```
;-------------------------------------------------------------------------------
; MSP430 Assembler Code Template for use with TI Code Composer Studio
;
;
;-------------------------------------------------------------------------------
            .cdecls C,LIST,"msp430.h"       ; Include device header file

;-------------------------------------------------------------------------------
            .def    RESET                   ; Export program entry-point to
                                            ; make it known to linker.
;-------------------------------------------------------------------------------
            .text                           ; Assemble into program memory.
            .retain                         ; Override ELF conditional linking
                                            ; and retain current section.
            .retainrefs                     ; And retain any sections that have
                                            ; references to current section.

;-------------------------------------------------------------------------------
RESET       mov.w   #__STACK_END,SP         ; Initialize stackpointer
StopWDT     mov.w   #WDTPW|WDTHOLD,&WDTCTL  ; Stop watchdog timer


;-------------------------------------------------------------------------------
; Main loop here
;-------------------------------------------------------------------------------

_start:

        bis.b #0xFF, P3DIR                              ;output for 7-seg disp

        bis.b #BIT0, P2DIR                              ;output for green led
        bis.b #BIT2, P2DIR                              ;output for blue led
        bis.b #BIT4, P7DIR                              ;output for red led

        bic.b #BIT5, P1DIR                              ;set direction for pin 1.5
(tilt switch)
        bis.b #BIT5, P1REN                              ;enable pullup resistor
        bis.b #BIT5, P1OUT                              ;set output register to 1

        bic.b #BIT2, P1DIR                              ;set direction for Pin 1.2
(red led)
        bis.b #BIT2, P1REN                              ;enable pullup resistor
        bis.b #BIT2, P1OUT                              ;set output register to 1

        bic.b #BIT3, P1DIR                              ;set direction for Pin 1.3
(blue led)
        bis.b #BIT3, P1REN                              ;enable pullup resistor
        bis.b #BIT3, P1OUT                              ;set output register to 1

        bic.b #BIT4, P1DIR                              ;set direction for Pin 1.4
```

```
(green led)
        bis.b #BIT4, P1REN                              ;enable pullup resistor
        bis.b #BIT4, P1OUT                              ;set output register to 1


tilt_check      call #red_test
                        bit.b #BIT5, P1IN       ;check if switch is on/off
                                jnz increase            ;jump to increase label if
on
                                jz  decrease            ;jump to decrease label if
off
                        ret


increase        mov.b #00010001b, P3OUT         ;display 0 on 7-seg disp
                                call #delay                             ;jump to
code from delay label
                                call #led_check                 ;jump back to
led_test label
                                                                                ;and
test for any RGB buttons

                        mov.b #10011111b, P3OUT         ;display 1 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #00110010b, P3OUT         ;display 2 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #00010110b, P3OUT         ;display 3 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #10011100b, P3OUT         ;display 4 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #01010100b, P3OUT         ;display 5 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #01010000b, P3OUT         ;display 6 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #00011111b, P3OUT         ;display 7 on 7-seg disp
                                call #delay
                                call #led_check
                        mov.b #00010000b, P3OUT         ;display 8 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #00010100b, P3OUT         ;display 9 on 7-seg disp
                                call #delay
                                call #led_check

                                jmp tilt_check                          ;jump back
to test if tilt switch is off

decrease        mov.b #00010100b, P3OUT         ;display 9 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #00010000b, P3OUT         ;display 8 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #00011111b, P3OUT         ;display 7 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #01010000b, P3OUT         ;display 6 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #01010100b, P3OUT         ;display 5 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #10011100b, P3OUT         ;display 4 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #00010110b, P3OUT         ;display 3 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #00110010b, P3OUT         ;display 2 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #10011111b, P3OUT         ;display 1 on 7-seg disp
                                call #delay
                                call #led_check

                        mov.b #00010001b, P3OUT         ;display 0 on 7-seg disp
                                call #delay
                                call #led_check
                                jmp tilt_check                  ;jump back to test
if tilt switch is on

;start of delay sub routine
delay   mov.w #0x00ffffff, R12          ;sets high number in register 12
timer           dec R12                                 ;decreases the number stored
in register 12
                        jnz timer                               ;jumps back a line
until register 12 is 0
                        ret

;start of led_check subroutine
led_check   bit.b #BIT2, P1IN           ;check if red button is on/off
                        jz red_light            ;if on, jump to red_light label

                        bit.b #BIT3, P1IN               ;check if blue button is
on/off
                                jz blue_light           ;if on, jump to blue_light
label

                        bit.b #BIT4, P1IN               ;check if green button is
on/off
                                jz green_light          ;if on, jump to green_light
label

                                ret                                     ;return to
call command

red_light       bic.b #BIT4, P7OUT              ;turn on red led
                        bis.b #BIT2, P2OUT              ;turn off blue led
                        bis.b #BIT0, P2OUT              ;turn off green led

        ret

blue_light      bis.b #BIT4, P7OUT              ;turn off red led
                        bic.b #BIT2, P2OUT              ;turn on blue led
                        bis.b #BIT0, P2OUT              ;turn off green led

        ret

green_light     bis.b #BIT4, P7OUT              ;turn off red led
                        bis.b #BIT2, P2OUT              ;turn off blue led
                        bic.b #BIT0, P2OUT              ;turn on green led

        ret

                nop

;-------------------------------------------------------------------------------
```

```
; Stack Pointer definition
;-------------------------------------------------------------------------------
            .global __STACK_END
            .sect   .stack

;-------------------------------------------------------------------------------
; Interrupt Vectors
;-------------------------------------------------------------------------------
            .sect   ".reset"                ; MSP430 RESET Vector
            .short  RESET
```