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NAME          TMRHNDLR

;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;
;                      TIMER HANDLERS                      ;
;                      Homework 4                          ;
;                      EE/CS 51                            ;
;
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

; This file includes . The included
; functions are:
;   TimerEventHandler - calls DisplayMUX repeatedly to sustain display
;   InstallTimerHandler - installs timer event handler for the timer interrupt

; Revision History:
;   10/27/16      Jennifer Du      initial revision

;external function declarations

        EXTRN    DisplayMux:NEAR                ; multiplexing function for LED display

$INCLUDE(handlers.inc)                        ; include file for handlers, interrupts, timers

CGROUP    GROUP    CODE

CODE      SEGMENT PUBLIC 'CODE'

        ASSUME    CS:CGROUP

; TimerEventHandler
;
; Description:      This function is the event handler for the timer
;                  interrupts. It outputs the next pattern
;                  to the LED display by calling DisplayMux whenever
;                  interrupted.
;
; Operation:       This function calls DisplayMux, which displays the
;                  current digit to be displayed, as stored by the variable
;                  currentSeg.
;
; Arguments:       None.
; Return Value:    None.
; Local Variables: None.
; Shared Variables: None.
; Global Variables: None.
; Input:          None.
; Output:          A digit will be displayed on the LED display.
; Error Handling:  None.
; Algorithms:      None.
; Data Structures: None.
;

TimerEventHandler    PROC    NEAR
                    PUBLIC  TimerEventHandler

StartTimerEventHandler:
        PUSH        AX                ; save the registers
        PUSH        BX
        PUSH        DX

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CallDisplayMux:
    CALL    DisplayMux                ; call DisplayMux once to flash one digit

EndTimerEventHandler:
    MOV     DX, INTCtrlrEOI           ;send the EOI to the interrupt controller
    MOV     AX, TimerEOI
    OUT     DX, AL

    POP     DX                        ;restore the registers
    POP     BX
    POP     AX

    IRET                             ;return (Event Handlers end with IRET not RET)

TimerEventHandler    ENDP

;
;
;
; InstallTimerHandler
;
; Description:      This function installs the event handler for the timer
;                  interrupt. It is based on Glen's code.
;
; Operation:       The event handler address is written to the timer
;                  interrupt vector.
;
; Arguments:       None.
; Return Value:    None.
; Local Variables: None.
; Shared Variables: None.
; Global Variables: None.
; Input:          None.
; Output:          None.
; Error Handling:  None.
; Algorithms:     None.
; Data Structures: None.
;

InstallTimerHandler    PROC    NEAR
                        PUBLIC  InstallTimerHandler

StartInstallTimerHandler:

    XOR     AX, AX                    ;clear ES (interrupt vectors are in segment 0)
    MOV     ES, AX

                                ;store the vector
    MOV     ES: WORD PTR (4 * Tmr0Vec), OFFSET(TimerEventHandler)
    MOV     ES: WORD PTR (4 * Tmr0Vec + 2), SEG(TimerEventHandler)

    RET                                     ;all done, return

InstallTimerHandler    ENDP

CODE                ENDS

END

```