



DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

**Title: Implementation of conditional statement
using assembly language.**

MICROPROCESSORS AND MICROCONTROLLERS
CSE 304



GREEN UNIVERSITY OF BANGLADESH

Table 1: Jump Instructions

| Opcode | Description | Flag |
|--------|------------------------------------|----------------|
| JA | Jump IF above | CF=0 and ZF=0 |
| JAЕ | Jump IF above or equal | CF=0 |
| JB | Jump IF below | CF |
| JBE | Jump IF below or equal | CF or ZF |
| JC | Jump IF carry | CF |
| JE | Jump IF equal | ZF |
| JG/JGE | Jump IF greater/Greater than equal | ZF=0 and SF=OF |
| JL/JLE | Jump IF Less/Less than equal | SF!=OF |

1 Objective(s)

- The main objective of this topic is to implement basic conditional statements in assembly language.

2 Problem analysis

To execute conditional operations, CPU checks the state of flag registers. Flag registers basically reflect what was the result of the last thing that CPU did. Decision is being made based on the status of various flag registers. Based on the flag register we can execute a certain portion or can execute different portion of our program. Just like if-else condition in high level language. This jump can be either conditional or unconditional. Unconditional jump may take place by JMP instruction. For conditional branching, CMP instruction can be used.

Syntax: CMP destination, source

Example:

CMP DX, 00 ; Compare the DX value with zero

JE L7 ; If yes, then jump to label L7

.

.

L7:

For conditional branching, various instructions are used other than JE. JNE/JNZ stands for Jump not Equal or Jump Not Zero, JG/JNLE stands for Jump Greater or Jump Not Less/Equal, JGE/JNL stands for Jump Greater/Equal or Jump Not Less etc. Follow your reference book for more branching instructions. Table 1. shows different jump instructions that are used in assembly language. It also depicts description of instructions and corresponding flag registers.

3 Printing two characters in alphabetic order using assembly language

```

1  .MODEL SMALL
2  .STACK 100H
3
4  .DATA
5      msg_1    DB  'Enter the first capital letter : $';message 1
6      msg_2    DB  'Enter the second capital letter : $';message 2
7      msg_3    DB  'The given capital letters in alphabetical order are : $';message
8              3
9      NEXT     DB  0DH, 0AH, "$"
10
11 .CODE
12     MAIN PROC
13         MOV AX, @DATA
14         MOV DS, AX

```

```

14
15     MOV AH, 9                ; set string output function
16
17     LEA DX, NEXT            ; Next line
18     INT 21H
19
20     LEA DX, msg_1           ; display message 1
21     INT 21H
22
23     MOV AH, 1                ; set input function
24     INT 21H                 ; read first character
25
26     MOV BL, AL              ; save first character into BL
27
28     MOV AH, 9                ; set string output function
29
30     LEA DX, NEXT            ; new line
31     INT 21H
32
33     LEA DX, msg_2           ; message 2
34     INT 21H
35
36     MOV AH, 1                ; set input function
37     INT 21H                 ; read second character
38
39     MOV BH, AL              ; save second character into BH
40
41     MOV AH, 9                ; set string output function
42
43     LEA DX, NEXT            ; next line
44     INT 21H
45
46     LEA DX, msg_3           ; message3
47     INT 21H
48
49     MOV AH, 2                ; set output function
50
51     CMP BL, BH
52
53     JAE Larger_
54     MOV DL, BL
55     INT 21H
56
57     MOV DL, BH
58     INT 21H
59
60     JMP _END
61
62     Larger_:
63     MOV DL, BH
64     INT 21H
65
66     MOV DL, BL
67     INT 21H
68
69     _END:
70
71     MOV AH, 4CH

```

| | |
|----|-----------|
| 72 | INT 21H |
| 73 | MAIN ENDP |
| 74 | END MAIN |

4 Input/Output

Output of the program is given below.

| |
|---|
| Enter the first capital letter: H Enter the second capital letter: A The given capital letters in alphabetical order are :AH |
|---|

5 Discussion & Conclusion

Based on the focused objective(s) to understand about the conditional statements in assembly language 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. Print two characters in reverse alphabetic order using assembly language.
2. Take a number from user, print whether the given number is odd or even.
3. Find out the largest number between two numbers using assembly language.

7 Lab Exercise (Submit as a report)

- Take a character input from user, check whether the given character is vowel or not (a,e,i,o,u).
- Take input from user, you have to find out whether the given input is alphabet or digit.
- Take a number input from user, check whether the given number is divisible by 5 or not.

8 Policy

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