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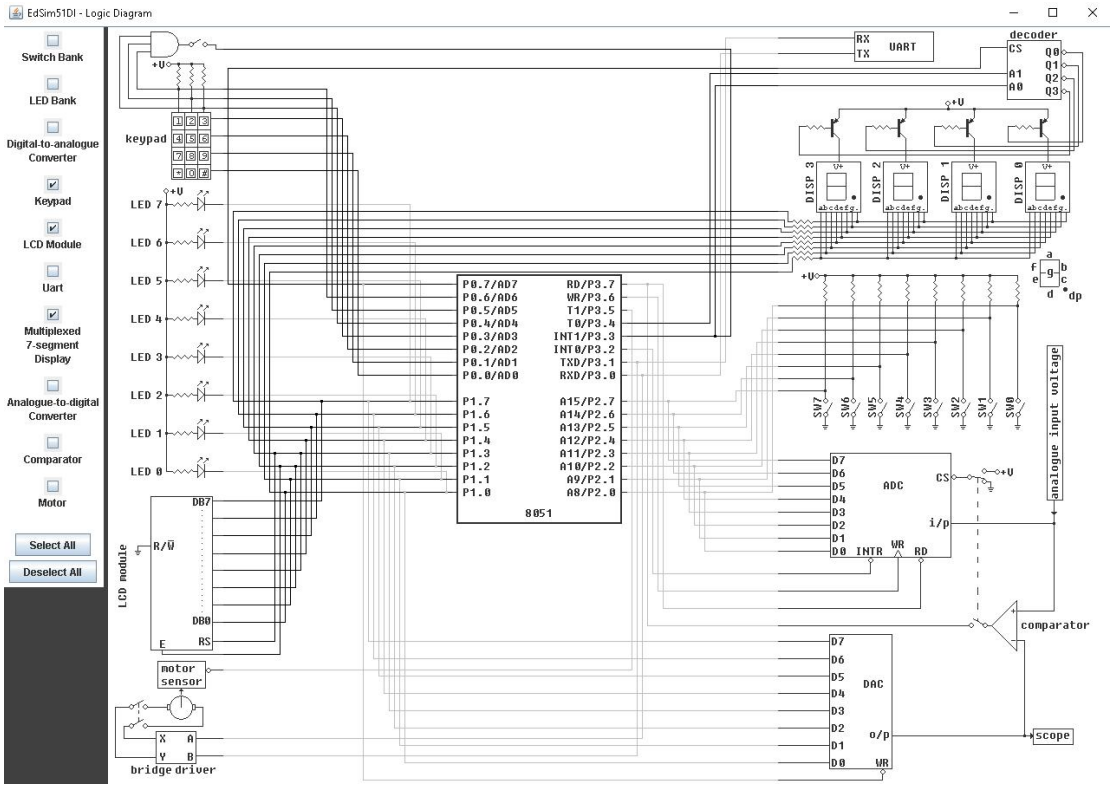
Projeto de Arquitetura de Computadores

- ## Descrição do Projeto

O projeto "Segurança do Brasil" visa criar um sistema de controle de acesso baseado no micro-controladores utilizando o ambiente de simulação EdSim51. O objetivo principal do projeto é desenvolver um painel de senha que permite aos usuários inserirem uma senha por um KeyPad 4x3 e, caso a senha seja correta, o usuário pode fechar a porta ou mudar a senha.

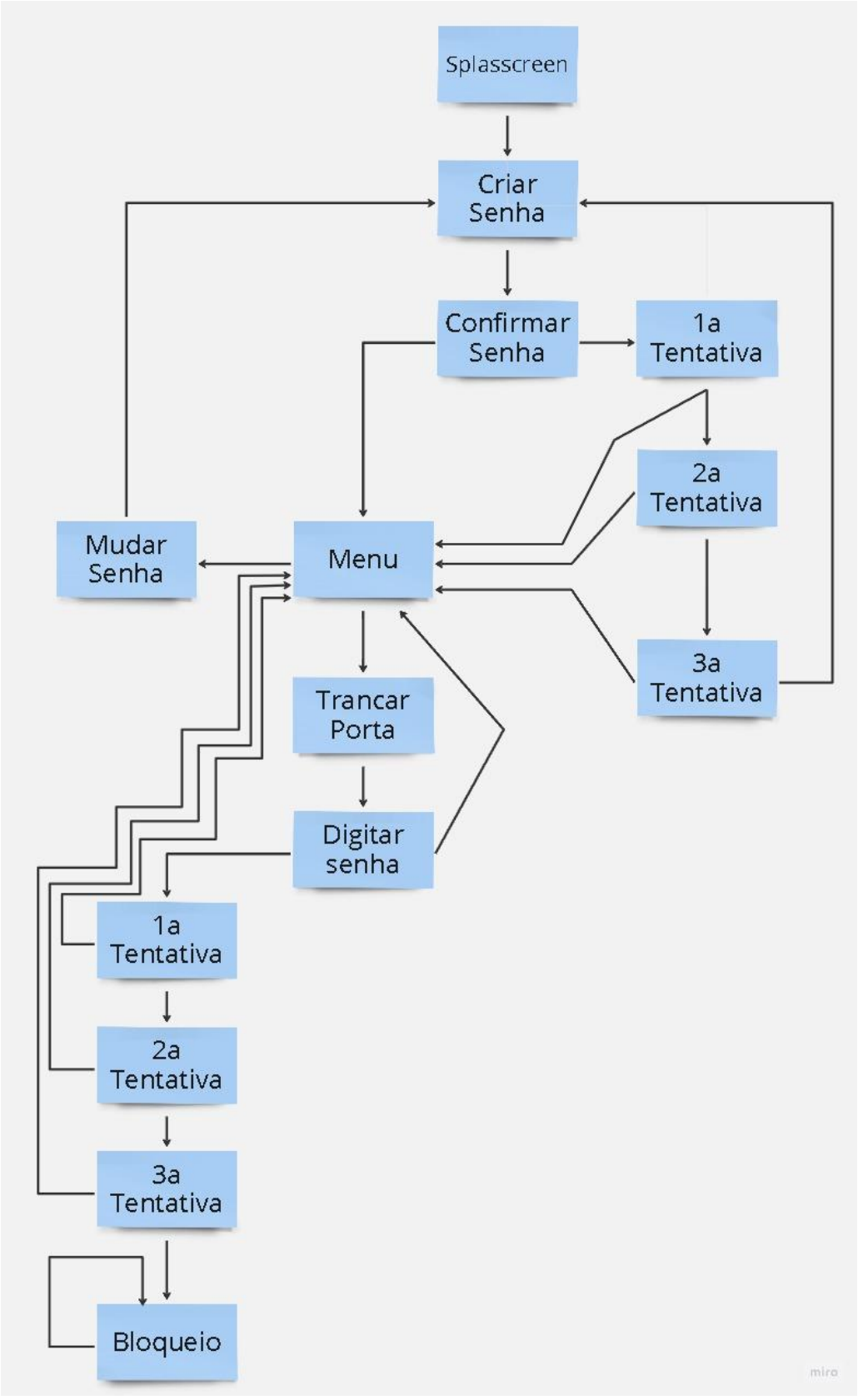
- ## Desenhos esquemáticos

O desenho esquemático do edsim51, mostrando as partes que estão sendo utilizadas.



Está selecionado o LCD Module, o KeyPad e Multiplexed 7-segment Display .

- **Fluxograma ou Diagrama**



- **Imagens da simulação realizada na IDE**

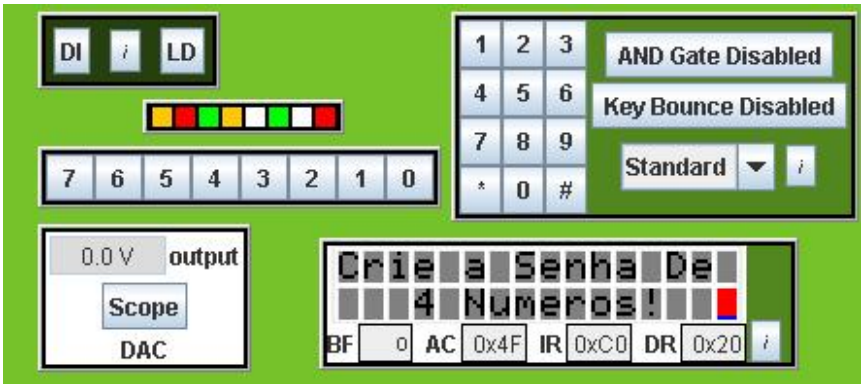


Figura 1 - Display mostrando ao usuario para criar a senha

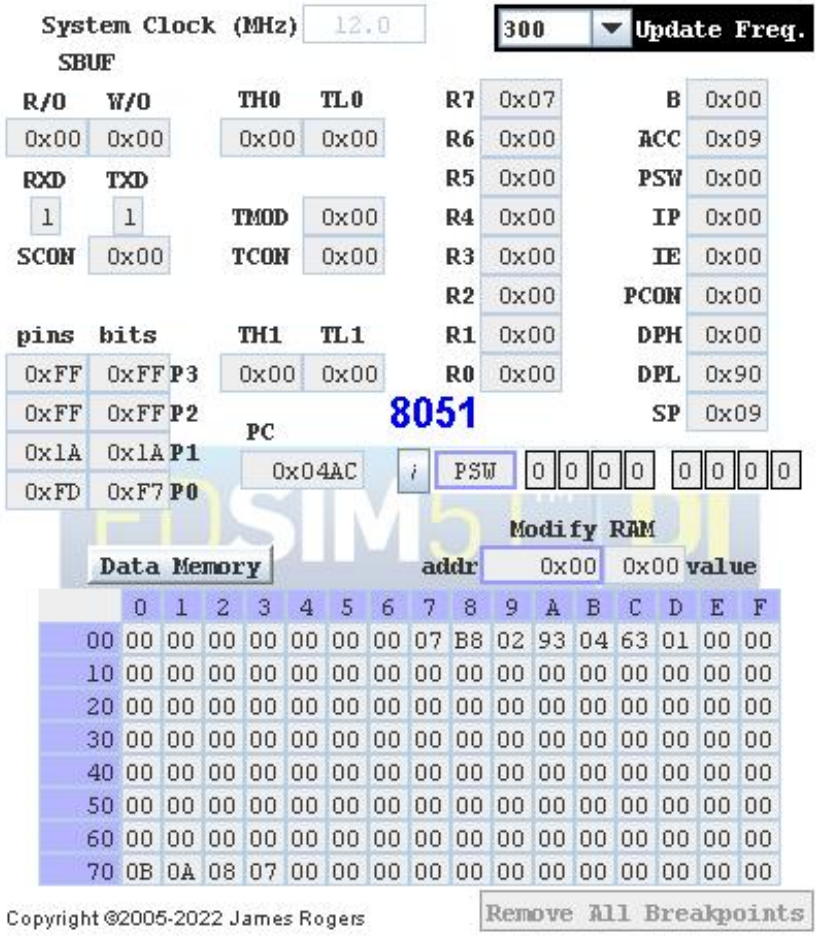


Figura 2 - Memória Interna com a senha salva

- **Imagens da simulação realizada na IDE**

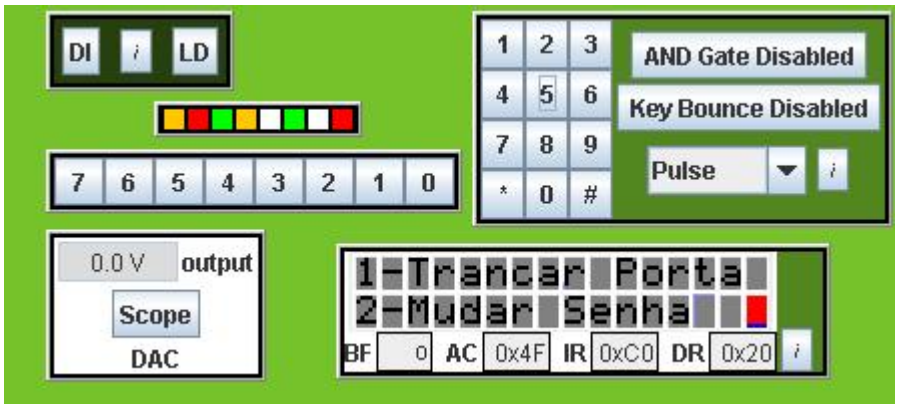


Figura 3 - Menu do programa

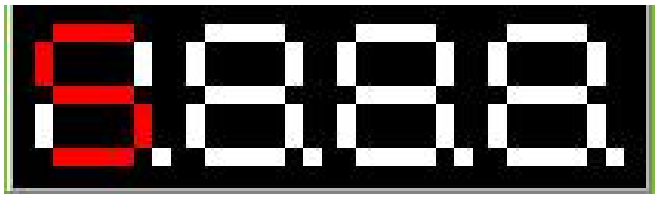


Figura 4 - Display 7seg com 5 da senha selecionado

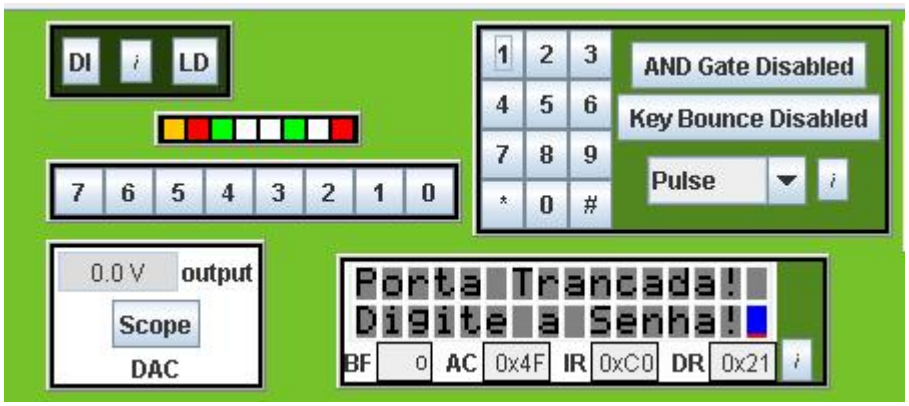


Figura 5 - Display mostrando que a porta está trancada

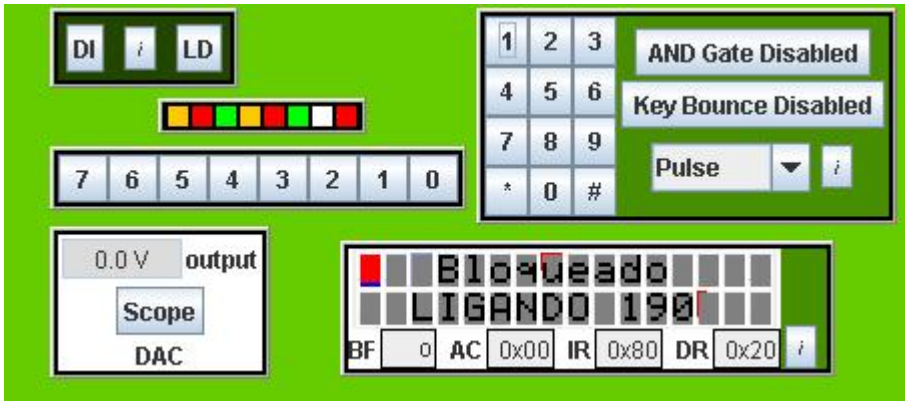


Figura 6 - Porta bloqueada

- **Código-fonte**

```
Org     00H
;============================MAPEAMENTO DE
PINOS==============================
    LCD         EQU P1
    E           EQU P1.2
    RS          EQU P1.3
;=========================================================================
=======
;================CHAMA AS INSTRUÃ‡OES DE ACORDO COM O DATA
SHEET===============
    LCALL       FUNCTIONSET
    LCALL       DISPLAYon_off
    LCALL       ENTRYMODE
;=========================================================================
========
;============================FUNÃ‡ÃƒO
PRINCIPAL================================


MAIN:
    MOV A,      #00h
    LCALL       posicionaCursor
    MOV DPTR,   #INICIO
    LCALL       LCDW
```

```
    MOV A,      #40h
    LCALL       posicionaCursor
    MOV DPTR,   #INICIO2
    LCALL       LCDW
    LJMP            CRIARSENHA
```

```
CRIARSENHA:
    LCALL       CLEARDISPLAY
    MOV A,      #00h
    LCALL       posicionaCursor
    MOV DPTR,   #TEMSENHA
    LCALL       LCDW
```

```
    MOV A,      #40h
    LCALL       posicionaCursor
    MOV DPTR,   #TEMSENHA2
    LCALL       LCDW
```

```
    LCALL       leituraTeclado
    MOV 70H, R7
    LCALL       leituraTeclado
    MOV 71H, R7
    LCALL       leituraTeclado
    MOV 72H, R7
    LCALL       leituraTeclado
    MOV 73H, R7
```

```
    LJMP        LOOP1TENTATIVA
```

```
SAVIO:
    LJMP SAVIO
```

```
;================================DATA================================
================
```

```
INICIO:
    DB          'P','a','u','l','o','/','G','u','i','l','h','e','r','m',
'e',0
INICIO2:
    DB          'S','e','g','u','r','a','n','c','a',' ','D','o','
','B','R',0
TEMSENHA:
    DB          'C','r','i','e',' ','a',' ','S','e','n','h','a','
','D','e',0
TEMSENHA2:
    DB          ' ',' ',' ','4',' ','N','u','m','e','r','o','s','!','
',' ',0
CONFIRMARSENHA:
    DB          ' ','C','o','n','f','i','r','m','e','
','S','e','n','h','a',0
DIGITARSENHA2:
    DB          'D','i','g','i','t','e',' ','a','
','S','e','n','h','a','!',0
SENHAINCORRETA:
    DB          ' ','S','e','n','h','a',' ','E','r','r','a','d','a','
','!',0
SEGUNDATENTATIVA:
    DB          ' ','2','a',' ','T','e','n','t','a','t','i','v','a','
','!',0
TERCEIRATENTATIVA:
    DB          ' ','3','a',' ','T','e','n','t','a','t','i','v','a','
','!',0
```

```
PORTALIBERADA:
    DB          'P','o','r','t','a','
','L','i','b','e','r','a','d','a','!',0
TRANCARPORTA:
    DB          '1','-','T','r','a','n','c','a','r','
','P','o','r','t','a',0
MUDARSENHAESCRITO:
    DB          '2','-','M','u','d','a','r',' ','S','e','n','h','a','
',' ',0
MUDARSENHAESCRITO2:
    DB          ' ',' ','M','u','d','a','r',' ','S','e','n','h','a','
',' ',0
PORTATRANCADA:
    DB          'P','o','r','t','a','
','T','r','a','n','c','a','d','a','!',0
BLOQUEIOESCRITO:
    DB          ' ',' ',' ','B','l','o','q','u','e','a','d','o',' ','
',' ',0
POLICIA:
    DB          ' ',' ','L','I','G','A','N','D','O',' ','1','9','0','
',' ',0
CLEAN:
    DB          ' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ','
',' ',0
```

```
    ;==============================SUBROTINAS=========================
=============
```

```
    ;================SUBROTINA QUE MANDA DO DPTR PARA O
LCD=========================
LCDW:
    CLR     A
    MOVC    A,@A+DPTR
    INC     DPTR            ;A RECEBE O VALOR NO PRÃ“XIMO ENDEREÃ‡O.
    JZ      finish          ;VERIFICA SE O VETOR ESTÃ NO FINAL.
;=====================================================================
=========
    MOV     LCD,A           ;MANDA SUPERIOR NIBLE
    SETB    RS              ;GARANTE QUE A MENSAGEM SEJA ENVIADA
    LCALL   NE              ;BORDA DE DESCIDA NO ENABLE(NEGATIVE EDGE)
;=====================================================================
=========
    RR      A
    RR      A
```

```
    RR      A
    RR      A
    MOV     LCD,A           ;MANDA NIBLE INFERIOR
;=====================================================================
=========
    SETB    RS              ;GARANTE QUE A MENSAGEM SEJA ENVIADA
    LCALL   NE              ;BORDA DE DESCIDA NO ENABLE(NEGATIVE EDGE)
    LCALL   delay
    LJMP    LCDW
    RET
```

```
finish:
    RET
;============SUBROTINA DA FUNCTION SET DE ACORDO COM O DATA
SHEET===============
FUNCTIONSET:
    CLR         RS              ;MANDA INSTRUÃ‡ÃƒO(GARANTE QUE A
INFORMAÃ‡ÃƒO SEJA MANDADA, CASO PRECISE SER CHAMADA DEPOIS DE "SEND
DATA")
    MOV LCD,    #00100000b      ;db7 db6 db5 db4 E RS x x (PAGINA 42)
    LCALL       NE              ;BORDA DE DESCIDA NO ENABLE(NEGATIVE
EDGE)
    LCALL       delay
    LCALL       NE
    MOV LCD,    #10000000b      ;N = DB7 = 1 -> DUAS LINHAS
                                ;F = DB6 -> FONTE
    LCALL       NE
    LCALL       delay
    RET
;================================ENTRYMODE============================
============
ENTRYMODE:
    CLR         RS              ;MANDA INSTRUÃ‡ÃƒO
    MOV         LCD,#00000000B
    LCALL   NE              ;BORDA DE DESCIDA NO ENABLE(NEGATIVE EDGE)
    MOV         LCD,#01110000B
    LCALL   NE              ;BORDA DE DESCIDA NO ENABLE(NEGATIVE EDGE)
    LCALL   delay           ;ESPERA O BF ZERAR
    RET
;============================DISPLAY ON/OFF
CONTROL================================
DISPLAYon_off:
    CLR         RS              ;MANDA INSTRUÃ‡ÃƒO
    MOV         LCD,#00000000B
```

```
    LCALL   NE
    MOV     LCD,#11110000B
    LCALL   NE
    LCALL   delay           ;ESPERA O BF ZERAR
    RET
;================================SEGUNDALINHA=========================
==============
SEGUNDA_LINHA:
    CLR         RS
    MOV         LCD,#11000000B
    LCALL   NE
    MOV         LCD,#00000000B
    LCALL   NE
    LCALL   DELAY
    RET
;================================CLEARDISPLAY=========================
==============
CLEARDISPLAY:
    ;CLR        RS
    ;MOV        LCD,#00000000B
    ;LCALL  NE
    ;MOV        LCD,#00010000B
    ;LCALL  NE
```

```
    MOV A,      #00h
    LCALL       posicionaCursor
```

```
    LCALL   DELAY
    MOV DPTR,   #CLEAN
    LCALL       LCDW
```

```
    MOV A,      #40h
    LCALL       posicionaCursor
```

```
    LCALL   DELAY
    MOV DPTR,   #CLEAN
    LCALL       LCDW
```

```
    RET
;========================SUBROTINA DE DELAY
50US==================================
delay:
    MOV R0,     #50
```

```
    DJNZ R0,    $
    RET
;=========================NEGATIVE EDGE NO
ENABLE=====================================
NE:
    SETB        E
    CLR         E
    RET
```

```
;---------------------------------- Pulse ---------------------------
-----------
Pulse:      SetB E      ; |*P1.2 is connected to 'E' pin of LCD module*
            Clr  E      ; | negative edge on E
            Ret
;---------------------------------- SendChar ----------------------
-----------
SendChar:   Mov C, ACC.7        ; |
            Mov P1.7, C         ; |
            Mov C, ACC.6        ; |
            Mov P1.6, C         ; |
            Mov C, ACC.5        ; |
            Mov P1.5, C         ; |
            Mov C, ACC.4        ; |
            Mov P1.4, C         ; | high nibble set
            ;LJMP $
            LCALL Pulse
```

```
            Mov C, ACC.3        ; |
            Mov P1.7, C         ; |
            Mov C, ACC.2        ; |
            Mov P1.6, C         ; |
            Mov C, ACC.1        ; |
            Mov P1.5, C         ; |
            Mov C, ACC.0        ; |
            Mov P1.4, C         ; | low nibble set
```

```
            LCALL Pulse
```

```
            LCALL Delay         ; wait for BF to clear
```

```
            Mov R1,#55h
            Ret
;------------------------------ Scan Row -----------------------------
----------
```

```
ScanKeyPad: CLR P0.3            ;Clear Row3
            LCALL IDCode0       ;LCALL scan column subroutine
            SetB P0.3           ;Set Row 3
            JB F0,Done          ;If F0 is set, end scan

            ;Scan Row2
            CLR P0.2            ;Clear Row2
            LCALL IDCode1       ;LCALL scan column subroutine
            SetB P0.2           ;Set Row 2
            JB F0,Done          ;If F0 is set, end scan

            ;Scan Row1
            CLR P0.1            ;Clear Row1
            LCALL IDCode2       ;LCALL scan column subroutine
            SetB P0.1           ;Set Row 1
            JB F0,Done          ;If F0 is set, end scan

            ;Scan Row0
            CLR P0.0            ;Clear Row0
            LCALL IDCode3       ;LCALL scan column subroutine
            SetB P0.0           ;Set Row 0
            JB F0,Done          ;If F0 is set, end scan

            LJMP ScanKeyPad     ;Go back to scan Row3

Done:       Clr F0              ;Clear F0 flag before exit
            Ret
;-------------------------------------------------------------------
----------
;--------------------------- Scan column subroutine ------------------
----------
IDCode0:    JNB P0.4, KeyCode03 ;If Col0 Row3 is cleared - key found
            JNB P0.5, KeyCode13 ;If Col1 Row3 is cleared - key found
            JNB P0.6, KeyCode23 ;If Col2 Row3 is cleared - key found
            RET

KeyCode03:  SETB F0         ;Key found - set F0
            Mov R7,#'3'     ;Code for '3'
            RET

KeyCode13:  SETB F0         ;Key found - set F0
            Mov R7,#'2'     ;Code for '2'
            RET
```

```
KeyCode23:  SETB F0          ;Key found - set F0
            Mov R7,#'1'      ;Code for '1'
            RET
```

```
IDCode1:    JNB P0.4, KeyCode02 ;If Col0 Row2 is cleared - key found
            JNB P0.5, KeyCode12 ;If Col1 Row2 is cleared - key found
            JNB P0.6, KeyCode22 ;If Col2 Row2 is cleared - key found
            RET
```

```
KeyCode02:  SETB F0          ;Key found - set F0
            Mov R7,#'6'      ;Code for '6'

            RET
```

```
KeyCode12:  SETB F0          ;Key found - set F0
            Mov R7,#'5'      ;Code for '5'
            RET
```

```
KeyCode22:  SETB F0          ;Key found - set F0
            Mov R7,#'4'      ;Code for '4'
            RET
```

```
IDCode2:    JNB P0.4, KeyCode01 ;If Col0 Row1 is cleared - key found
            JNB P0.5, KeyCode11 ;If Col1 Row1 is cleared - key found
            JNB P0.6, KeyCode21 ;If Col2 Row1 is cleared - key found
            RET
```

```
KeyCode01:  SETB F0          ;Key found - set F0
            Mov R7,#'9'      ;Code for '9'
            RET
```

```
KeyCode11:  SETB F0          ;Key found - set F0
            Mov R7,#'8'      ;Code for '8'
            RET
```

```
KeyCode21:  SETB F0          ;Key found - set F0
            Mov R7,#'7'      ;Code for '7'
            RET
```

```
IDCode3:    JNB P0.4, KeyCode00 ;If Col0 Row0 is cleared - key found
            JNB P0.5, KeyCode10 ;If Col1 Row0 is cleared - key found
            JNB P0.6, KeyCode20 ;If Col2 Row0 is cleared - key found
            RET
```

```
KeyCode00:  SETB F0         ;Key found - set F0
            Mov R7,#'#'     ;Code for '#'
            RET
```

```
KeyCode10:  SETB F0         ;Key found - set F0
            Mov R7,#'0'     ;Code for '0'
            RET
```

```
KeyCode20:  SETB F0         ;Key found - set F0
            Mov R7,#'*'     ;Code for '*'
            RET
;================================POSICIONA O
CURSOR==================================
posicionaCursor :
    CLR RS ; clear RS - indicates that instruction is being sent to
module
    SETB P1.7 ; |
    MOV C, ACC.6 ; |
    MOV P1.6, C ; |
    MOV C, ACC.5 ; |
    MOV P1.5, C ; |
    MOV C, ACC.4 ; |
    MOV P1.4, C ; | high nibble set
    SETB E ; |
    CLR E ; | negative edge on E
    MOV C, ACC.3 ; |
    MOV P1.7, C ; |
    MOV C, ACC.2 ; |
    MOV P1.6, C ; |
    MOV C, ACC.1 ; |
    MOV P1.5, C ; |
    MOV C, ACC.0 ; |
    MOV P1.4, C ; | low nibble set
    SETB E ; |
    CLR E ; | negative edge on E
    LCALL delay ; wait for BF to clear
    RET
```

```
;================================ 3 TENTATIVAS DE ESCREVER A SENHA
INICIAL ==================================
LOOP1TENTATIVA:
    LCALL       CLEARDISPLAY
    MOV A,      #00h
    LCALL       posicionaCursor
```

```
    MOV DPTR,   #CONFIRMARSENHA
    LCALL       LCDW
```

```
    LCALL       leituraTeclado
    MOV A, R7
    MOV R3,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R4,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R5,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R6,A
```

```
    MOV A,R3
    CJNE A,70H,LOOP2TENTATIVA
    MOV A,R4
    CJNE A,71H,LOOP2TENTATIVA
    MOV A,R5
    CJNE A,72H,LOOP2TENTATIVA
    MOV A,R6
    CJNE A,73H,LOOP2TENTATIVA
    LJMP LIBEROU
```

```
LOOP2TENTATIVA:
```

```
    LCALL       CLEARDISPLAY
    MOV A,      #00h
    LCALL       posicionaCursor
    MOV DPTR,   #SENHAINCORRETA
    LCALL       LCDW
```

```
    MOV A,      #40h
    LCALL       posicionaCursor
    MOV DPTR,   #SEGUNDATENTATIVA
    LCALL       LCDW
```

```
    LCALL       leituraTeclado
    MOV A, R7
```

```
    MOV R3,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R4,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R5,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R6,A
```

```
    MOV A,R3
    CJNE A,70H,LOOP3TENTATIVA
    MOV A,R4
    CJNE A,71H,LOOP3TENTATIVA
    MOV A,R5
    CJNE A,72H,LOOP3TENTATIVA
    MOV A,R6
    CJNE A,73H,LOOP3TENTATIVA
    LJMP LIBEROU
```

```
LOOP3TENTATIVA:
    LCALL       CLEARDISPLAY
    MOV A,      #00h
    LCALL       posicionaCursor
    MOV DPTR,   #SENHAINCORRETA
    LCALL       LCDW
```

```
    MOV A,      #40h
    LCALL       posicionaCursor
    MOV DPTR,   #TERCEIRATENTATIVA
    LCALL       LCDW
```

```
    LCALL       leituraTeclado
    MOV A, R7
    MOV R3,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R4,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R5,A
    LCALL       leituraTeclado
```

```
    MOV A, R7
    MOV R6,A
```

```
    MOV A,R3
    CJNE A,70H,REFACA
    MOV A,R4
    CJNE A,71H,REFACA
    MOV A,R5
    CJNE A,72H,REFACA
    MOV A,R6
    CJNE A,73H,REFACA
    LJMP LIBEROU
;================================ Refazer a senha inicial
==================================
REFACA:
    LCALL       CLEARDISPLAY
    MOV A,      #00h
    LCALL       posicionaCursor
    MOV DPTR,   #TEMSENHA
    LCALL       LCDW
```

```
    MOV A,      #40h
    LCALL       posicionaCursor
    MOV DPTR,   #TEMSENHA2
    LCALL       LCDW
```

```
    LCALL       leituraTeclado
    MOV 70H, R7
    LCALL       leituraTeclado
    MOV 71H, R7
    LCALL       leituraTeclado
    MOV 72H, R7
    LCALL       leituraTeclado
    MOV 73H, R7
```

```
    LCALL       CLEARDISPLAY
    MOV A,      #00h
    LCALL       posicionaCursor
    MOV DPTR,   #CONFIRMARSENHA
    LCALL       LCDW
```

```
    LJMP LOOP1TENTATIVA
;================================IR MENU CASO SENHA ESTEJA
CERTA==================================
```

```
LIBEROU:
    LCALL       CLEARDISPLAY
    MOV A,      #00h
    LCALL       posicionaCursor
    MOV DPTR,   #PORTALIBERADA
    LCALL       LCDW

    LJMP        escolhaMenu

escolhaMenu:

    LCALL       CLEARDISPLAY
    MOV A,      #00h
    LCALL       posicionaCursor
    MOV DPTR,   #TRANCARPORTA
    LCALL       LCDW
    MOV A,      #40h
    LCALL       posicionaCursor
    MOV DPTR,   #MUDARSENHAESCRITO
    LCALL       LCDW

    LCALL leituraTeclado
    CJNE R7, #0BH, escolhaMenu2
    LJMP TRANCOU

escolhaMenu2:
    CJNE R7, #0AH, escolhaMenu
    LJMP mudarSenha

;================================TRANCAR A
PORTA==================================
TRANCOU:
    LCALL       CLEARDISPLAY
    MOV A,      #00h
    LCALL       posicionaCursor
    MOV DPTR,   #PORTATRANCADA
    LCALL       LCDW
    MOV A,      #40h
    LCALL       posicionaCursor
    MOV DPTR,   #DIGITARSENHA2
    LCALL       LCDW
    LJMP        DESTRANCARPORTA
;==============================MUDAR A
SENHA==================================
```

```
mudarSenha:
    LCALL       CLEARDISPLAY
    MOV A,      #00h
    LCALL       posicionaCursor
    MOV DPTR,   #MUDARSENHAESCRITO2
    LCALL       LCDW
    LJMP CRIARSENHA
    LJMP LIBEROU
```

```
;==============================DESTRANCAR A PORTA COM 3 TENTATIVAS JA COM A SENHA DEFINIDA==================================
```

```
DESTRANCARPORTA:
    LCALL       leituraTeclado
    MOV A, R7
    MOV R3,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R4,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R5,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R6,A
```

```
    MOV A,R3
    CJNE A,70H,DESTRANCARPORTA2
    MOV A,R4
    CJNE A,71H,DESTRANCARPORTA2
    MOV A,R5
    CJNE A,72H,DESTRANCARPORTA2
    MOV A,R6
    CJNE A,73H,DESTRANCARPORTA2
    LJMP LIBEROU
```

```
DESTRANCARPORTA2:
    LCALL       CLEARDISPLAY
    MOV A,      #00h
    LCALL       posicionaCursor
    MOV DPTR,   #SENHAINCORRETA
    LCALL       LCDW
```

```
    MOV A,      #40h
```

```
    LCALL       posicionaCursor
    MOV DPTR,   #SEGUNDATENTATIVA
    LCALL       LCDW
```

```
    LCALL       leituraTeclado
    MOV A, R7
    MOV R3,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R4,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R5,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R6,A
```

```
    MOV A,R3
    CJNE A,70H,DESTRANCARPORTA3
    MOV A,R4
    CJNE A,71H,DESTRANCARPORTA3
    MOV A,R5
    CJNE A,72H,DESTRANCARPORTA3
    MOV A,R6
    CJNE A,73H,DESTRANCARPORTA3
    LJMP LIBEROU
```

```
DESTRANCARPORTA3:
    LCALL       CLEARDISPLAY
    MOV A,      #00h
    LCALL       posicionaCursor
    MOV DPTR,   #SENHAINCORRETA
    LCALL       LCDW
```

```
    MOV A,      #40h
    LCALL       posicionaCursor
    MOV DPTR,   #TERCEIRATENTATIVA
    LCALL       LCDW
```

```
    LCALL       leituraTeclado
    MOV A, R7
    MOV R3,A
    LCALL       leituraTeclado
    MOV A, R7
```

```
    MOV R4,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R5,A
    LCALL       leituraTeclado
    MOV A, R7
    MOV R6,A
```

```
    MOV A,R3
    CJNE A,70H,BLOQUEIO
    MOV A,R4
    CJNE A,71H,BLOQUEIO
    MOV A,R5
    CJNE A,72H,BLOQUEIO
    MOV A,R6
    CJNE A,73H,BLOQUEIO
    LJMP LIBEROU
```

```
;================================BLOQUEAR A PORTA E CHAMAR A
POLICIA==================================
BLOQUEIO:
    LCALL       CLEARDISPLAY
    MOV A,      #00h
    LCALL       posicionaCursor
    MOV DPTR,   #BLOQUEIOESCRITO
    LCALL       LCDW
    MOV A,      #40h
    LCALL       posicionaCursor
    MOV DPTR,   #POLICIA
    LCALL       LCDW
    LJMP BLOQUEIO
```

```
;================================LER O INPUT DO
USUARIO==================================
leituraTeclado:
    CLR F0
    MOV A,#0
    MOV P0,#11111110b
    LCALL   COLUM_VERFY
    MOV P0,#11111101b
    LCALL   COLUM_VERFY
    MOV P0,#11111011b
    LCALL   COLUM_VERFY
```

```
    MOV P0,#11110111b
    LCALL   COLUM_VERFY
```

```
    JNB F0,leituraTeclado
    RET
```

```
REST_LOOP:
```

```
MOV DPTR,#VETOR_DISPLAY
MOV   R7, A
MOVC    A,@A+DPTR
MOV P1,A
```

```
JNB P0.4, $
JNB P0.5, $
JNB P0.6, $
```

```
SETB  F0
```

```
COLUM_VERFY:
JNB P0.4, REST_LOOP
INC A
JNB P0.5, REST_LOOP
INC A
JNB P0.6, REST_LOOP
INC A
RET
```

```
VETOR_DISPLAY:
DB  11111111B   ;|PosiÃ§Ã£o 0: Nada  |
DB  11000000B   ;|PosiÃ§Ã£o 1: Zero  |
DB  11111111B   ;|PosiÃ§Ã£o 2: Nada  |
DB  10010000B   ;|PosiÃ§Ã£o 3: Nove  |
DB  10000000B   ;|PosiÃ§Ã£o 4: Oito  |
DB  11111000B   ;|PosiÃ§Ã£o 5: Sete  |
DB  10000010B   ;|PosiÃ§Ã£o 6: Seis  |
DB  10010010B   ;|PosiÃ§Ã£o 7: Cinco |
DB  10011001B   ;|PosiÃ§Ã£o 8: Quatro|
DB  10110000B   ;|PosiÃ§Ã£o 9: TrÃªs  |
DB  10100100B   ;|PosiÃ§Ã£o 10: Dois |
DB  11111001B   ;|PosiÃ§Ã£o 11: Um   |
```

```
RET
```

```
gotKey:
    SETB F0
    RET
END
```