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;EXPT NO._4C: LCD INTERFACING IN 4 BIT MODE FOR DISPLAYING "WELCOME TO VIIT" ROTATING MESSAGE
;NAME - ANIL RAJPUROHIT
;ROLL NO.312046, BATCH -B2
;DATE OF PERFORMANCE - 25/7/18

        ORG 000H
        RS EQU P2.0
        EN EQU P2.1
        RW EQU P2.2
        LCD EQU P0

        MOV A,#28H      ;TO INITIALIZE LCD AS 4 BIT DATA LENGTH, NO.OF LINES 2, 5*7 RESOLUTION
        ACALL COMMAND   ;SEND COMMAND TO LCD
        MOV A,#0EH      ;TURN ON THE DISPLAY AND CURSOR
        ACALL COMMAND   ;SEND COMMAND TO LCD
        MOV A,#01H      ;CLEAR LCD DISPLAY,MEMORY AND CURSOR AT HOME POSITION
        ACALL COMMAND   ;SEND COMMAND TO LCD
        MOV A,#07H      ;TO SHIFT CURSOR TO LEFT FOR NEXT CHARACTER AND DIGIT RIGHT TO LEFT
        ACALL COMMAND   ;SEND COMMAND TO LCD
        MOV A,#8FH      ;SELECT 1ST LINE AND LAST POITION TO DISPLAY AND ROTATE MESSAGE
        ACALL COMMAND   ;SEND COMMAND TO LCD
        MOV A,#80H      ;SELECT 1ST LINE AND POSITION TO DISPLAY MESSAGE
        ACALL COMMAND   ;SEND COMMAND TO LCD

        HERE:MOV A,#'W'     ;SENDING DATA TO LCD
             ACALL DISPLAY
             MOV A,#'E'
             ACALL DISPLAY
             MOV A,#'L'
             ACALL DISPLAY
             MOV A,#'C'
             ACALL DISPLAY
             MOV A,#'O'
             ACALL DISPLAY
             MOV A,#'M'
             ACALL DISPLAY
             MOV A,#'E'
             ACALL DISPLAY
             MOV A,#' '
             ACALL DISPLAY
             MOV A,#'T'
             ACALL DISPLAY
             MOV A,#'O'
             ACALL DISPLAY
             MOV A,#' '
             ACALL DISPLAY
             MOV A,#'V'
             ACALL DISPLAY
             MOV A,#'I'
             ACALL DISPLAY
             MOV A,#'I'
             ACALL DISPLAY
             MOV A,#'T'
             ACALL DISPLAY
             SJMP HERE      ;LOOPING FOR CONTINUOUS OPERATION

        COMMAND:            ;COMMAND SUBROUTINE
             ACALL DELAY
             MOV R0,A       ;COPY COMMAND INSTRUCTION FROM ACC TO R0
             ANL A,#0F0H    ;MASK LOWER NIBBLE
             SWAP A         ;SWAP THE HIGHER NIBBLE TO LSB SIDE AS LOWER PORT PINS ARE CONNECTED
             MOV P0,A       ;MOVE COMMAND TO LCD THROUGH PORT
             CLR RS         ;SELECTING COMMAND REGISTER FOR COMMMAND
             CLR RW         ;SELECTING WRITING MODE
             SETB EN        ;FOR WRITE GIVE HIGH TO LOW PULSE
             NOP            ;WAIT FOR TWO MACHINE CYCLES
             NOP
             CLR EN
             MOV A,R0       ;TAKE ORIGINAL COMMAND FROM PORT R0
             ANL A,#0FH     ;MASK HIGHER NIBBLE
             MOV P0,A       ;MOVE COMMAND TO LCD THROUGH PORT
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 72                CLR RS          ;SELECTING COMMAND REGISTER FOR COMMAND
 73                CLR RW          ;SELECTING WRITING MODE
 74                SETB EN         ;FOR WRITE GIVE HIGH TO LOW PULSE
 75                NOP             ;WAIT FOR TWO MACHINE CYCLES
 76                NOP
 77                CLR EN
 78                RET
 79
 80           DISPLAY:
 81                ACALL DELAY     ;DELAY CALL
 82                MOV R0,A        ;COPY COMMAND INSTRUCTION FROM ACC TO R0
 83                ANL A,#0F0H     ;MASK LOWER NIBBLE
 84                SWAP A          ;SWAP THE HIGHER NIBBLE TO LSB SIDE
 85                MOV P0,A        ;MOVE COMMAND TO LCD THROUGH PORT
 86                SETB RS         ;SELECTING DATA REGISTER FOR COMMAND
 87                CLR RW          ;SELECTING WRITING MODE
 88                SETB EN         ;FOR WRITE GIVE HIFH TO LOW PULSE
 89                NOP             ;WAIT FOR TWO MACHINE CYCLES
 90                NOP
 91                CLR EN
 92                MOV A,R0        ;TAKE ORIGINAL COMMAND FROM R0
 93                ANL A,#0FH      ;MASK HIGHER NIBBLE
 94                MOV P0,A        ;MOVE COMMAND TO LCD THROUGH PORT
 95                SETB RS         ;SELECTING DATA REGISTER FOR COMMAND
 96                CLR RW          ;SELECTING WRITING MODE
 97                SETB EN         ;FOR WRITE GIVE HIGH TO LOW PULSE
 98                NOP             ;WAIT FOR TWO MACHINE CYCLES
 99                NOP
100                CLR EN
101                RET
102
103           DELAY:               ;DELAY SUBROUTINE
104                MOV TMOD,#01H
105                MOV TH0,#0F8H
106                MOV TL0,#0CCH
107                SETB TR0
108           L3:  JNB TF0,L3
109                CLR TR0
110                CLR TF0
111                RET
112
113              END
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