

Input: 3 1 4 5 1 6 8 7 Output: ODD Digits: 17 EVEN Digits: 18

8 Policy

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