CIS40/CNET220 EXERCISE 6

NAME

1. Assemble the **MASM** version of the code in the PWB or Visual C++ editor (see next sheet for code and template)

MASM Version	DEBUG Version
; PUSH DS ;save Debug return information	0100 PUSH DS
; MOV AX,0	0101 MOV AX,0000
; PUSH AX	0104 PUSH AX
MOV AX,2000H ;initialize output message seg/offset	0105 MOV AX,2000
MOV DS,AX	0108 MOV DS,AX
MOV SI,0	010A MOV SI,0000
WAITFORLF:	
MOV AH,1 ;1 is keyboard command for INT 21H	010D MOV AH,01
INT 21H ;read one character from keyboard	010F INT 21
CMP AL,0DH ;0DH is Carriage Return	0111 CMP AL,0D
JE DATAENTERED ;if Enter Key pressed jump	0113 JZ 001A
MOV [SI],AL ;else save output to buffer	0115 MOV [SI],AL
INC SI	0117 INC SI
JMP WAITFORLF ;get next character	0118 JMP 010D
DATAENTERED:	
MOV AL,20H ;add a space to previous characters	011A MOV AL,20
MOV [SI],AL ;save to output buffer	011C MOV [SI],AL
INC SI	011E INC SI
MOV AH,0 ;read Display character	011F MOV AH,00
INT 16H	0121 INT 16
CMP AL,'D' ;'D' is for display	0123 CMP AL,44
JE DISPLAYMESSAGE ;if 'D' pressed display and quit	0125 JZ 0129
JMP WAITFORLF ;else get next set of characters	0127 JMP 010D
DISPLAYMESSAGE:	
MOV AL,24h	0129 MOV AL,24
MOV [SI],AL	012B MOV [SI],AL
MOV AH,9H ;9 is the command to display a buffer	012D MOV AH,09
MOV DX,0 ;this is the offset to the buffer	012F MOV DX,0000
INT 21H	0132 INT 21
; RETF ;Return to DEBUG program	0134 RETF

Table 1

MASM 6 ASSEMBLER DIRECTIVES

```
.MODEL  small


        .STACK   200

        .DATA

;Define Constants

cstCR           = 0Dh
cstLF           = 0Ah
cstSPACE        = 20h
cstEOL          = 24h


        .CODE

        .STARTUP
MAIN    PROC

        MOV AX,2000H ;initialize output message seg/offset
        MOV DS,AX
        MOV SI,0

WAITFORLF:
        MOV AH,1        ;1 is keyboard command for INT 21H
        INT 21H         ;read one character from keyboard
        CMP AL,0DH      ;0DH is Carriage Return
        JE DATAENTERED      ;if Enter Key pressed jump
        MOV [SI],AL     ;else save output to buffer
        INC SI
        JMP WAITFORLF       ;get next character

DATAENTERED:
        MOV AL,20H      ;add a space to previous characters
        MOV [SI],AL     ;save to output buffer
        INC SI

        MOV AH,0        ;read Display character
        INT 16H
        CMP AL,'D'      ;'D' is for display
        JE DISPLAYMESSAGE   ;if 'D' pressed display and quit
        JMP WAITFORLF       ;else get next set of characters

DISPLAYMESSAGE:
        MOV    AL,24h
        MOV    [SI],AL
        MOV    AH,9H    ;9 is the command to display a buffer
        MOV    DX,0     ;this is the offset to the buffer
        INT    21H

MAIN    ENDP
        .EXIT
        END             ;Place End here if no subroutines else place after last subroutine
```

2. Build the code from the project menu tab
3. Run the code in debug mode from the run menu tab
4. Test its operation entering various messages, then displaying them by entering ‘D’
5.

Instructor Verification basic operation _____

    a. Modify to accept ‘d’ also for displaying the message
6. Modify the code so that a carriage return and line feed happen after each entered word
    a. Note the carriage return character 0Dh causes the cursor to go to the beginning of the line
    b. Note the line feed character 0Ah causes the cursor to go to the next line
    c. Send these characters using the INT 21 command with AH equal 2

Instructor Verification _____