Санкт-Петербургский Национальный Исследовательский Университет
Информационных Технологий, Механики и Оптики

ПИиКТ

Лабораторная работа 7

по дисциплине

«Архитектура компьютера»

Выполнили: Студенты группы P33113

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Санкт-Петербург

2020г

Задание

Построить таблицу кодов сканирования.

Разработать программу ввода чисел для заданной раскладки.

1 2 3 4 5

6 7 8 9 0

-, esc

Исходный текст программы

C51

```
# include <reg51.h>

void Int00(void) interrupt 0 {
	int i = 0;
	float n;
	char digit;
	char xdata str[8];
	char m = 1;
	int mm;
	char x = P3;
	switch (x) {
		case 0xfe: digit = '1'; break;
		case 0x02: digit = '2'; break;
		case 0xfd: digit = '3'; break;
		case 0x79: digit = '4'; break;
		case 0xfb: digit = '5'; break;

		case 0x08: digit = '6'; break;
		case 0xf7: digit = '7'; break;
		case 0x10: digit = '8'; break;
		case 0xef: digit = '9'; break;
		case 0x01: digit = '0'; break;

		case 0xfa: digit = '-'; break;
		case 0xbe: digit = ','; break;
		case 0xfc: digit = 'e'; break;
		default: digit = 0xff;
	}
	if (digit == ',' || digit == '-') {
		mm = m;
		str[i++] = digit;
	}
	if (digit == 'e') {
		digit = 0xff;
		n /= mm;
	}
	if (digit != 0xff) {
```

```
                str[i++] = digit;
                m *= 10;
                n = n * 10 + (digit & 0xff);
        }
        while (~INT0);
}

int main() {
        EX0 = 1;
        IT0 = 1;
        EA = 1;
        while(1);
        return 0;
}
```

A51

```
  ; FUNCTION Int00 (BEGIN)
0000 C0E0           PUSH    ACC
0002 C0F0           PUSH    B
0004 C083           PUSH    DPH
0006 C082           PUSH    DPL
0008 C0D0           PUSH    PSW
000A 75D000           MOV     PSW,#00H
000D C000           PUSH    AR0
000F C001           PUSH    AR1
0011 C002           PUSH    AR2
0013 C003           PUSH    AR3
0015 C004           PUSH    AR4
0017 C005           PUSH    AR5
0019 C006           PUSH    AR6
001B C007           PUSH    AR7
                            ; SOURCE LINE # 3
                            ; SOURCE LINE # 4
001D 750000     R     MOV     i,#00H
0020 750000     R     MOV     i+01H,#00H
                            ; SOURCE LINE # 8
0023 750001     R     MOV     m,#01H
                            ; SOURCE LINE # 10
;---- Variable 'x' assigned to Register 'R7' ----
0026 AFB0             MOV     R7,P3
                            ; SOURCE LINE # 11
0028 EF             MOV     A,R7
0029 120000     E     LCALL   ?C?CCASE
002C 0000       R     DW      ?C0011
002E 01             DB      01H
002F 0000       R     DW      ?C0003
0031 02             DB      02H
0032 0000       R     DW      ?C0007
0034 08             DB      08H
0035 0000       R     DW      ?C0009
0037 10             DB      010H
0038 0000       R     DW      ?C0005
003A 79             DB      079H
```

```
003B 0000      R    DW     ?C0013
003D BE             DB     0BEH
003E 0000      R    DW     ?C0010
0040 EF             DB     0EFH
0041 0000      R    DW     ?C0008
0043 F7             DB     0F7H
0044 0000      R    DW     ?C0012
0046 FA             DB     0FAH
0047 0000      R    DW     ?C0006
0049 FB             DB     0FBH
004A 0000      R    DW     ?C0014
004C FC             DB     0FCH
004D 0000      R    DW     ?C0004
004F FD             DB     0FDH
0050 0000      R    DW     ?C0002
0052 FE             DB     0FEH
0053 0000           DW     00H
0055 0000      R    DW     ?C0015
                            ; SOURCE LINE # 12
0057       ?C0002:
0057 750031    R    MOV    digit,#031H
005A 803F           SJMP   ?C0001
C51 COMPILER V9.60.0.0  LAB7                                  11/10/2020 20:11:00 PAGE 3

                            ; SOURCE LINE # 13
005C       ?C0003:
005C 750032    R    MOV    digit,#032H
005F 803A           SJMP   ?C0001
                            ; SOURCE LINE # 14
0061       ?C0004:
0061 750033    R    MOV    digit,#033H
0064 8035           SJMP   ?C0001
                            ; SOURCE LINE # 15
0066       ?C0005:
0066 750034    R    MOV    digit,#034H
0069 8030           SJMP   ?C0001
                            ; SOURCE LINE # 16
006B       ?C0006:
006B 750035    R    MOV    digit,#035H
006E 802B           SJMP   ?C0001
                            ; SOURCE LINE # 18
0070       ?C0007:
0070 750036    R    MOV    digit,#036H
0073 8026           SJMP   ?C0001
                            ; SOURCE LINE # 19
0075       ?C0008:
0075 750037    R    MOV    digit,#037H
0078 8021           SJMP   ?C0001
                            ; SOURCE LINE # 20
007A       ?C0009:
007A 750038    R    MOV    digit,#038H
007D 801C           SJMP   ?C0001
                            ; SOURCE LINE # 21
```

```
007F        ?C0010:
007F 750039     R    MOV    digit,#039H
0082 8017           SJMP   ?C0001
                            ; SOURCE LINE # 22
0084        ?C0011:
0084 750030     R    MOV    digit,#030H
0087 8012           SJMP   ?C0001
                            ; SOURCE LINE # 24
0089        ?C0012:
0089 75002D     R    MOV    digit,#02DH
008C 800D           SJMP   ?C0001
                            ; SOURCE LINE # 25
008E        ?C0013:
008E 75002C     R    MOV    digit,#02CH
0091 8008           SJMP   ?C0001
                            ; SOURCE LINE # 26
0093        ?C0014:
0093 750065     R    MOV    digit,#065H
0096 8003           SJMP   ?C0001
                            ; SOURCE LINE # 27
0098        ?C0015:
0098 7500FF     R    MOV    digit,#0FFH
                            ; SOURCE LINE # 28
009B        ?C0001:
                            ; SOURCE LINE # 29
009B E500       R    MOV    A,digit
009D 642C           XRL    A,#02CH
009F 6005           JZ     ?C0017
00A1 E500       R    MOV    A,digit
00A3 B42D21         CJNE   A,#02DH,?C0016
00A6        ?C0017:
                            ; SOURCE LINE # 30
00A6 AF00       R    MOV    R7,m
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00A8 EF             MOV    A,R7
00A9 33             RLC    A
00AA 95E0           SUBB   A,ACC
00AC F500       R    MOV    mm,A
00AE 8F00       R    MOV    mm+01H,R7
                            ; SOURCE LINE # 31
00B0 0500       R    INC    i+01H
00B2 E500       R    MOV    A,i+01H
00B4 AE00       R    MOV    R6,i
00B6 7002           JNZ    ?C0026
00B8 0500       R    INC    i
00BA        ?C0026:
00BA 14             DEC    A
00BB 2400       R    ADD    A,#LOW str
00BD F582           MOV    DPL,A
00BF 7400       R    MOV    A,#HIGH str
00C1 3E             ADDC   A,R6
00C2 F583           MOV    DPH,A
```

```
00C4 E500      R    MOV    A,digit
00C6 F0             MOVX   @DPTR,A
                           ; SOURCE LINE # 32
00C7       ?C0016:
                           ; SOURCE LINE # 33
00C7 E500      R    MOV    A,digit
00C9 B46536         CJNE   A,#065H,?C0018
                           ; SOURCE LINE # 34
00CC 7500FF    R    MOV    digit,#0FFH
                           ; SOURCE LINE # 35
00CF AF00      R    MOV    R7,n+03H
00D1 AE00      R    MOV    R6,n+02H
00D3 AD00      R    MOV    R5,n+01H
00D5 AC00      R    MOV    R4,n
00D7 C004           PUSH   AR4
00D9 C005           PUSH   AR5
00DB C006           PUSH   AR6
00DD C007           PUSH   AR7
00DF AC00      R    MOV    R4,mm
00E1 AD00      R    MOV    R5,mm+01H
00E3 EC             MOV    A,R4
00E4 120000    E    LCALL  ?C?FCASTI
00E7 A804           MOV    R0,AR4
00E9 A905           MOV    R1,AR5
00EB AA06           MOV    R2,AR6
00ED AB07           MOV    R3,AR7
00EF D007           POP    AR7
00F1 D006           POP    AR6
00F3 D005           POP    AR5
00F5 D004           POP    AR4
00F7 120000    E    LCALL  ?C?FPDIV
00FA 8F00      R    MOV    n+03H,R7
00FC 8E00      R    MOV    n+02H,R6
00FE 8D00      R    MOV    n+01H,R5
0100 8C00      R    MOV    n,R4
                           ; SOURCE LINE # 36
0102       ?C0018:
                           ; SOURCE LINE # 37
0102 AF00      R    MOV    R7,digit
0104 EF             MOV    A,R7
0105 33             RLC    A
0106 95E0           SUBB   A,ACC
0108 FE             MOV    R6,A
0109 EF             MOV    A,R7
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010A F4             CPL    A
010B 4E             ORL    A,R6
010C 6052           JZ     ?C0020
                           ; SOURCE LINE # 38
010E 0500      R    INC    i+01H
0110 E500      R    MOV    A,i+01H
0112 AE00      R    MOV    R6,i
```

```
0114 7002          JNZ    ?C0027
0116 0500      R   INC    i
0118       ?C0027:
0118 14            DEC    A
0119 2400      R   ADD    A,#LOW str
011B F582          MOV    DPL,A
011D 7400      R   MOV    A,#HIGH str
011F 3E            ADDC   A,R6
0120 F583          MOV    DPH,A
0122 E500      R   MOV    A,digit
0124 F0            MOVX   @DPTR,A
                           ; SOURCE LINE # 39
0125 E500      R   MOV    A,m
0127 75F00A        MOV    B,#0AH
012A A4            MUL    AB
012B F500      R   MOV    m,A
                           ; SOURCE LINE # 40
012D E4            CLR    A
012E FF            MOV    R7,A
012F FE            MOV    R6,A
0130 7D20          MOV    R5,#020H
0132 7C41          MOV    R4,#041H
0134 AB00      R   MOV    R3,n+03H
0136 AA00      R   MOV    R2,n+02H
0138 A900      R   MOV    R1,n+01H
013A A800      R   MOV    R0,n
013C 120000    E   LCALL  ?C?FPMUL
013F C004          PUSH   AR4
0141 C005          PUSH   AR5
0143 C006          PUSH   AR6
0145 C007          PUSH   AR7
0147 AC00      R   MOV    R4,digit
0149 E4            CLR    A
014A 120000    E   LCALL  ?C?FCASTC
014D D003          POP    AR3
014F D002          POP    AR2
0151 D001          POP    AR1
0153 D000          POP    AR0
0155 120000    E   LCALL  ?C?FPADD
0158 8F00      R   MOV    n+03H,R7
015A 8E00      R   MOV    n+02H,R6
015C 8D00      R   MOV    n+01H,R5
015E 8C00      R   MOV    n,R4
                           ; SOURCE LINE # 41
0160       ?C0020:
                           ; SOURCE LINE # 42
0160 A2B2          MOV    C,INT0
0162 B3            CPL    C
0163 40FB          JC     ?C0020
                           ; SOURCE LINE # 43
0165 D007          POP    AR7
0167 D006          POP    AR6
0169 D005          POP    AR5
```

```
016B D004            POP     AR4
016D D003            POP     AR3
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016F D002            POP     AR2
0171 D001            POP     AR1
0173 D000            POP     AR0
0175 D0D0            POP     PSW
0177 D082            POP     DPL
0179 D083            POP     DPH
017B D0F0            POP     B
017D D0E0            POP     ACC
017F 32              RETI
          ; FUNCTION Int00 (END)

          ; FUNCTION main (BEGIN)
                               ; SOURCE LINE # 45
                               ; SOURCE LINE # 46
0000 D2A8            SETB    EX0
                               ; SOURCE LINE # 47
0002 D288            SETB    IT0
                               ; SOURCE LINE # 48
0004 D2AF            SETB    EA
0006         ?C0023:
                               ; SOURCE LINE # 49
0006 80FE            SJMP    ?C0023
0008 22              RET
          ; FUNCTION main (END)
```

Распечатка загрузочного файла

```
:03000300020B5A93
:100B5A00C0E0C0F0C083C082C0D075D000C000C061
:0D0B6A0001C002C003C004C005C006C007E2
:100B770075080075090075F01AFB0EF120B340B44
:100B8700DE010BB6020BCA080BD4100BC0790BE8B9
:100B9700BE0BD9EF0BCFF70BE3FA0BC5FB0BEDFC45
:100BA7000BBBFD0BB1FE00000BF2750E31803F75DC
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```

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```

```
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:00000001FF
```

Вывод

Лабораторная на практическом примере показала, как микроконтроллеры обрабатывают и интерпретируют сигналы прерывания с устройства ввода-вывода на примере клавиатуры.