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;=====================================================================
; A RUDIMENTARY MUSIC PLAYER PROGRAM FOR WICHIT'S 8080 DEV BOARD
;          v3.3 by DeviceGuru (http://deviceguru.com)
; NOTES...
; 1. this was inspired by the listing here:
; http://kevindriscoll.org/projects/ccswg2012/fool_on_a_hill.html
; 2. this was compiled with zasm, available for free download here:
; http://k1.spdns.de/Develop/Projects/zasm/Distributions/
; or via online compiler at: http://k1.spdns.de/cgi-bin/zasm.cgi
; 3. Be sure to set the 8080 board's interrupt switch to "10ms tick"
;=====================================================================
;
#target bin
.8080
#code FILLER,0,0x8100 ; create offset so code compiles to begin at 8100h in the
board's RAM
#code PROGRAM
prep:               ; initialize interrupt vector
    mvi a,$c3
    sta 8038h
    mvi a,$12
    sta 8039h
    mvi a,$81
    sta 803ah
    jmp begin       ; jump around ISR
; ================================================
interrupt_service_routine:
                    ; this creates note tempo
    dcr c           ; decrement C and return
    ei
    ret
; ================================================
begin:
    lxi h,daisy   ; point to notecode table for desired song
get_note:
    mov a,m         ; get current notecode
    out $00         ; show notecode on LEDs
    cpi $ff         ; is note an ff?
    jz done         ; if yes we're done
    mov a,m         ; get notecode again
    cpi $00         ; is note a 00?
    jz play_rest    ; if yes go do 1-beat rest
    jmp play_note   ; if no go do 1-beat note
;
done:
    mvi a,$aa
    out $00         ; show end code in LEDs
    di              ; disable interrupts
    RST 3           ; done!
;
; ================================================
;
play_note:
    mvi c,tempo     ; set tempo (1 beat ~ tempo*20 ms)
    ei              ; enable interrupts
; do first half of square wave
noteloop:
    mvi a,$7f       ; turn speaker DC on
    out $40
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    mov a,m          ; get notecode again
;
loop1:
    dcr a
    jnz loop1        ; continue for 1st half of square wave
;
    mvi a,$ff        ; turn speaker DC off
    out $40
    mov a,m          ; get notecode again
loop2:
    dcr a
    jnz loop2      ; loop to complete 2nd half of square wave
;
    mov a,c          ; see if interrupt-decremented duration is completed
    cpi $00
    jnz noteloop     ; continue note for one beat
;
    inx h            ; point to next note
    jmp get_note
;
play_rest:
    mvi c,tempo       ; set tempo (1 beat = tempo*20 ms)
    ei
loop3:
    mov a,c          ; loop for one beat
    cpi $00
    jnz loop3        ; continue rest for one beat
    inx h            ; point to next note
    jmp get_note
;
; =====================================================
;
tempo equ $25        ; quarter note duration at moderato rate
;
;daisy:  ; notes for Daisy Daisy song...
    db n_c5,n_c5,n_c5,n_a4,n_a4,n_a4,n_f4,n_f4,n_f4,n_c4,n_c4,n_c4
;      dai-          sy              dai-           sy
    db n_d4,n_e4,n_f4,n_d4,n_d4,n_f4,n_c4,n_c4,n_c4,n_c4,n_c4,n_c4
;      give me   your an-       swer do
    db n_g4,n_g4,n_g4,n_c5,n_c5,n_c5,n_a4,n_a4,n_a4,n_f4,n_f4,n_f4
;      i'm            half           cra            sy
    db n_d4,n_e4,n_f4,n_g4,n_g4,n_a4,n_g4,n_g4,n_g4,n_g4,n_g4,n_a4
;      all  for  the  love      of   you                      it
    db n_b4f,n_a4,n_g4,n_c5,n_c5,n_a4,n_g4,n_f4,n_f4,n_f4,n_f4,n_g4
;      won't be   a    sty       lish mar  riage,             I
    db n_a4,n_a4,n_f4,n_d4,n_d4,n_f4,n_d4,n_c4,n_c4,n_c4,n_c4,n_c4
;      can't     a    ford      the  car  riage,             but
    db n_f4,n_f4,n_a4,n_g4,$00,$00,n_f4,n_f4,n_a4,n_g4,n_a4,n_b4f
;      you'll    look sweet,         on        the  seat of   a
    db n_c5,n_a4,n_f4,n_g4,n_g4,n_c4,n_f4,n_f4,n_f4,n_f4,$ff
;      by-  cy-  cle  built     for  two
;
sunshine:  ; notes for You Are My Sunshine song...
    db $00,n_g3,n_c4,n_d4,n_e4,n_e4,n_e4,n_e4
;      (rest) you are my sun      -shine
    db $00,n_e4,n_d4,n_e4,n_c4,n_c4,n_c4,n_c4
;      (rest) my on-  ly  sun-      shine
    db $00,n_c4,n_d4,n_e4,n_f4,n_f4,n_a4,n_a4
;      (rest) you make me hap-      py
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    db $00,n_a4,n_g4,n_f4,n_e4,n_e4,n_e4,n_e4
;      (rest) when skys are gray
    db $00,n_c4,n_d4,n_e4,n_f4,n_f4,n_a4,n_a4
;      (rest) You'll ne- ver know      dear,
    db $00,n_a4,n_g4,n_f4,n_e4,n_e4,n_c4,n_c4
;      (rest) how  much I love      you
    db $00,$00,n_c4,n_d4,n_e4,n_e4,n_e4,n_f4
;     (rest)(rest)  please don't take  my
    db n_d4,n_d4,n_d4,n_e4,n_c4,n_c4,n_c4,n_c4,n_c4,$ff
;      sun-      shine a-  way
;
birthday:  ; notes for Happy Birthday song...
    db n_c4,n_c4,n_d4,n_d4,n_c4,n_c4,n_f4,n_f4,n_e4,n_e4,n_e4,$00
;      ha-  py   birth     -day      to        you
    db n_c4,n_c4,n_d4,n_d4,n_c4,n_c4,n_g4,n_g4,n_f4,n_f4,n_f4,$00
;      ha-  py   birth     -day      to        you
    db n_c4,n_c4,n_c5,n_c5,n_a4,n_a4,n_f4,n_f4,n_e4,n_e4,n_d4,n_d4,$00,$00
;      ha-  py   birth     -day      dear      ha-       zel
    db n_b4f,n_b4f,n_a4,n_a4,n_f4,n_f4,n_g4,n_g4,n_f4,n_f4,n_f4,$ff
;      ha-   py    birth     -day      to        you!
;
; === Note codes from c3 through c5 ===
;n_c3  equ $ ; 131 Hz
;n_d3  equ $ ; 147 Hz
;n_e3  equ $ ; 165 Hz
;n_f3  equ $ ; 175 Hz
n_g3  equ $f7 ; 185 Hz
n_a3  equ $dc ; 220 Hz
n_b3f equ $d0 ; 233 Hz
n_b3  equ $c6 ; 247 Hz
n_c4  equ $b9 ; 262 Hz
n_d4  equ $a5 ; 294 Hz
n_e4  equ $93 ; 330 Hz
n_f4  equ $8b ; 349 Hz
n_g4  equ $7b ; 392 Hz
n_a4  equ $6e ; 440 Hz
n_b4f equ $68 ; 466 Hz
n_b4  equ $62 ; 494 Hz
n_c5  equ $5d ; 523 Hz
n_d5  equ $52 ; 587 Hz
n_e5  equ $49 ; 660 Hz
n_f5  equ $45 ; 698 Hz
n_g5  equ $3e ; 784 Hz
n_a5  equ $37 ; 880 Hz
n_b5f equ $34 ; 932 Hz
n_b5  equ $31 ; 988 Hz
n_c6  equ $2e ; 1046 Hz
;======================================================
.end
```