Green University of Bangladesh
Department of Computer Science and Engineering (CSE)

Faculty of Sciences and Engineering

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Lab Report No: 03

Course Title: Microprocessor & Microcontroller Lab

Course Code: CSE 304 **Section:** 213D1

Lab Experiment Name: Implementation of conditional statement using assembly language

Student Details

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Lab Report Status

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Comments:..... **Date:.....**

1. TITLE OF THE LAB REPORT EXPERIMENT

Implementation of conditional statement using assembly language

2. OBJECTIVES/AIM

- To understand basic conditional statements in assembly language
- To understand about conditional branching
- To understand about conditional and unconditional jumping
- To understand about level using jumping

3. PROCEDURE

Problem-1: Check a character vowel or consonant

Step-1: Define the necessary data strings for messaging.

Step-2: Read the input character from the user.

Step-3: Compare the input character with various vowels (both uppercase and lowercase) using conditional statements.

Step-4: If the character is a vowel, print "Vowel" and return.

Step-5: else the character is a consonant, print "Consonant" and return.

Step-6: Terminate the program using the DOS interrupt (int 21h, function 4Ch).

Problem-2: Check whether an input is an Alphabet or digit or others

Step-1: Declare the necessary data strings for messaging and a newline.

Step-2: Load the data segment and move it to the data register.

Step-3: Prompt the user to enter an input character.

Step-4: Check if the input character is a digit (ASCII range 30h to 39h).

Step-5: If it is not a digit, check if it is an uppercase letter (ASCII range 41h to 5Ah).

Step-6: If it is not an uppercase letter, check if it is a lowercase letter (ASCII range 61h to 7Ah).

Step-7: Print the appropriate message based on the category of the input character

4. IMPLEMENTATION + OUTPUT

Problem-1: Check a character vowel or consonant

```
; check a character is vowel or consonant
org 100h
.model small
.stack 100h

.data
  msg1 db "Enter Character : $"
  vowel db "Vowel$"
  const db "Consonant$"
  newline db 0dh, 0ah, "$"

.code
main proc
     mov ax,@data
     mov ds,ax
     mov ah, 9
     lea dx, msg1
     int 21h
     mov ah,1h
     int 21h
     ; print a newline
     mov ah, 9
     lea dx, newline
     int 21h
```

```
     ; below is conditional statements for various conditon with
level
     cmp al,'A'
     je vwl

     cmp al,'a'
     je vwl

     cmp al,'E'
     je vwl

     cmp al,'e'
     je vwl

     cmp al,'I'
     je vwl

     cmp al,'i'
     je vwl

     cmp al,'O'
     je vwl

     cmp al,'o'
     je vwl

     cmp al,'U'
     je vwl

     cmp al,'u'
     je vwl

     mov ah,9
     lea dx, const
     int 21h
```

```
    ret

    vwl:
    mov ah,9
    lea dx, vowel
    int 21h
    ret

    Quit:
    mov ah,4ch
    int 21h

main endp
```

Problem-2: Whether an input is alphabet or digits or others

```
org 100h
.model small
.stack 100h

.data
    msg1 db 'Alphabet$'
    msg2 db 'Digit$'
    msg3 db 'others$'
    msg4 db 'Enter Input:$'
    newline db 0dh, 0ah, "$"

.code
main proc

    MOV AX, @DATA
    MOV DS, AX


    mov ah, 9
```

```
    lea dx, msg4
    int 21h

    ; Read character
    mov ah, 01h
    int 21h
    mov bl, al

    ; Print newline
    mov ah, 9
    lea dx, newline
    int 21h

    ; Check character category
    cmp bl, 30h  ; Check if it's a digit
    JAE check_alpha

    others:
    mov ax, @data
    mov ds, ax
    mov ah, 9
    lea dx, msg3
    int 21h
    jmp end

    check_alpha:
    ; Compare with ASCII for digit '9'
    cmp bl, 39h
    JBE print2

; Compare with ASCII for uppercase letter 'A'
    cmp bl, 41h
    JAE check_lower

    print2:
    mov ax, @data
```

```
mov ds, ax
mov ah, 9
lea dx, msg2
int 21h
jmp end

check_lower:
; Compare with ASCII for uppercase letter 'Z'
cmp bl, 5Ah
JBE print3

small_letter:
; Compare with ASCII for lowercase letter 'a'
cmp bl, 61h
JAE small_letter_1

print3:
mov ax, @data
mov ds, ax
mov ah, 9
lea dx, msg1
int 21h
jmp end

small_letter_1:
; Compare with ASCII for lowercase letter 'z'
cmp bl, 7Ah
JBE print4

print4:
mov ax, @data
mov ds, ax
mov ah, 9
lea dx, msg1
int 21h
```

```
    end:
    ret

main endp
endp
```

5. OUTPUT

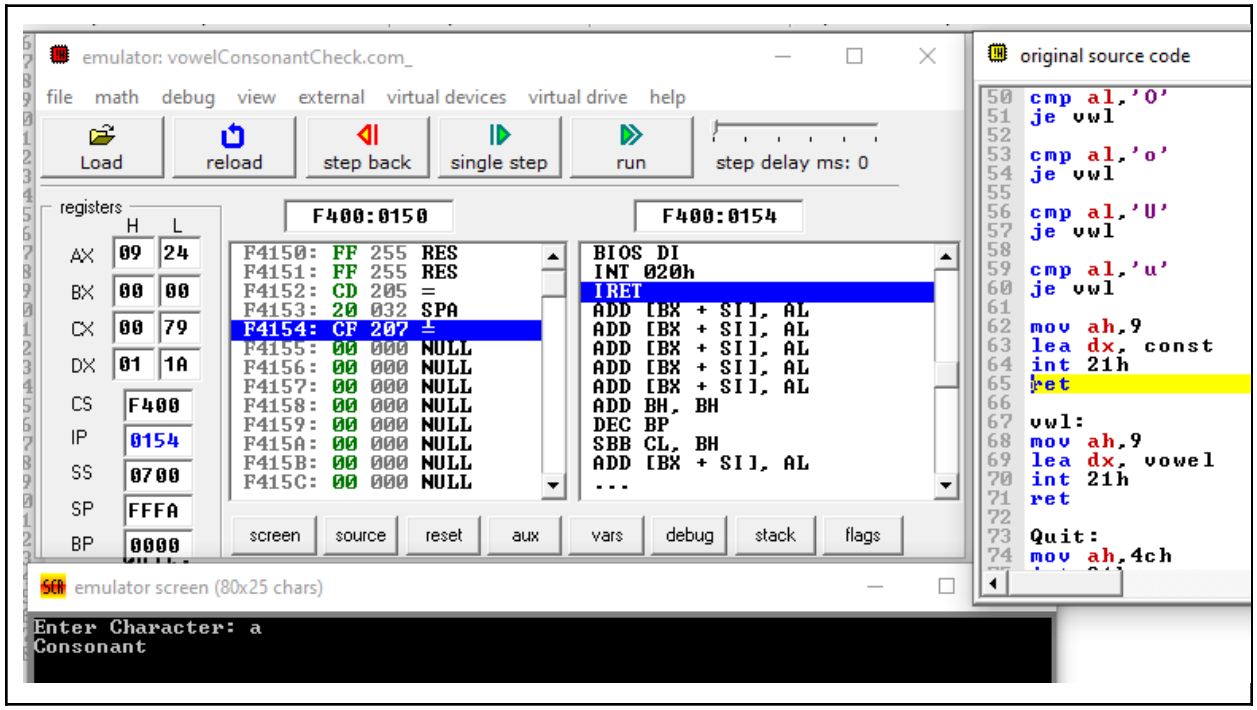

Figure-1: Output snapshot in console to print a character is vowel or consonant

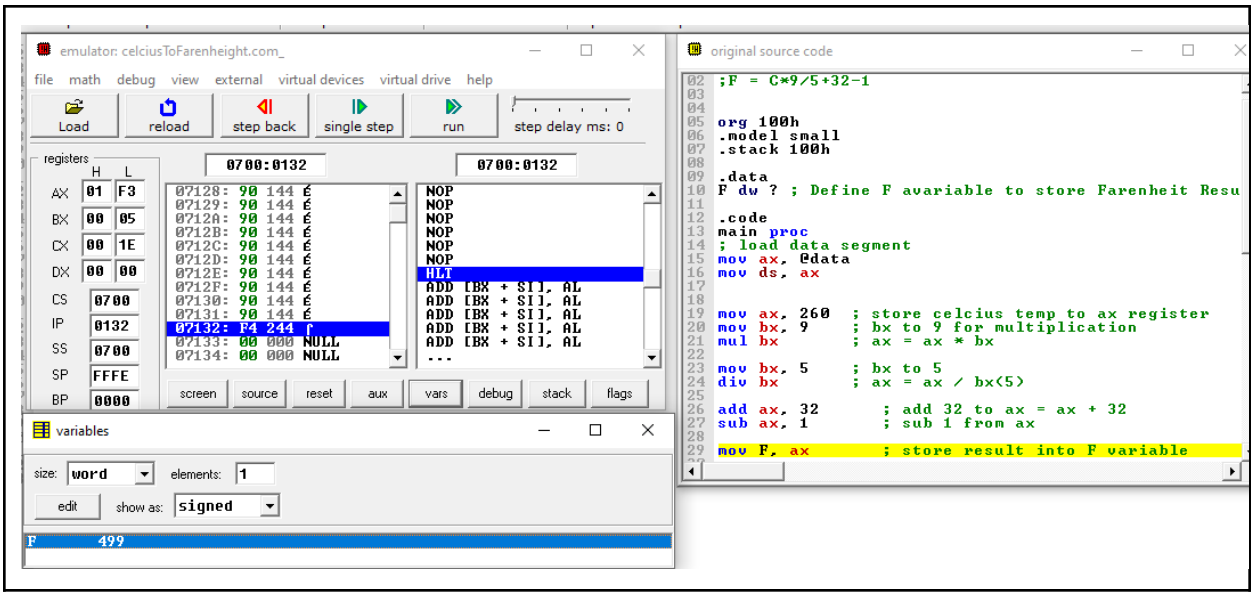

Figure-2: Output of an input whether this input is an alphabet or digit or others

6. ANALYSIS AND DISCUSSION

The Vowel Checker Program efficiently identifies whether a character is a vowel by comparing it against the vowel set ('a', 'e', 'i', 'o', 'u'), delivering precise outcomes for all characters within its range through simple conditional checks. In contrast, the Alphabet or Digit Program adeptly determines if an input is a letter or a number based on ASCII values, effectively handling both lowercase and uppercase letters as well as distinguishing them from digits using straightforward ASCII range comparisons. Both programs showcase efficiency and accuracy in their respective functionalities.