



YCCE, Nagpur



MGI

# Keyboard interfacing with 8051

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**Professor**

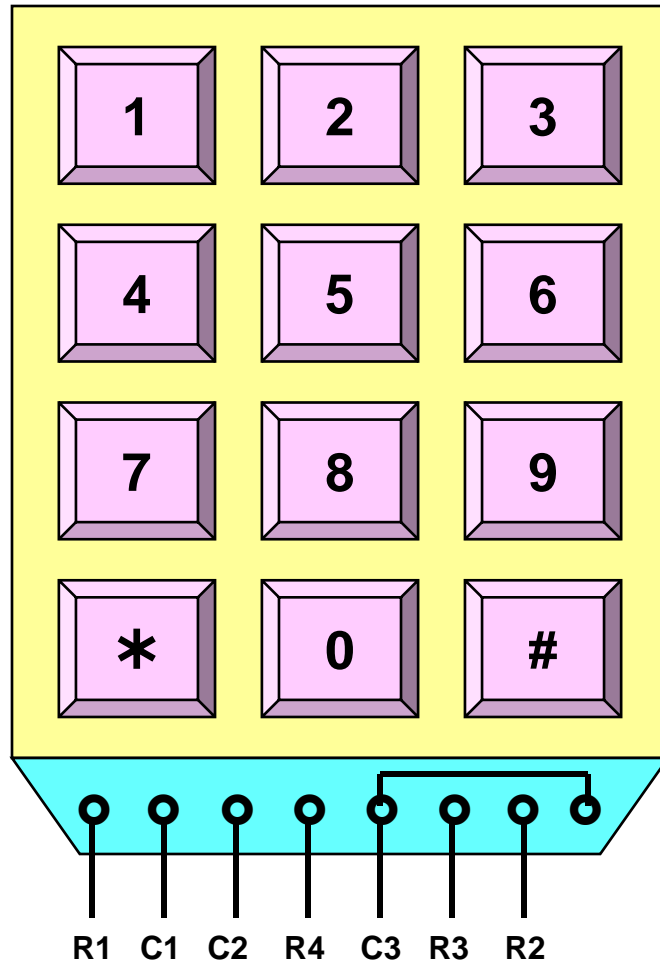
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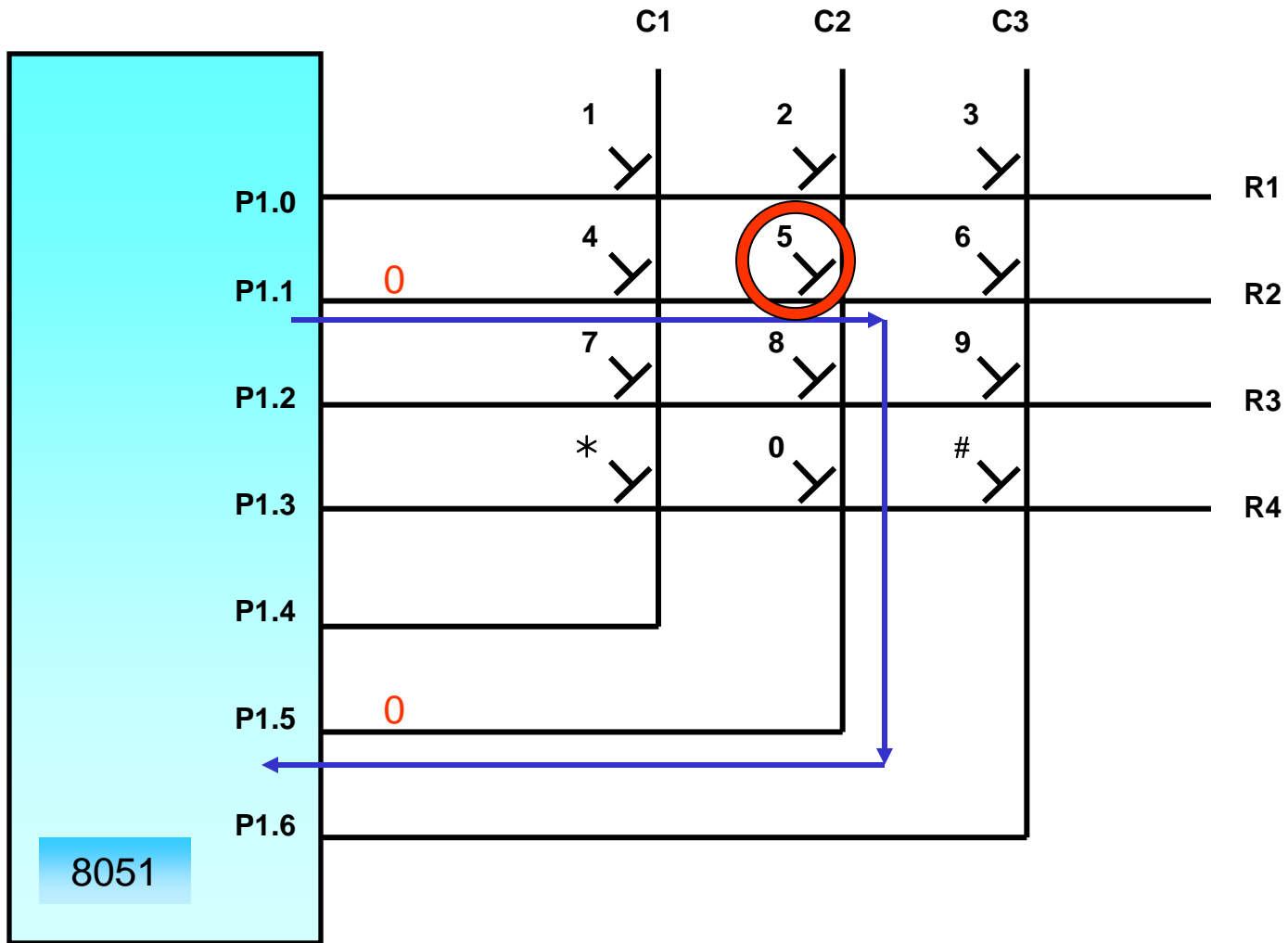
**Website: [www.ycce.edu](http://www.ycce.edu)**

# Interfacing telephone keypad



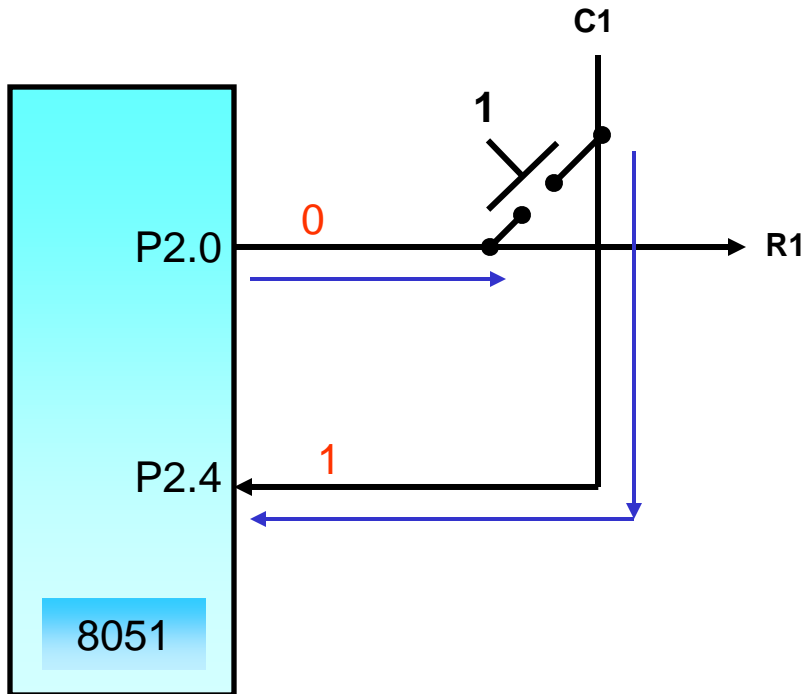
ROWS		COLUMN	
R1	P1.0	C1	P1.4
R2	P1.1	C2	P1.5
R3	P1.2	C3	P1.6
R4	P1.3		

# Interfacing 4 X 3 Key Matrix



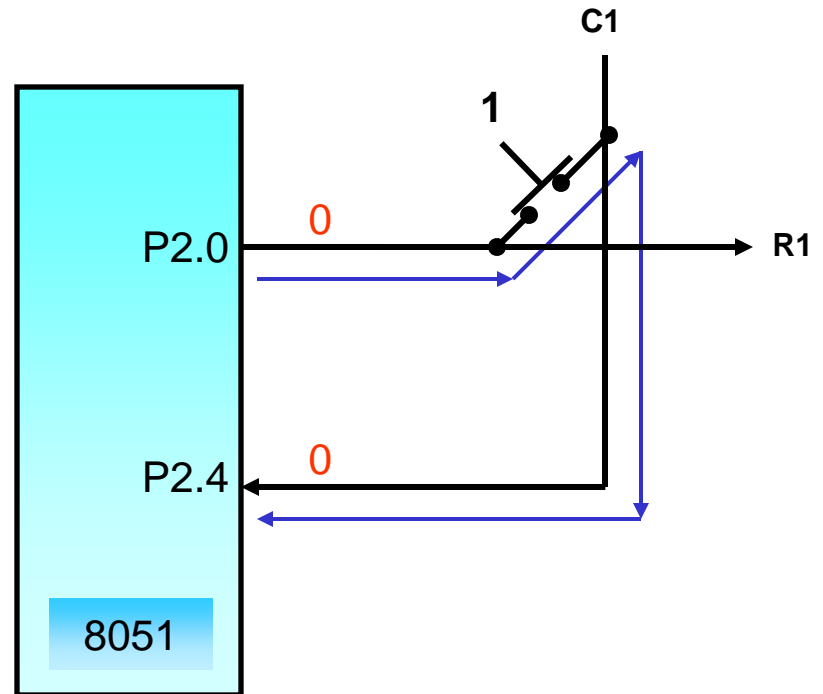
# Key closure detection

Key not pressed



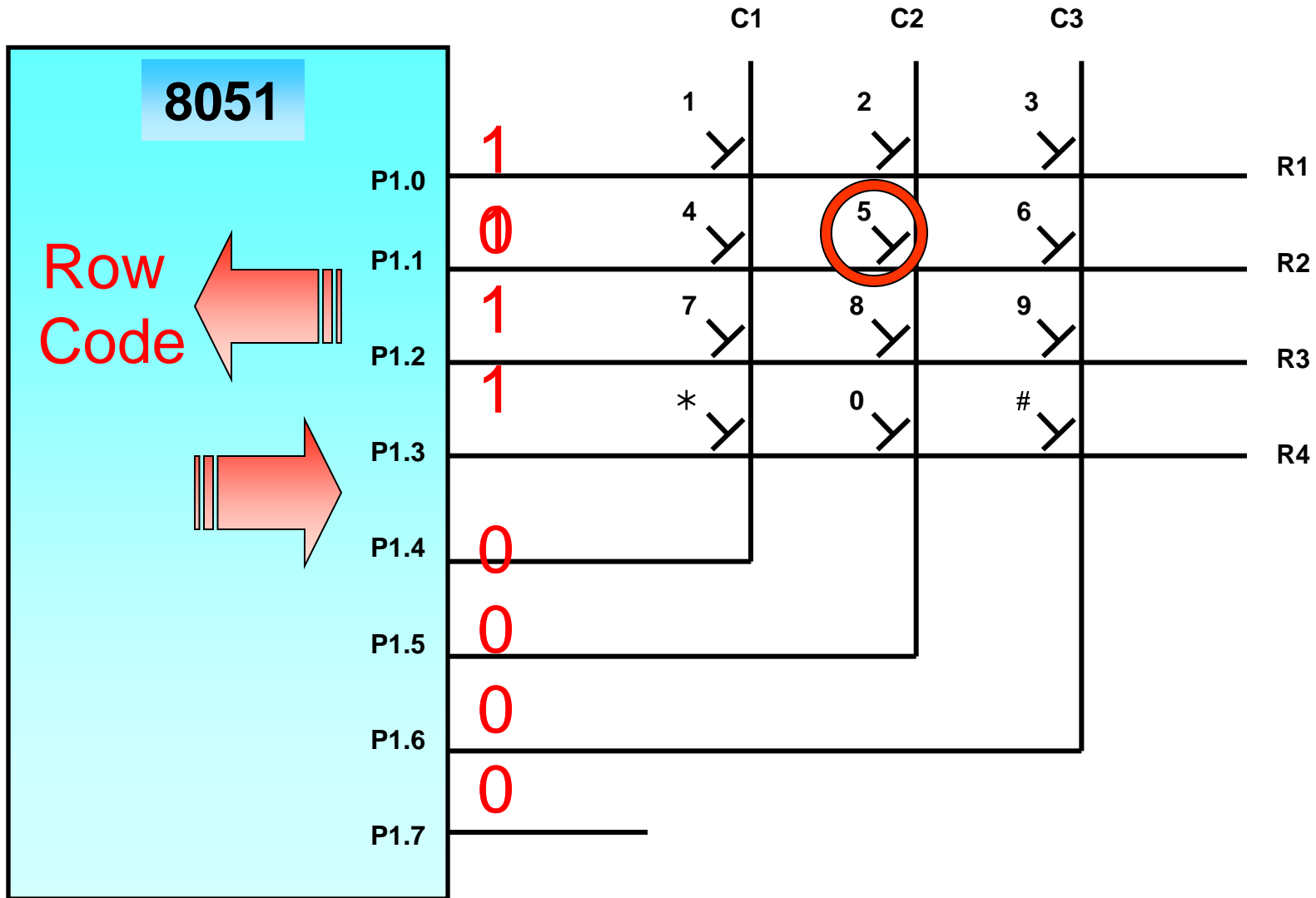
```
CLR P2.0  
MOV C, P2.4 ; C=1
```

Key pressed

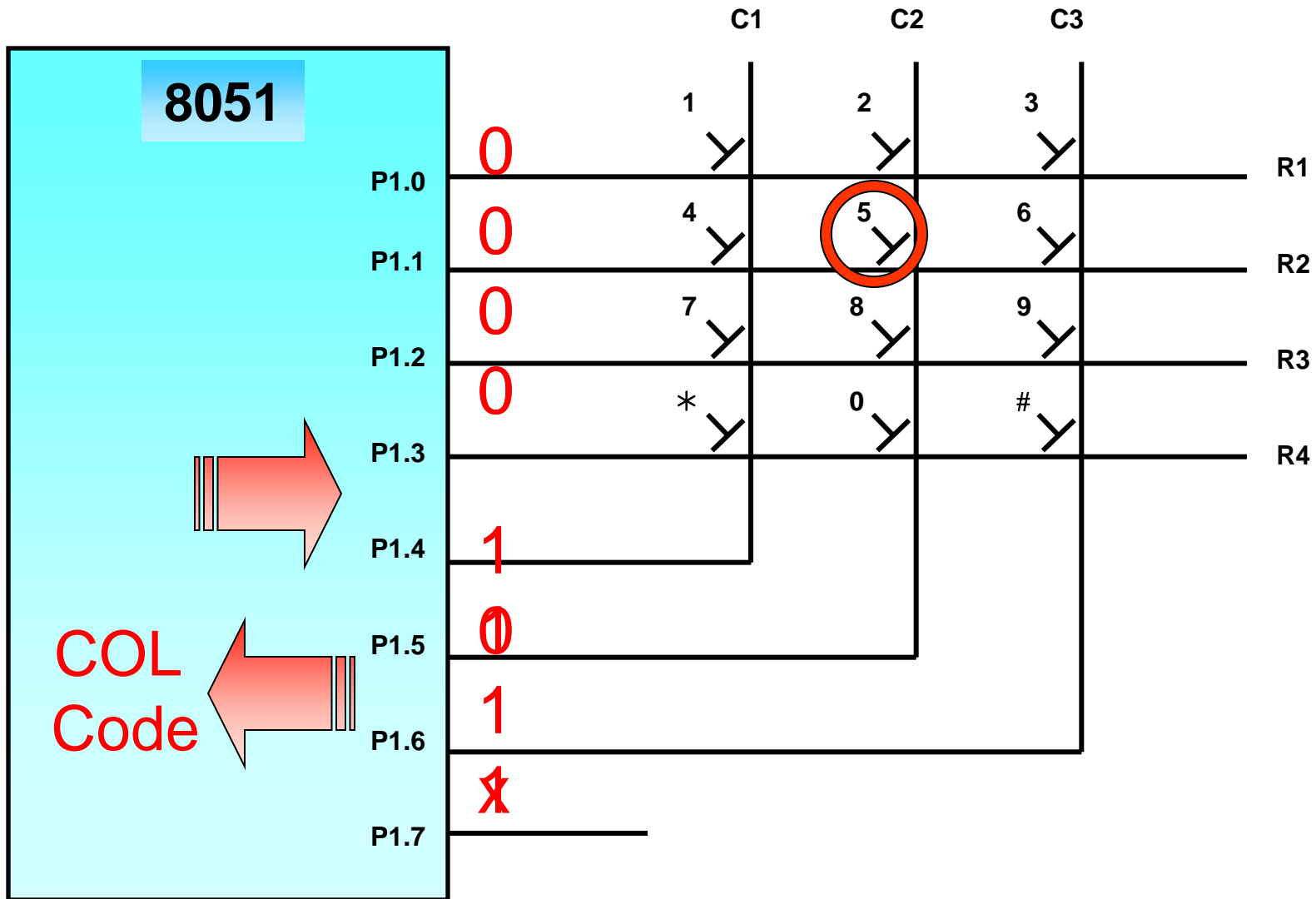


```
CLR P2.0  
MOV C, P2.4 ; C=0
```

# Key Code 8 bit (Col : Row)



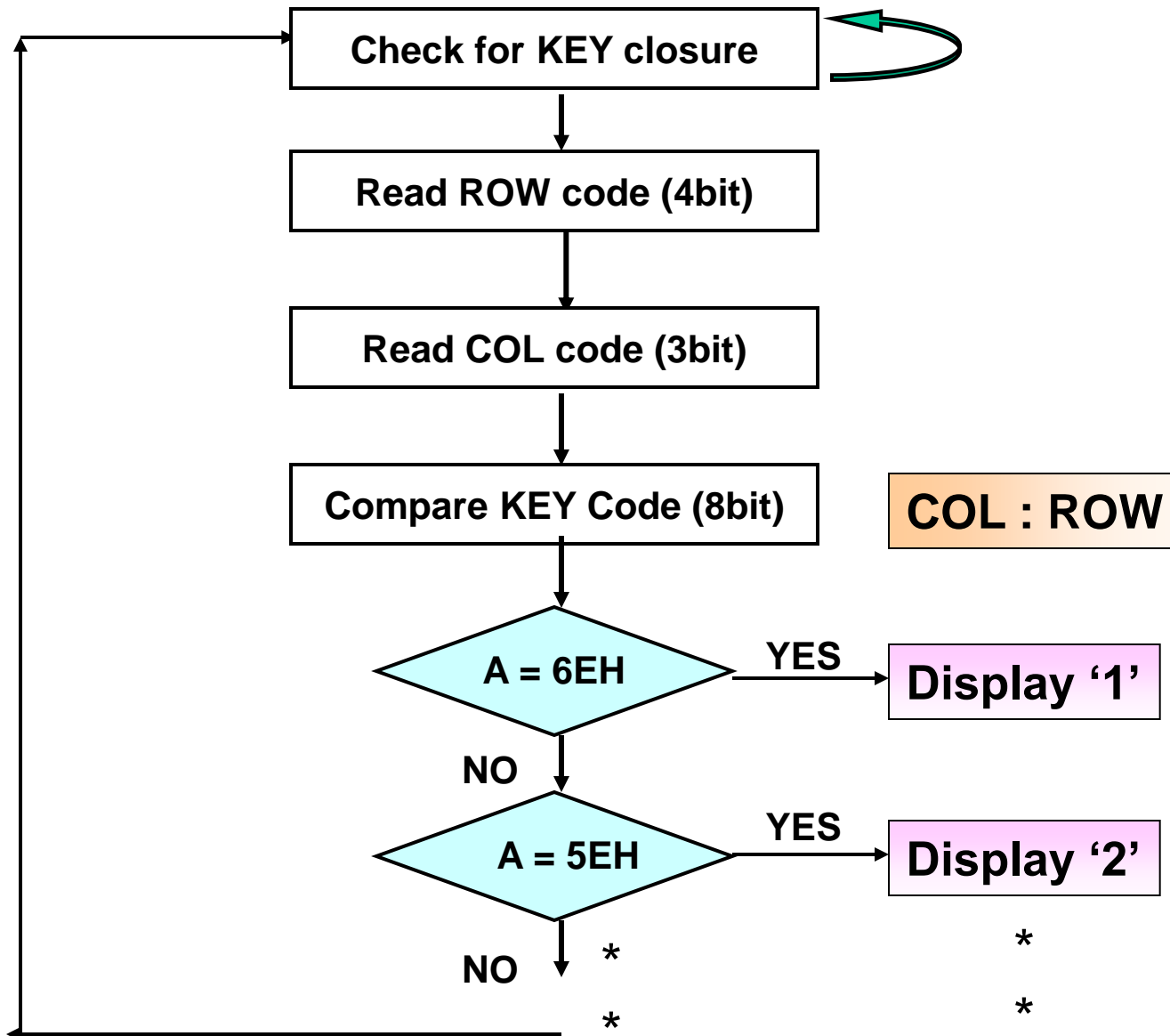
# Key Code 8 bit (Col : Row)



# Tele keypad (Key code)

Col - Row	Key No.	Col Code P1.6,P1.5,P1.4	Row Code P1.3,P1.2,P1.1,P1.0	KEY CODE
C1 - R1	<b>1</b>	110	1110	<b>6EH</b>
C2 - R1	<b>2</b>	101	1110	<b>5EH</b>
C3 - R1	<b>3</b>	011	1110	<b>3EH</b>
C1 - R2	<b>4</b>	110	1101	<b>6DH</b>
C2 - R2	<b>5</b>	101	1101	<b>5DH</b>
C3 - R2	<b>6</b>	011	1101	<b>3DH</b>
C1 - R3	<b>7</b>	110	1011	<b>6BH</b>
C2 - R3	<b>8</b>	101	1011	<b>5BH</b>
C3 - R3	<b>9</b>	011	1011	<b>3BH</b>
C1 - R4	<b>*</b>	110	0111	<b>67H</b>
C2 - R4	<b>0</b>	101	0111	<b>57H</b>
C3 - R4	<b>#</b>	011	0111	<b>37H</b>

# Program Logic





# Program

```
$MOD51
  ORG 0000H
  MOV SP,#5FH
LOOP: MOV P1, #0FH ;ROWS = 1 & COL = 0
MOV A, P1
CJNE A, #0FH, KEY_FOUND
SJMP LOOP ; No Key Closure
KEY_FOUND:
  ACALL delay_50ms ;DEBOUNCE DELAY OF 50 MSEC
  MOV A,P1 ;Get ROW code
  ANL A,#0FH ;Mask 4 MSB's
  MOV B,A ; Store Row Code in B reg.(4 LSB)
  MOV P1,#0F0H ; ROWS = 0 & COL =1
  ACALL delay_5ms
  MOV A,P1 ;Get COL code
  ANL A,#70H ;Mask 4 LSB's
  ORL A,B ;Combine COL & ROW code = KEYcode
  CJNE A,#6EH,K1 ; COMPARE WITH KEYCODE of '1'
  MOV A,#'1' ; STORE ASCII VALUE OF KEY DETECTED
  AJMP KEY_RET ; Go to display
K1: CJNE A,#5EH,K2 ; COMPARE WITH KEYCODE of '2'
  MOV A,#'2'
  AJMP KEY_RET
```

# Program (cont..)

```
K9:      CJNE A,#67H,K10
          MOV  A, #'*'                ; FOR *
          AJMP KEY_RET
K10:     CJNE  A, #57H, K11
          MOV  A, #'0'
          AJMP KEY_RET
K11:     CJNE  A, #37H, K12
          MOV  A, #'#'                ; FOR #
          AJMP KEY_RET
K12:     CLR   A                      ; A = 00H IF NO KEY IS PRESSED
KEY_RET:
          MOV  B,A                    ; STORE KEY NO. IN B REG
KEY_LOOP:
          MOV P1,#0FH                ; ROWS = 1 & COL = 0
          ACALL delay_50ms
          MOV A,P1
          CJNE A,#0FH, KEY_LOOP    ; CHECK KEY RELEASE
          MOV A,B                  ; PUT KEY NO. IN REG A AND RETURN
          CJNE A,#00H,VALID_TELKEY
          AJMP LOOP
VALID_TELKEY: ACALL SEG7
          AJMP LOOP
```

# ASCII

SYMBOL	HEX	SYMBOL	HEX	SYMBOL	HEX	SYMBOL	HEX	SYMBOL	HEX
NUL	00	SUB	1A	4	34	N	4E	h	68
SOH	01	ESC	1B	5	35	O	4F	i	69
STX	02	FS	1C	6	36	P	50	j	6A
ETX	03	GS	1D	7	37	Q	51	k	6B
EOT	04	RS	1E	8	38	R	52	l	6C
ENQ	05	US	1F	9	39	S	53	m	6D
ACK	06	SP	20	:	3A	T	54	n	6E
BEL	07	!	21	;	3B	U	55	o	6F
BS	08	"	22	<	3C	V	56	p	70
HT	09	#	23	=	3D	W	57	q	71
LF	0A	\$	24	>	3E	X	58	r	72
VT	0B	%	25	?	3F	Y	59	s	73
FF	0C	&	26	@	40	Z	5A	t	74
CR	0D	'	27	A	41	[	5B	u	75
S0	0E	(	28	B	42	\	5C	v	76
S1	0F	)	29	C	43	]	5D	w	77
DLE	10	*	2A	D	44	^	5E	x	78
DC1	11	+	2B	E	45	_	5F	y	79
DC2	12	,	2C	F	46	`	60	z	7A
DC3	13	-	2D	G	47	a	61	{	7B
DC4	14	.	2E	H	48	b	62		7C
NAK	15	/	2F	I	49	c	63	}	7D
SYN	16	0	30	J	4A	d	64	~	7E
ETB	17	1	31	K	4B	e	65	DEL	7F
CAN	18	2	32	L	4C	f	66		
EM	19	3	33	M	4D	g	67		

# 7 Segment Code

Key No.	7 Segment Code (Binary)	7 Segment Code (Hex Code)
1	0 0 0 0 0 1 1 0	06H
2	0 1 0 1 1 0 1 1	5BH
3	0 1 0 0 1 1 1 1	4FH
4	0 1 1 0 0 1 1 0	66H
5	0 1 1 0 1 1 0 1	6DH
6	0 1 1 1 1 1 0 1	7DH
7	0 0 0 0 0 1 1 1	07H
8	0 1 1 1 1 1 1 1	7FH
9	0 1 1 0 1 1 1 1	6FH
*	0 1 1 1 0 1 1 0	76H
0	0 0 1 1 1 1 1 1	3FH
#	0 0 1 1 0 1 1 0	36H

# Translation of Key no. / Key code to ASCII

Key No.	KEYCODE	ASCII	OR	7 SEG_CODE
1	6EH	31H		06H
2	5EH	32H		5BH
3	3EH	33H		4FH
4	6DH	34H		66H
5	5DH	35H		6DH
6	3DH	36H		7DH
7	6BH	37H		07H
8	5BH	38H		7FH
9	3BH	39H		6FH
*	67H	2AH		76H
0	57H	30H		3FH
#	37H	23H		36H

# Interfacing 4 X 3 Key Matrix & Display

