Department of
Computer Science and Engineering

Title: Introduction to assembly program structure and various arithmetic operations.

Microprocessors and microcontrollers
CSE 304

Green University of Bangladesh

1 Objective(s)

- To provide an introduction to syntax and structure of assembly language.
- To implement various basic arithmetical operations.

2 Problem analysis

An assembly program basically divided into three sections. They are- (i) The Data section, (ii) The bss section and (iii) The text section. The Data section is used for initializing data and constants. This data doesn't change during runtime. The bss section is used for declaring variables and at last the text section contains actual code. In this section the actual program execution begins. Syntax of assembly language follows as- [Labels] mnemonic [Operands] [;Comments] in this format.For arithmetic operations ADD, SUB, MUL, DIV etc commands are used in assembly. In the given example, two numbers

2.1 Assembly Programs

This is the basic structure of assembly codes.

```
1  MODEL SMALL
2  ;This is a comment
3  .STACK lOOH
4  .DATA
5  ;data definitions go here
6  .CODE:
7  MAIN PROC
8  ;instructions go here
9  MAIN ENDP
10 ;other proced
11 END MAIN
```

2.1.1 Taking input from user

```
1  .MODEL SMALL
2   .STACK 100H
3
4   .CODE
5     MAIN PROC
6       MOV AH, 1                    ; read a character
7       INT 21H
8
9       MOV BL, AL                   ; save input character into BL
10
11      MOV AH, 2
12      MOV DL, 0DH
13      INT 21H
14      MOV DL, 0AH                  ;line 11 to line 14 is used for printing new
            line.
15
16      MOV AH, 2                    ; display the character stored in BL
17      MOV DL, BL
18      INT 21H
19
20      MOV AH, 4CH                  ; return control to DOS
21      INT 21H
```

```
22
23      MAIN ENDP
24   END MAIN
```

3 Multiplication of two numbers(2 and 5)

```
1  TITLE PGM1_1: Sample program
2  .MODEL SMALL
3  .STACK 100H
4  .DATA
5  A DW 2
6  B DW 5
7  RESULT DW ?
8  .CODE
9  MAIN PROC
10     MOV AX,@DATA
11     MOV DS,AX
12     ;MUL TWO NUMBERS
13
14     MOV AX,A
15     MUL B
16     MOV RESULT,AX
17
18
19     MOV AX,02H
20     INT 21H
21
22
23     MAIN ENDP
24     END MAIN
```

4 Ouput

10

5 Discussion & Conclusion

Based on the focused objective(s) to understand about the structure of assembly language,various arithmetic operations and 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. Perform addition, subtraction, multiplication and division of 6 and 2 these two numbers in a single code.
2. Take two single digit integer inputs from and perform addition, subtraction, multiplication and division on two numbers.

7 Lab Exercise (Submit as a report)

- Take a double digit number input from the user.

- Convert 260°C to Fahrenheit using the following expression and store in a F variable: °F = °C×9/5 + 32 - 1
- Convert 1000 °F (Fahrenheit) to °C (Celsius) using the following expression and store in a C variable: °C = (°F - 32)× 5/9 + 1

8 Policy

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