

**LAMPIRAN A**  
**LISTING PROGRAM**

### 1. Listing program menu utama

-----Menu Utama-----

```
DSEG AT 40H
TIMER1: DS 1
TIMER2: DS 1
OVERALL: DS 1
FRANSWOTH: DS 1
ACCUMULATOR1: DS 1
ACCUMULATOR2: DS 1
ACCUMULATOR3: DS 1
OPERATOR1: DS 1
OPERATOR2: DS 1
OPERATOR3: DS 1
MORSE_TIME1: DS 1
MORSE_TIME2: DS 1
SPACE_TIME1: DS 1
SPACE_TIME2: DS 1
TEST_TIME: DS 1
PENALTI: DS 1
BENAR1: DS 1
BENAR2: DS 1
JUMLAH1: DS 1
JUMLAH2: DS 1
JAWABAN_UJI: DS 1
BUFFER1: DS 1
BUFFER3: DS 27
CSEG
```

```
DOT_TIME EQU 1
DASH_TIME EQU 3
ELEMENT_TIME EQU 1
LETTER_TIME EQU 3
```

```

WORD_TIME EQU 7
SPACE_MENU EQU 10
JUMLAH_MENU EQU 4
TIMER_TIME EQU -1000
TIME_S_TEST EQU -50000
DELAY_SW EQU -40000
BUZZER BIT P2.4
PENGETUK BIT P1.1
LIGHT BIT P2.3
PICTURE BIT 7CH

```

```

ORG 00H
AJMP START_UTAMA
ORG 03H
AJMP KEYBOARD
ORG 2BH
AJMP TIME_SEC

```

```

START_UTAMA:

```

```

    CLR PICTURE
    CLR LIGHT
    CLR BUZZER
    MOV TIMER1,#0
    MOV TIMER2,#20
    MOV MORSE_TIME2,#0F0H
    MOV MORSE_TIME1,#000H
    MOV SPACE_TIME1,#000H
    MOV SPACE_TIME2,#0F0H
    MOV FRANSWOTH,#9
    MOV OVERALL,#5
    MOV TEST_TIME,#5
    MOV PENALTI,#5

```

```

MOV TMOD,#020H
MOV TH1,#0DCH
MOV TL1,#0DCH
SETB TR1
ACALL INIT_KEYBOARD
ACALL INIT_LCD
MOV A,#00CH
ACALL KIRIM_PERINTAH
MOV A,#080H
ACALL KIRIM_PERINTAH
MOV DPTR,#TAMPIL_JUDUL
ACALL KIRIM_FULL
CLR ARROW
MOV R1,#000H
MOV R0,#000H
MOV R2,#000H
MOV BUFFER4,#0
MOV R5,#100
SETB IE.0
CLR TF0
LOOP_JUDUL_UTAMA:
MOV R4,#100
LOOP_CEK:
ACALL DELAY
TUNGGU_TEKAN:
MOV A,BUFFER4
JNZ LOOP_MENU_UTAMA
JNB TF0,TUNGGU_TEKAN
CLR TF0
CLR TR0
DJNZ R4,LOOP_CEK
DJNZ R5,LOOP_JUDUL_UTAMA

```

LOOP\_MENU\_UTAMA:

```
CLR IE.0
ACALL BERSIH_LAYAR
ACALL TAMPILKAN_MENU_UTAMA
ACALL POSISI_TANDA
ACALL AMBILKARAKTERKEYBOARD
JNB ARROW,CEK_TOMBOL_UTAMA
CJNE A,#075H,TOMBOL_BAWAH
CJNE R0,#000H,CEK_BAGIAN_BAWAH
AJMP LOOP_MENU_UTAMA
```

CEK\_BAGIAN\_BAWAH:

```
CJNE R1,#001H,PINDAH_ATAS
MOV R1,#000H
```

KEATAS\_SELESAI:

```
DEC R0
AJMP LOOP_MENU_UTAMA
```

PINDAH\_ATAS:

```
MOV R1,#000H
MOV A,R2
CLR C
SUBB A,#SPACE_MENU
MOV R2,A
AJMP KEATAS_SELESAI
```

TOMBOL\_BAWAH:

```
CJNE A,#072H,LOOP_MENU_UTAMA
CJNE R0,#JUMLAH_MENU,CEK_BAGIAN_ATAS
AJMP LOOP_MENU_UTAMA
```

CEK\_BAGIAN\_ATAS:

```
CJNE R1,#000H,PINDAH_BAWAH
MOV R1,#001H
```

KEBAWAH\_SELESAI:

```
INC R0
```

```

        AJMP LOOP_MENU_UTAMA
PINDAH_BAWAH:
        MOV R1,#001H
        MOV A,R2
        ADD A,#SPACE_MENU
        MOV R2,A
        AJMP KEBAWAH_SELESAI
CEK_TOMBOL_UTAMA:
        CJNE A,#00AH,LOOP_MENU_UTAMA
        ACALL     BERSIH_LAYAR
        PUSH 0
        PUSH 1
        PUSH 2
        CJNE R0,#000H,CEK_MENU_2
        LCALL     START_MENU1
        AJMP BERSIH_MENU_UTAMA
CEK_MENU_2:
        CJNE R0,#001,CEK_MENU_3
        LCALL     START_MENU2
        AJMP BERSIH_MENU_UTAMA
CEK_MENU_3:
        CJNE R0,#002,CEK_MENU_4
        LCALL     START_MENU3
        AJMP BERSIH_MENU_UTAMA
CEK_MENU_4:
        CJNE R0,#003,CEK_MENU_5
        LCALL     START_MENU4
        AJMP BERSIH_MENU_UTAMA
CEK_MENU_5:
        LCALL     START_MENU5
BERSIH_MENU_UTAMA:
        POP 2

```

```
POP 1
POP 0
AJMP LOOP_MENU_UTAMA
```

TAMPILKAN\_MENU\_UTAMA:

```
ACALL BERSIH_LAYAR
MOV DPTR,#TAMPIL_UTAMA
PUSH ACC
MOV A,#SPACE_MENU
ADD A,#SPACE_MENU
MOV R3,A
MOV A,#081H
ACALL KIRIM_PERINTAH
```

LOOP\_TAMPILKAN\_MENU\_UTAMA:

```
MOV A,R2
MOVC A,@A+DPTR
ACALL KIRIM_KARAKTER
INC DPTR
CJNE R3,#SPACE_MENU + 1,TERUS_LOOP_MENU_UTAMA
MOV A,#0C1H
ACALL KIRIM_PERINTAH
```

TERUS\_LOOP\_MENU\_UTAMA:

```
DJNZ R3,LOOP_TAMPILKAN_MENU_UTAMA
POP ACC
RET
```

POSISI\_TANDA:

```
MOV A,#080H
ACALL KIRIM_PERINTAH
ACALL HAPUS_1_CHAR
MOV A,#0C0H
ACALL KIRIM_PERINTAH
```

```
ACALL    HAPUS_1_CHAR
CJNE R1,#000H,POSISI_LINE_2
MOV A,#080H
ACALL    KASIH_TANDA
RET
```

POSISI\_LINE\_2:

```
MOV A,#0C0H
ACALL    KASIH_TANDA
RET
```

KASIH\_TANDA:

```
ACALL    KIRIM_PERINTAH
ACALL    TANDA_PANAH
RET
```

TANDA\_PANAH:

```
MOV A,#03EH
ACALL    KIRIM_KARAKTER
RET
```

TIME\_SEC:

```
CLR TF2
DEC R7
CJNE R7,#000H,BALIK
MOV R7,#20
DEC R6
CJNE R6,#000H,BALIK
MOV R6,#60
DEC R5
```

BALIK:

```
RETI
```



TAMPIL\_UTAMA:

DB 'PENGENALAN'

DB 'LATIHAN '

DB 'UJIAN '

DB 'MENGETIK '

DB 'SETTING '

TAMPIL\_JUDUL:

DB ' ALAT LATIH '

DB ' KODE MORSE '

## 2. Listing program LCD

```
-----LCD-----
RS    BIT P2.5
ECLOCK    BIT P2.7
RW    BIT P2.6
BARISDUA EQU 0C0H
BARISSATU EQU 080H

KIRIMPESAN_LCD:
    MOV A,#00H
    MOVC    A,@A+DPTR
    CJNE A,#0FH,KIRIM_LCD
    RET

KIRIM_LCD:
    ACALL    KIRIM_KARAKTER
    INC    DPTR
    AJMP KIRIMPESAN_LCD

KIRIM_FULL:
    PUSH 0
    MOV R0,#32
    MOV A,#001H
    ACALL    KIRIM_PERINTAH

LOOP_KIRIM_TERUS:
    MOV A,#00H
    MOVC    A,@A+DPTR
    INC    DPTR
    ACALL    KIRIM_KARAKTER
    CJNE R0,#17,KIRIM_FULL_JALAN_TERUS
    ACALL    BARIS2

KIRIM_FULL_JALAN_TERUS:
    DJNZ R0,LOOP_KIRIM_TERUS
```

```
POP 0
RET
```

INIT\_LCD:

```
SETB RS
CLR ECLOCK
MOV R4,#1
LCALL DELAY_KETUK
MOV A,#30H
ACALL KIRIM_PERINTAH
MOV R4,#1
LCALL DELAY_KETUK
MOV A,#30H
ACALL KIRIM_PERINTAH
MOV R4,#1
LCALL DELAY_KETUK
MOV A,#30H
ACALL KIRIM_PERINTAH
MOV A,#20H
ACALL KIRIM_PERINTAH
MOV A,#28H
ACALL KIRIM_PERINTAH
MOV A,#08H
ACALL KIRIM_PERINTAH
MOV A,#01H
ACALL KIRIM_PERINTAH
MOV A,#0EH
ACALL KIRIM_PERINTAH
MOV A,#06H
ACALL KIRIM_PERINTAH
RET
```

KIRIM\_PERINTAH:

```
CLR  RS
CLR  RW
ACALL KIRIM_DATAALCD
SWAP A
ACALL KIRIM_DATAALCD
ACALL PERIKSABUSY
RET
```

KIRIM\_DATAALCD:

```
SETB ECLOCK
MOV  P0,A
CLR  ECLOCK
RET
```

KIRIM\_KARAKTER:

```
CLR  RW
SETB RS
ACALL KIRIM_DATAALCD
SWAP A
ACALL KIRIM_DATAALCD
ACALL PERIKSABUSY
LCALL DELAY_5MS
RET
```

BACAREGISTER:

```
MOV  P0,#0FFH
SETB RW
CLR  RS
SETB ECLOCK
MOV  A,P0
ANL  A,#0F0H
```

```
CLR ECLOCK
PUSH ACC
SETB ECLOCK
MOV B,#0FFH
DJNZ B,$
MOV A,P0
ANL A,#0F0H
CLR ECLOCK
SWAP A
POP B
ADD A,B
CLR RW
RET
```

PERIKSABUSY:

```
ACALL BACAREGISTER
JB ACC.7,PERIKSABUSY
RET
```

BARIS2:

```
MOV A,#BARISDUA
ACALL KIRIM_PERINTAH
RET
```

BARIS1:

```
MOV A,#BARISSATU
ACALL KIRIM_PERINTAH
RET
```

BERSIH\_LAYAR:

```
MOV A,#001H
```

```
ACALL    KIRIM_PERINTAH
RET
```

DELAY\_5MS:

```
PUSH TMOD
MOV  TMOD,#21H
MOV  TH0,#0EDH
MOV  TL0,#0FFH
SETB TR0
```

TUNGGU\_5MS:

```
JBC  TF0,SUDAH_5MS
AJMP TUNGGU_5MS
```

SUDAH\_5MS:

```
CLR  TR0
POP  TMOD
RET
```

### 3. Listing program PC Keyboard

-----Keyboard-----

ORG \$

DSEG AT 7FH

BUFFER4: DS 1

CSEG

LSHIFT EQU 12H

CAPSLOCK EQU 58H

RSHIFT EQU 59H

ARROW BIT 7FH

SHIFT\_FLAGBIT 7EH

KBDCLOCK BIT INT0

KBDDATA BIT P1.0

TMPC BIT 7DH

INIT\_KEYBOARD:

MOV IE,#080H

MOV R4,#20

LOOP\_CEK\_KEY:

MOV A,#00H

ACALL DELAY

LOOP\_CEK\_KEY2:

JNB KBDCLOCK,KEYBOARD\_SEND

JNB TF0,LOOP\_CEK\_KEY2

CLR TF0

CLR TR0

DJNZ R4,LOOP\_CEK\_KEY

AJMP KEYBOARD\_ERROR

KEYBOARD\_SEND:

CLR TF0

CLR TR0

```

        ACALL    AMBIL_KEYBOARD
        JZ      KEYBOARD_ERROR
        CLR    SHIFT_FLAG
        RET
KEYBOARD_ERROR:
        MOV    DPTR,#KEYBOARD_RUSAK
        ACALL    KIRIM_FULL
        AJMP   LOOP_CEK_KEY
        RET

AMBILKARAKTERKEYBOARD:
        MOV    BUFFER4,#0
        SETB  IE.0
LOOPAMBILKARAKTERKEYBOARD:
        MOV    A,BUFFER4
        JZ    LOOPAMBILKARAKTERKEYBOARD
        CLR    IE.0
        RET

KEYBOARD:
        CLR    IE.0
        PUSH  ACC
        MOV    TMPC,C
        CLR    ARROW
        LCALL    KEYBOARD_INTERRUPT
        JNC   KELUAR_KEY
        MOV    BUFFER4,A
KELUAR_KEY:
        SETB  IE.0
        MOV    C,TMPC
        POP   ACC
        RETI

```



AMBIL\_KEYBOARD:

```
JB    KBDCLOCK,$
MOV   A,#000H
PUSH 0
JNB   KBDCLOCK,$
MOV   R0,#08H
```

AMBIL\_KEYBOARD2:

```
JB    KBDCLOCK,$
MOV   C,KBDDATA
RR    A
MOV   ACC.7,C
JNB   KBDCLOCK,$
DJNZ  R0,AMBIL_KEYBOARD2
JB    KBDCLOCK,$
JNB   KBDCLOCK,$
JB    KBDCLOCK,$
JNB   KBDCLOCK,$
POP   0
RET
```

KONVERSI\_SCANCODE:

```
MOV  DPTR,#TABEL_KONVERSI
MOVC A,@A+DPTR
RET
```

KEYBOARD\_INTERRUPT:

```
ACALL  AMBIL_KEYBOARD
CJNE  A,#0E0H,BUKAN_EXT
AJMP  EXT
```

BUKAN\_EXT:

```
CJNE  A,#0F0H,KYBD_TIDAKLEPAS
ACALL  AMBIL_KEYBOARD
```

```

        CJNE A,#LSHIFT,BUKAN_LSHIFTLEPAS
        AJMP KOMPLEMEN_SHIFTFLG
BUKAN_LSHIFTLEPAS:
        CJNE A,#RSHIFT,BUKAN_SHIFTLEPAS
KOMPLEMEN_SHIFTFLG:
        CPL  SHIFT_FLAG
BUKAN_SHIFTLEPAS:
        CLR  C
        RET
EXT:
        SETB ARROW
        ACALL  AMBIL_KEYBOARD
        CJNE A,#0F0H,KYBD_EXT_TIDAKLEPAS
        ACALL  AMBIL_KEYBOARD
        CLR  C
        RET
KYBD_EXT_TIDAKLEPAS:
        SETB C
        RET
KYBD_TIDAKLEPAS:
        CJNE A,#LSHIFT,BUKAN_LSHIFTTEKAN
        AJMP KOMPLEMEN_SHIFTFLG
BUKAN_LSHIFTTEKAN:
        CJNE A,#RSHIFT,BUKAN_RSHIFTTEKAN
        AJMP KOMPLEMEN_SHIFTFLG
BUKAN_RSHIFTTEKAN:
        CJNE A,#CAPSLOCK,BUKANCAPSLOCK
        AJMP KOMPLEMEN_SHIFTFLG
BUKANCAPSLOCK:
        ACALL  KONVERSI_SCANCODE
        ACALL  CAPITAL
        SETB C

```

RET

CAPITAL:

CLR C

LCALL CAPITALIZE

SETB C

RET

CAPITALIZE:

CJNE A,#'a',PERIKSA\_CARRY

PERIKSA\_CARRY:

JNC LEBIH\_KECIL\_Z

RET

LEBIH\_KECIL\_z:

CJNE A,#'z',PERIKSA\_CARRY2

LJMP KAPITAL

PERIKSA\_CARRY2:

JC KAPITAL

Ret

KAPITAL:

CLR C

SUBB A,#20H

RET

KEYBOARD\_RUSAK:

DB 'KEYBOARD NORESPO'

DB 'N, PRESS ANY KEY'

TABEL\_KONVERSI:

DB 00

DB 0F9H

DB 00

DB 0F5H,0F3H,0F1H,0F2H,0FCH

```
DB 00H
DB 0FAH,0F8H,0F6H,0F4H
DB 0C0H
DB '~'
DB 00H
DB 00H
DB 0C1H
DB 0C2H
DB 00H
DB 0C3H
DB 'q1'
DB 00H,00H,00H
DB 'zsaw2'
DB 00H,00H
DB 'cxde43'
DB 00H,00H
DB ' vfr5'
DB 00H,00H
DB 'nbhgy6'
DB 00H,00H,00H
DB 'mju78'
DB 00H,00H
DB ',kio09'
DB 00H,00H
DB './l;p-'
DB 00H,00H,00H
DB 2CH
DB 00H
DB '['
DB 00H,00H
DB 0C5H
DB 0C6H
```

```
DB 0AH
DB 'J'
DB 00H
DB '\
DB 00H,00H,00H,00H,00H,00H,00H,00H
DB 08H
DB
00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00H,00H
DB 0DH
DB 00H
DB 0FBH
DB 00H,00H,00H,00H,00H,00H,00H,00H,00H,00H
DB 0F7H
```

#### 4. Listing program Kumpulan Prosedur

----- Kumpulan Prosedur-----

ORG\$

KODEMORSE:

```
PUSH ACC
ACALL IDENTIFIKASI
CJNE A,#00FH,KEMBALI
POP ACC
RET
```

KEMBALI:

```
ACALL GAMBAR_MORSE
ACALL KETUK_MORSE
POP ACC
RET
```

IDENTIFIKASI:

```
CLR C
CJNE A,#0',CEK_0
ACALL ANGKA
RET
```

CEK\_0:

```
JNC ANGKA_9
MOV A,#00FH
RET
```

ANGKA\_9:

```
CJNE A,#9',CEK_ANGKA
ACALL ANGKA
RET
```

CEK\_ANGKA:

```
JNC HURUF_ALFA
ACALL ANGKA
RET
```

HURUF\_ALFA:

```
CJNE A,#'A',CEK_A
ACALL HURUF
RET
```

CEK\_A:

```
JNC CEK_Z
MOV A,#00FH
RET
```

CEK\_Z:

```
CJNE A,#'Z',ANTARA_A_Z
ACALL HURUF
RET
```

ANTARA\_A\_Z:

```
JNC TIDAK_TAHU
ACALL HURUF
RET
```

TIDAK\_TAHU:

```
MOV A,#00FH
RET
```

HURUF:

```
CLR C
SUBB A,#041H
MOV DPTR,#DATAMORSEALFA
MOVC A,@A+DPTR
RET
```

ANGKA:

```
CLR C
SUBB A,#030H
MOV DPTR,#DATAMORSEANGKA
MOVC A,@A+DPTR
```

RET

KETUK\_MORSE:

```
PUSH 2
JB ACC.0,NUMERICMORSE
PUSH ACC
ANL A,#00001111B
RR A
MOV R2,A
POP ACC
ACALL KIRIM_KETUK
POP 2
RET
```

NUMERICMORSE:

```
MOV R2,#005H
ACALL KIRIM_KETUK
POP 2
RET
```

KIRIM\_KETUK:

```
PUSH ACC
ACALL SEDANG_KIRIM_KETUK
POP ACC
RET
```

SEDANG\_KIRIM\_KETUK:

```
MOV R4,#ELEMENT_TIME
CLR BUZZER
MOV TIMER1,MORSE_TIME1
MOV TIMER2,MORSE_TIME2
ACALL DELAY_KETUK
JB ACC.7,DASH_KETUK
```



```
PUSH ACC
MOV R4,#DOT_TIME
SETB BUZZER
ACALL DELAY_KETUK
CLR BUZZER
POP ACC
AJMP GESER_KETUK
```

DASH\_KETUK:

```
PUSH ACC
MOV R4,#DASH_TIME
SETB BUZZER
ACALL DELAY_KETUK
CLR BUZZER
POP ACC
```

GESER\_KETUK:

```
RL A
DJNZ R2,SEDANG_KIRIM_KETUK
RET
```

DELAY\_KETUK:

```
PUSH ACC
PUSH 2
PUSH 1
```

LOOP\_R4:

```
MOV R1,TIMER1
MOV R2,TIMER2
```

LOOP\_DELAY:

```
CLR TF0
ACALL DELAY
JNB TF0,$
CLR TR0
CJNE R2,#0,KRG_DELAY
```

```

MOV R2,#0FFH
CJNE R1,#0,KRG_1_DELAY
AJMP KELUAR_LOOP_DELAY
KRG_1_DELAY:
DEC R1
AJMP LOOP_DELAY
KRG_DELAY:
DEC R2
AJMP LOOP_DELAY
KELUAR_LOOP_DELAY:
DJNZ R4,LOOP_R4
POP 1
POP 2
POP ACC
RET

```

```

DELAY:
CLR TF0
CLR TR0
MOV TH0,#HIGH TIMER_TIME
MOV TL0,#LOW TIMER_TIME
ORL TMOD,#001H
SETB TR0
RET

```

```

DELAY2:
CLR TF0
CLR TR0
MOV TH0,#HIGH DELAY_SW
MOV TL0,#LOW DELAY_SW
ORL TMOD,#001H
SETB TR0

```

RET

GAMBAR\_MORSE:

```
PUSH 2
JB ACC.0,NUMERICGAMBAR
PUSH ACC
ANL A,#00001111B
RR A
MOV R2,A
POP ACC
ACALL KIRIMGAMBAR
POP 2
RET
```

NUMERICGAMBAR:

```
MOV R2,#005H
ACALL KIRIMGAMBAR
POP 2
RET
```

KIRIMGAMBAR:

```
PUSH ACC
ACALL SEDANG_KIRIM_GAMBAR
POP ACC
RET
```

SEDANG\_KIRIM\_GAMBAR:

```
JB ACC.7,DASH_GAMBAR
PUSH ACC
MOV A,#00101110B
ACALL KIRIM_KARAKTER
POP ACC
AJMP GESER
```

DASH\_GAMBAR:

```
PUSH ACC
MOV A,#01011111B
ACALL KIRIM_KARAKTER
POP ACC
```

GESER:

```
RL A
DJNZ R2,SEDANG_KIRIM_GAMBAR
RET
```

TAMPIL\_SUB\_MENU:

```
MOV A,#081H
ACALL KIRIM_PERINTAH
MOV DPTR,#TAMPIL_MENU_A
ACALL KIRIMPESAN_LCD
MOV A,#0C1H
ACALL KIRIM_PERINTAH
MOV DPTR,#TAMPIL_MENU_B
ACALL KIRIMPESAN_LCD
RET
```

KONVERSI\_RANDOM:

```
CLR C
CJNE A,#0DCH,CEK_RANDOM
AJMP START_KONVERSI
```

CEK\_RANDOM:

```
JNC START_KONVERSI
CLR C
ADD A,#024H
AJMP KONVERSI_RANDOM
```

START\_KONVERSI:

```
CLR C
```

```

SUBB A,#0DCH
CLR C
CJNE A,#000H,CEK_ANGKA_9
AJMP HASIL_ANGKA
CEK_ANGKA_9:
CJNE A,#009H,CEK_ANGKA_1_8
AJMP HASIL_ANGKA
CEK_ANGKA_1_8:
JC HASIL_ANGKA
CJNE A,#00AH,CEK_HURUF_Z
AJMP HASIL_ALFA
CEK_HURUF_Z:
CJNE A,#024H,CEK_HURUF_A_Z
AJMP HASIL_ALFA
CEK_HURUF_A_Z:
JC HASIL_ALFA
AJMP EXIT
HASIL_ALFA:
CLR C
SUBB A,#00AH
ADD A,#041H
AJMP EXIT
HASIL_ANGKA:
ADD A,#030H
EXIT:
RET

HAPUS_1_CHAR:
PUSH ACC
MOV A,#020H
ACALL KIRIM_KARAKTER
POP ACC

```

RET

HAPUS:

```
PUSH ACC
PUSH 0
MOV A,#08BH
ACALL    KIRIM_PERINTAH
ACALL    START_HAPUS
MOV A,#0CBH
ACALL    KIRIM_PERINTAH
ACALL    START_HAPUS
POP 0
POP ACC
RET
```

START\_HAPUS:

```
MOV R0,#005H
```

LOOP\_HAPUS:

```
MOV A,#020H
ACALL    KIRIM_KARAKTER
DJNZ R0,LOOP_HAPUS
RET
```

TAMPIL\_K\_M:

```
ACALL    BERSIH_LAYAR
MOV A,#080H
ACALL    KIRIM_PERINTAH
MOV DPTR,#TAMPIL_K
ACALL    KIRIMPESAN_LCD
ACALL    BARIS2
MOV DPTR,#TAMPIL_M
ACALL    KIRIMPESAN_LCD
```

RET

TAMPIL\_M\_K:

```
ACALL    BERSIH_LAYAR
MOV  A,#080H
ACALL    KIRIM_PERINTAH
MOV  DPTR,#TAMPIL_M
ACALL    KIRIMPESAN_LCD
ACALL    BARIS2
MOV  DPTR,#TAMPIL_K
ACALL    KIRIMPESAN_LCD
RET
```

AMBIL\_SW\_KETUK:

```
PUSH 0
PUSH 1
PUSH 2
PUSH 3
PUSH SPACE_TIME2
PUSH SPACE_TIME1
PUSH MORSE_TIME2
PUSH MORSE_TIME1
MOV  A,MORSE_TIME2
SUBB A,#41
MOV  MORSE_TIME2,A
MOV  A,MORSE_TIME1
SUBB A,#0
MOV  MORSE_TIME1,A
CLR  C
MOV  A,SPACE_TIME2
SUBB A,#41
MOV  SPACE_TIME2,A
```

```

MOV A,SPACE_TIME1
SUBB A,#0
MOV SPACE_TIME1,A
MOV A,#001H
MULAI_LOOP_SW_KETUK:
JB ACC.5,LANGSUNG_HASIL
MOV R0,#DOT_TIME + DASH_TIME
MOV R1,#0
SETB BUZZER
CLR C
ACALL DELAY2
JNB TF0,$
CLR TR0
LOOP_SW_KETUK:
MOV R2,MORSE_TIME1
MOV R3,MORSE_TIME2
LOOP_SW_CEK:
ACALL DELAY
LOOP_TUNGGU_SW:
JB PENGETUK,KELUAR_LOOP_SW_KETUK
JNB TF0,LOOP_TUNGGU_SW
CLR TF0
CLR TR0
CJNE R3,#0,CEK_R3_LOOP
MOV R3,#0FFH
CJNE R2,#0,CEK_R2_LOOP
AJMP CEK_R0
CEK_R2_LOOP:
DEC R2
AJMP LOOP_SW_CEK
CEK_R3_LOOP:
DEC R3

```



```

        AJMP LOOP_SW_CEK
CEK_R0:
        DJNZ R0,LOOP_SW_KETUK
        CLR  BUZZER
        JNB  PENGETUK,$
KELUAR_LOOP_SW_KETUK:
        CLR  BUZZER
        ACALL    DELAY2
        JNB  TF0,$
        CLR  TR0
        ACALL    CATAT_KETUKAN
        MOV  R0,#000H
LOOP_CEK_KOSONG:
        MOV  R2,SPACE_TIME1
        MOV  R3,SPACE_TIME2
LOOP_SW_KO:
        ACALL    DELAY
LOOP_CEK_SW_KO:
        JNB  PENGETUK,MULAI_LOOP_SW_KETUK
        JNB  TF0,LOOP_CEK_SW_KO
        CLR  TR0
        CJNE R3,#0,CEK_R3_KO
        MOV  R3,#0FFH
        CJNE R2,#0,CEK_R2_KO
        AJMP CEK_R0_KO
CEK_R2_KO:
        DEC  R2
        AJMP LOOP_SW_KO
CEK_R3_KO:
        DEC  R3
        AJMP LOOP_SW_KO
CEK_R0_KO:

```

```
INC R0
CJNE R0,#LETTER_TIME,LOOP_CEK_KOSONG
```

LANGSUNG\_HASIL:

```
POP MORSE_TIME1
POP MORSE_TIME2
POP SPACE_TIME1
POP SPACE_TIME2
ACALL HASIL
POP 3
POP 2
POP 1
POP 0
RET
```

CATAT\_KETUKAN:

```
CLR C
CJNE R0,#DASH_TIME,CEK_DOT_DASH
AJMP CATAT_DASH
RET
```

CEK\_DOT\_DASH:

```
JNC CATAT_DOT
JC CATAT_DASH
```

KELUAR\_CATAT:

```
RET
```

CATAT\_DOT:

```
CLR C
ACALL DICATAT
JB PICTURE,KELUAR_CATAT
PUSH ACC
MOV A,#00101110B
ACALL KIRIM_KARAKTER
POP ACC
```

```

RET
CATAT_DASH:
SETB C
ACALL    DICATAT
JB      PICTURE,KELUAR_CATAT
PUSH ACC
MOV  A,#01011111B
ACALL    KIRIM_KARAKTER
POP  ACC
RET

```

```

DICATAT:
RL  A
MOV ACC.0,C
RET

```

```

HASIL:
MOV R0,#007H
LOOP_CEK_BANYAK_INPUT:
RL  A
DEC R0
JNB ACC.7,LOOP_CEK_BANYAK_INPUT
RL  A
ANL A,#0FEH
CJNE R0,#005H,CEK_HURUF
ACALL    CEK_ANGKA_NUM
RET

```

```

CEK_HURUF:
MOV DPTR,#DATAMORSEALFA
PUSH ACC
MOV  A,R0

```

```

    RL    A
    MOV  R0,A
    POP  ACC
    ORL  A,R0
    MOV  R1,#26
    ACALL    KONVERSI_MORSE_ALFA
    CJNE  A,#0FFH,KEMBALI_HURUF
    MOV  A,#00FH
    RET

KEMBALI_HURUF:
    ADD  A,#041H
    RET

CEK_ANGKA_NUM:
    MOV  DPTR,#DATAMORSEANGKA
    ORL  A,#001H
    MOV  R1,#10
    ACALL    KONVERSI_MORSE_ALFA
    CJNE  A,#0FFH,KEMBALI_ANGKA
    MOV  A,#00FH
    RET

KEMBALI_ANGKA:
    ADD  A,#030H
    RET

KONVERSI_MORSE_ALFA:
    PUSH 1
LOOP_KONVERSI_MORSE_ALFA:
    PUSH ACC
    MOV  A,#0
    MOVC    A,@A+DPTR
    INC  DPTR

```

```

MOV R0,A
POP ACC
PUSH ACC
CLR C
SUBB A,R0
JZ ADA_HASIL
POP ACC
DJNZ R1,LOOP_KONVERSI_MORSE_ALFA
POP 1
MOV A,#0FFH
RET

```

ADA\_HASIL:

```

CLR C
POP ACC
MOV A,R1
MOV R2,A
POP 1
MOV A,R1
SUBB A,R2
RET

```

JAWABAN:

```

CJNE A,00H,SALAH_JAWAB
MOV DPTR,#TAMPIL_BENAR
AJMP TAMPIL_JAWABAN

```

SALAH\_JAWAB:

```

MOV DPTR,#TAMPIL_SALAH

```

TAMPIL\_JAWABAN:

```

PUSH ACC
LCALL BERSIH_LAYAR
LCALL KIRIMPESAN_LCD
POP ACC

```

```
LCALL    ISI_JAWABAN
RET
```

ISI\_JAWABAN:

```
LCALL    BARIS2
MOV  A,R0
LCALL    KIRIM_KARAKTER
MOV  DPTR,#TAMPIL_SPACE
LCALL    KIRIMPESAN_LCD
MOV  A,R0
LCALL    IDENTIFIKASI
LCALL    GAMBAR_MORSE
RET
```

SIAP\_TEST:

```
MOV  JAWABAN_UJI,#00H
MOV  R5,TEST_TIME
MOV  R6,#60
MOV  R7,#20
MOV  BENAR1,#0
MOV  JUMLAH1,#0
MOV  BENAR2,#0
MOV  JUMLAH2,#0
MOV  R0,#BUFFER3
MOV  BUFFER2,#27
MOV  BENAR1,#0
MOV  JUMLAH1,#0
MOV  BENAR2,#0
MOV  JUMLAH2,#0
SETB IE.5
MOV  RCAP2L,#LOW TIME_S_TEST
MOV  RCAP2H,#HIGH TIME_S_TEST
```

```

MOV T2CON,#00000000B
CLR BUZZER
LOOP_PENGOSONGAN:
MOV @R0,#0
INC R0
DJNZ BUFFER2,LOOP_PENGOSONGAN
MOV TL2,#LOW TIME_S_TEST
MOV TH2,#HIGH TIME_S_TEST
ACALL BERSIH_LAYAR
MOV A,#080H
ACALL KIRIM_PERINTAH
MOV DPTR,#TAMPIL_SIAP
ACALL KIRIMPESAN_LCD
MOV R3,#5
LOOP_SIAP:
MOV A,#08BH
ACALL KIRIM_PERINTAH
MOV A,R3
ADD A,#30H
ACALL KIRIM_KARAKTER
MOV R2,#20
LOOP_CEK_SIAP2:
MOV R4,#50
LOOP_CEK_SIAP:
LCALL DELAY
JNB TF0,$
CLR TF0
CLR TR0
DJNZ R4,LOOP_CEK_SIAP
DJNZ R2,LOOP_CEK_SIAP2
DJNZ R3,LOOP_SIAP
RET

```

TAMPIL\_JUDUL\_MODUL:

```
LCALL    KIRIM_FULL
MOV R3,#100
CLR  TF0
MOV  BUFFER4,#0
SETB IE.0
```

LOOP\_JUDUL\_MODUL:

```
MOV R4,#50
```

LOOP\_CEK\_MODUL:

```
LCALL    DELAY
```

TUNGGU\_TEKAN\_MODUL:

```
MOV  A,BUFFER4
JNZ  EXIT_JUDUL
JNB  TF0,TUNGGU_TEKAN_MODUL
CLR  TF0
CLR  TR0
DJNZ R4,LOOP_CEK_MODUL
DJNZ R3,LOOP_JUDUL_MODUL
```

EXIT\_JUDUL:

```
CLR  IE.0
RET
```

KONVER\_DEC\_HEX:

```
CLR  C
MOV  A,#0
CJNE R5,#0,RATUSANDH
AJMP PULUHANDH
```

RATUSANDH:

```
ADD  A,#100
JC   FF
DJNZ R5,RATUSANDH
```



```

PULUHANDH:
    CJNE R6,#0,JALAN_PULUHANDH
    AJMP SATUANDH
JALAN_PULUHANDH:
    ADD A,#10
    JC FF
    DJNZ R6,JALAN_PULUHANDH
SATUANDH:
    CJNE R7,#0,JALAN_SATUANDH
    LJMP EXIT_DEC_HEX
JALAN_SATUANDH:
    ADD A,#1
    JC FF
    DJNZ R7,JALAN_SATUANDH
EXIT_DEC_HEX:
    RET
FF:
    MOV A,#0FFH
    LJMP EXIT_DEC_HEX
    RET

TAMPIL_SIAP:
    DB 'BERSIAP... ',00FH
TAMPIL_BENAR:
    DB 'JAWABAN BENAR..',00FH
TAMPIL_SALAH:
    DB 'SALAH YG BENAR ',00FH
TAMPIL_SPACE:
    DB ' ',00FH
TAMPIL_MENU_A:
    DB 'LETTER->MORSE',00FH

```

TAMPIL\_MENU\_B:

DB 'MORSE->LETTER',00FH

DATAMORSEANGKA:

DB 0F9H,079H,039H,019H,009H,001H,081H,0C1H,0E1H,0F1H

DATAMORSEALFA:

DB 044H,088H,0A8H,086H,002H,028H,0C6H,008H,004H,078H,0A6H,  
048H,0C4H,084H,0E6H

DB 068H,0D8H,046H,006H,082H,026H,018H,066H,098H,  
0B8H,0C8H

TAMPIL\_K:

DB 'KARAKTER : ',00FH

TAMPIL\_M:

DB 'MORSE : ',00FH

### 5. Listing program menu pertama

```
-----Menu 1-----  
ORG $  
START_MENU1:  
    MOV R1,#000H  
    LCALL    TANDA_PANAH  
LIST_MENU_1:  
    LCALL    TAMPIL_SUB_MENU  
LOOP_MENU_1:  
    LCALL    POSISI_TANDA  
    LCALL    AMBILKARAKTERKEYBOARD  
    JNB  ARROW,CEK_TOMBOL_MENU11  
    CJNE A,#075H,CEK_BAWAH  
    MOV R1,#000H  
    LJMP LOOP_MENU_1  
CEK_BAWAH:  
    CJNE A,#072H,LOOP_MENU_1  
    MOV R1,#001H  
    LJMP LOOP_MENU_1  
CEK_TOMBOL_MENU11:  
    CJNE A,#00DH,BUKAN_ESC  
    RET  
BUKAN_ESC:  
    CJNE A,#00AH,LOOP_MENU_1  
    LCALL    BERSIH_LAYAR  
    PUSH 1  
    CJNE R1,#001H,MENU11  
    ACALL    START_MODUL12  
SELESAI_MENU1:  
    POP 1  
    LCALL    BERSIH_LAYAR  
    LJMP LIST_MENU_1
```

```

MENU11:
    ACALL    START_MODUL11
    AJMP SELESAI_MENU1

START_MODUL11:
    MOV R7,#000H
    CLR BUZZER
    LCALL    TAMPIL_K_M
    MOV A,#05FH
LOOP_MODUL11:
    LCALL    HAPUS
    PUSH ACC
    MOV A,#08BH
    LCALL    KIRIM_PERINTAH
    POP  ACC
    CJNE A,#05FH,TAMPILKAN_MORSE
    LCALL    KIRIM_KARAKTER
    LJMP LANJUT
TAMPILKAN_MORSE:
    PUSH ACC
    LCALL    IDENTIFIKASI
    CJNE A,#00FH,ADA_MORSE
    POP  ACC
    LJMP LANJUT
ADA_MORSE:
    POP  ACC
    PUSH ACC
    LCALL    KIRIM_KARAKTER
    MOV A,#0CBH
    LCALL    KIRIM_PERINTAH
    POP  ACC
    LCALL    KODEMORSE

```

LANJUT:

```
LCALL    AMBILKARAKTERKEYBOARD
CJNE A,#00DH,LOOP_MODUL11
RET
```

START\_MODUL12:

```
CLR BUZZER
LCALL    TAMPIL_M_K
MOV A,#00FH
```

LOOP\_MODUL12:

```
CJNE A,#00FH,TIDAK_KOSONG
LCALL    HAPUS
LJMP MULAI_JALAN_M12
```

TIDAK\_KOSONG:

```
PUSH ACC
MOV A,#0CBH
LCALL    KIRIM_PERINTAH
POP ACC
LCALL    KIRIM_KARAKTER
```

MULAI\_JALAN\_M12:

```
SETB IE.0
MOV BUFFER4,#0
```

TUNGGU\_SW:

```
MOV A,BUFFER4
JNZ CEK_KEYBOARD_MODUL12
JB PENGETUK,TUNGGU_SW
CLR IE.0
LCALL    HAPUS
MOV A,#08BH
LCALL    KIRIM_PERINTAH
LCALL    AMBIL_SW_KETUK
LJMP LOOP_MODUL12
```

CEK\_KEYBOARD\_MODUL12:

CLR IE.0

CJNE A,#00DH,MULAI\_JALAN\_M12

RET

## 6. Listing program menu kedua

-----Menu 2-----

START\_MENU2:

MOV R1,#000H

LCALL TANDA\_PANAH

LIST\_MENU\_2:

LCALL TAMPIL\_SUB\_MENU

LOOP\_MENU\_2:

LCALL POSISI\_TANDA

LCALL AMBILKARAKTERKEYBOARD

JNB ARROW,CEK\_TOMBOL\_MENU21

CJNE A,#075H,CEK\_BAWAH\_2

MOV R1,#000H

LJMP LOOP\_MENU\_2

CEK\_BAWAH\_2:

CJNE A,#072H,LOOP\_MENU\_2

MOV R1,#001H

LJMP LOOP\_MENU\_2

CEK\_TOMBOL\_MENU21:

CJNE A,#00DH,BUKAN\_ESC\_MENU2

RET

BUKAN\_ESC\_MENU2:

CJNE A,#00AH,LOOP\_MENU\_2

LCALL BERSIH\_LAYAR

PUSH 1

CJNE R1,#001H,MENU21

LCALL START\_MODUL22

SELESAI\_MENU2:

POP 1

LCALL BERSIH\_LAYAR

LJMP LIST\_MENU\_2

MENU21:

```
LCALL    START_MODUL21
LJMP SELESAI_MENU2
```

```
START_MODUL21:
```

```
CLR BUZZER
MOV DPTR,#TAMPIL_JUDUL_MODUL21
LCALL    TAMPIL_JUDUL_MODUL
```

```
LOOP_MODUL21:
```

```
LCALL    BERSIH_LAYAR
LCALL    TAMPIL_K_M
CLR TR1
MOV A,TL1
SETB TR1
LCALL    KONVERSI_RANDOM
PUSH ACC
MOV A,#08BH
LCALL    KIRIM_PERINTAH
POP ACC
MOV R0,A
LCALL    KIRIM_KARAKTER
SETB IE.0
MOV BUFFER4,#0
```

```
TUNGGU_SW_MODUL21:
```

```
MOV A,BUFFER4
JNZ CEK_KEYBOARD_MODUL21
JB PENGETUK,TUNGGU_SW_MODUL21
CLR IE.0
MOV A,#0CBH
LCALL    KIRIM_PERINTAH
PUSH 0
LCALL    AMBIL_SW_KETUK
POP 0
```



```

        LCALL    JAWABAN
        MOV  R5,#100
        CLR  TF0
        CLR  TR0
        SETB IE.0
        MOV  BUFFER4,#0
LOOP_TUNGGU_JAWABAN_MODUL21:
        MOV  R4,#100
LOOP_DALAM_TUNGGU_JAWABAN_MODUL21:
        LCALL    DELAY
TUNGGU_TEKAN_SW_JAWABAN_MODUL21:
        MOV  A,BUFFER4
        JNZ  CEK_KEYBOARD_MODUL21
        JNB  TF0,TUNGGU_TEKAN_SW_JAWABAN_MODUL21
        CLR  TF0
        CLR  TR0
        DJNZ R4,LOOP_DALAM_TUNGGU_JAWABAN_MODUL21
        DJNZ R5,LOOP_TUNGGU_JAWABAN_MODUL21
        CLR  IE.0
        LJMP LOOP_MODUL21
CEK_KEYBOARD_MODUL21:
        CLR  IE.0
        CJNE A,#00DH,LOOP_MODUL21
        RET

TAMPIL_JUDUL_MODUL21:
        DB   '  LATIHAN  '
        DB   'LETTER KE MORSE '

START_MODUL22:
        CLR  BUZZER
        MOV  DPTR,#TAMPIL_JUDUL_MODUL22

```

```

        LCALL    TAMPIL_JUDUL_MODUL
LOOP_MODUL22:
        LCALL    BERSIH_LAYAR
        LCALL    TAMPIL_M_K
        CLR     TR1
        MOV     A,TL1
        SETB    TR1
        LCALL    KONVERSI_RANDOM
        MOV     R0,A
        PUSH   ACC
        MOV     A,#08BH
        LCALL    KIRIM_PERINTAH
        POP     ACC
        LCALL    KODEMORSE
        MOV     A,#0CBH
        LCALL    KIRIM_PERINTAH
        LCALL    AMBILKARAKTERKEYBOARD
        CJNE   A,#00DH,TERUSKAN_MODUL22
        RET
TERUSKAN_MODUL22:
        PUSH   ACC
        MOV     A,#0CBH
        LCALL    KIRIM_PERINTAH
        POP     ACC
        LCALL    JAWABAN
        MOV     R5,#100
        CLR     TF0
        CLR     TR0
        SETB    IE.0
        MOV     BUFFER4,#0
LOOP_TUNGGU_JAWABAN_MODUL22:
        MOV     R4,#100

```

LOOP\_DALAM\_TUNGGU\_MODUL22:

LCALL DELAY

TUNGGU\_TEKAN\_KEYBOARD\_JAWABAN\_MODUL22:

MOV A,BUFFER4

JNZ CEK\_LOOP\_MODUL22

JNB TF0,TUNGGU\_TEKAN\_KEYBOARD\_JAWABAN\_MODUL22

CLR TF0

CLR TR0

DJNZ R4,LOOP\_DALAM\_TUNGGU\_MODUL22

DJNZ R5,LOOP\_TUNGGU\_JAWABAN\_MODUL22

CLR IE.0

LJMP LOOP\_MODUL22

CEK\_LOOP\_MODUL22:

CLR IE.0

CJNE A,#00DH,LOOP\_MODUL22

RET

TAMPIL\_JUDUL\_MODUL22:

DB ' LATIHAN '

DB 'MORSE KE LETTER '

### 7. Listing program menu ketiga

-----Menu 3-----

ADA BIT 7BH

ORG \$

START\_MENU3:

MOV R1,#000H

LCALL TANDA\_PANAH

LIST\_MENU\_3:

LCALL TAMPIL\_SUB\_MENU

LOOP\_MENU\_3:

LCALL POSISI\_TANDA

LCALL AMBILKARAKTERKEYBOARD

JNB ARROW,CEK\_TOMBOL\_MENU31

CJNE A,#075H,CEK\_BAWAH\_3

MOV R1,#00H

AJMP LOOP\_MENU\_3

CEK\_BAWAH\_3:

CJNE A,#072H,LOOP\_MENU\_3

MOV R1,#001H

AJMP LOOP\_MENU\_3

CEK\_TOMBOL\_MENU31:

CJNE A,#00DH,BUKAN\_ESC\_MENU3

RET

BUKAN\_ESC\_MENU3:

CJNE A,#00AH,LOOP\_MENU\_3

LCALL BERSIH\_LAYAR

PUSH 1

CJNE R1,#001H,MENU31

LCALL START\_MODUL32

SELESAI\_MENU3:

POP 1

LCALL BERSIH\_LAYAR

```

        AJMP LIST_MENU_3
MENU31:
        LCALL    START_MODUL31
        AJMP SELESAI_MENU3

AMBIL_RANDOM_TEST:
        MOV  R0,#BUFFER3
        MOV  R2,#27
        MOV  A,TL1
LOOP_CARI:
        CLR  C
        MOV  BUFFER1,@R0
        CJNE A,BUFFER1,TIDAK_SAMA
        MOV  R0,#BUFFER3
        MOV  R2,#27
        CLR  C
        ADD  A,#5
        JNC  LOOP_CARI
        ADD  A,#0DCH
        AJMP LOOP_CARI
TIDAK_SAMA:
        INC  R0
        DJNZ R2,LOOP_CARI
        MOV  R0,#BUFFER3
        MOV  R2,#27
        PUSH ACC
LOOP_COPY:
        XCH  A,@R0
        INC  R0
        DJNZ R2,LOOP_COPY
        POP  ACC
        LCALL    KONVERSI_RANDOM

```

RET

JAWABAN\_UJIAN:

CJNE A,JAWABAN\_UJI,SALAH\_JAWAB\_UJIAN

MOV A,BENAR2

CJNE A,#0FFH,BENAR\_SATUAN

MOV BENAR2,#0

INC BENAR1

BENAR\_SATUAN:

INC BENAR2

RET

SALAH\_JAWAB\_UJIAN:

RET

JUMLAH\_SOAL:

MOV A,JUMLAH2

CJNE A,#0FFH,SOAL\_SATUAN

MOV JUMLAH2,#0

INC JUMLAH1

RET

SOAL\_SATUAN:

INC JUMLAH2

RET

LIHAT\_DATA\_HASIL:

JB TEST,LIHAT\_DATA\_TEST

LCALL HASIL\_TEST

RET

LIHAT\_DATA\_TEST:

LCALL HASIL\_DATA\_TEST

RET

HASIL\_TEST:

```
LCALL    BERSIH_LAYAR
MOV  A,#080H
LCALL    KIRIM_PERINTAH
MOV  DPTR,#KECEPATAN
LCALL    KIRIMPESAN_LCD
MOV  ACCUMULATOR2,BENAR2
MOV  ACCUMULATOR1,BENAR1
MOV  ACCUMULATOR3,#0
MOV  OPERATOR3,#0
MOV  OPERATOR1,#0
MOV  OPERATOR2,TEST_TIME
ACALL   KONVER_HEX_DEC
LCALL   BARIS2
MOV  DPTR,#KETEPATAN
LCALL   KIRIMPESAN_LCD
MOV  ACCUMULATOR2,BENAR2
MOV  ACCUMULATOR1,BENAR1
MOV  ACCUMULATOR3,#0
MOV  OPERATOR3,#0
MOV  OPERATOR1,#0
MOV  OPERATOR2,#100
LCALL   KALI
MOV  OPERATOR3,#0
MOV  OPERATOR1,#JUMLAH1
MOV  OPERATOR2,#JUMLAH2
LCALL   BAGI
ACALL   KONVER_HEX_DEC
MOV  A,#025H
LCALL   KIRIM_KARAKTER
RET
```

HASIL\_DATA\_TEST:

```
LCALL    BERSIH_LAYAR
MOV  A,#080H
LCALL    KIRIM_PERINTAH
MOV  DPTR,#JML_BENAR
LCALL    KIRIMPESAN_LCD
MOV  ACCUMULATOR3,#0
MOV  ACCUMULATOR1,BENAR1
MOV  ACCUMULATOR2,BENAR2
ACALL   KONVER_HEX_DEC
LCALL    BARIS2
MOV  DPTR,#JML_SOAL
LCALL    KIRIMPESAN_LCD
MOV  ACCUMULATOR3,#0
MOV  ACCUMULATOR1,JUMLAH1
MOV  ACCUMULATOR2,JUMLAH2
ACALL   KONVER_HEX_DEC
RET
```

KONVER\_HEX\_DEC:

```
PUSH 0
PUSH 1
PUSH 2
PUSH 3
MOV  OPERATOR3,#0
MOV  OPERATOR2,#00AH
MOV  OPERATOR1,#0
MOV  R0,#0
MOV  R1,#0
MOV  R2,#0
MOV  R3,#0
```

LOOP:



```

CLR C
LCALL KURANG
JC KELUAR_LOOP
CJNE R2,#009H,PULUHAN
MOV R2,#0
CJNE R1,#009H,RATUSAN
MOV R1,#0
CJNE R0,#009H,RIBUAN
MOV R0,#0
AJMP KELUAR_LOOP

RATUSAN:
INC R1
AJMP LOOP

RIBUAN:
INC R0
AJMP LOOP

PULUHAN:
INC R2
AJMP LOOP

KELUAR_LOOP:
CLR C
MOV A,ACCUMULATOR2
ADD A,#00AH
MOV R3,A
CLR C
CLR ADA
MOV A,R0
JZ LEWAT_RIBUAN
SETB ADA
ADD A,#030H
LCALL KIRIM_KARAKTER

LEWAT_RIBUAN:

```

```

MOV A,R1
JB ADA,RATUSAN_ADA
JZ LEWAT_RATUSAN
SETB ADA
RATUSAN_ADA:
ADD A,#030H
LCALL KIRIM_KARAKTER
LEWAT_RATUSAN:
MOV A,R2
JB ADA,PULUHAN_ADA
JZ LEWAT_PULUHAN
SETB ADA
PULUHAN_ADA:
ADD A,#030H
LCALL KIRIM_KARAKTER
LEWAT_PULUHAN:
MOV A,R3
ADD A,#030H
LCALL KIRIM_KARAKTER
POP 3
POP 2
POP 1
POP 0
RET

HITUNG_PENALTI:
MOV A,R6
CLR C
CJNE A,PENALTI,CEK_PENALTI
SETB C
CEK_PENALTI:
JNC PENALTI_CEK

```

```

        ADD  A,#60
PENALTI_CEK:
        CLR  C
        SUBB A,PENALTI
        CLR  C
        RET

KECEPATAN:
        DB  'KECEPATAN :',00FH
KETEPATAN:
        DB  'KETEPATAN :',00FH
JML_BENAR:
        DB  'BENAR :',00FH
JML_SOAL:
        DB  'SOAL :',00FH

TEST      BIT  7AH
START_MODUL31:
        MOV  DPTR,#TAMPIL_JUDUL_MODUL31
        LCALL TAMPIL_JUDUL_MODUL
        PUSH SPACE_TIME2
        PUSH SPACE_TIME1
        PUSH MORSE_TIME2
        PUSH MORSE_TIME1
        CLR  C
        MOV  A,MORSE_TIME2
        SUBB A,#41
        MOV  MORSE_TIME2,A
        MOV  A,MORSE_TIME1
        SUBB A,#0
        MOV  MORSE_TIME1,A
        CLR  C

```

```

MOV A,SPACE_TIME2
SUBB A,#41
MOV SPACE_TIME2,A
MOV A,SPACE_TIME1
SUBB A,#0
MOV SPACE_TIME1,A
CLR C
M31_MULAI_TEST:
    LCALL    SIAP_TEST
LOOP_MODUL31:
    CLR    TR2
    LCALL    BERSIH_LAYAR
    LCALL    TAMPIL_K_M
    LCALL    AMBIL_RANDOM_TEST
    PUSH ACC
    LCALL    JUMLAH_SOAL
    MOV A,#08BH
    LCALL    KIRIM_PERINTAH
    POP ACC
    MOV JAWABAN_UJI,A
    LCALL    KIRIM_KARAKTER
    MOV A,#0CBH
    LCALL    KIRIM_PERINTAH
    LCALL    HITUNG_PENALTI
    SETB TR2
TUNGGU_SW_MODUL31:
    CJNE R5,#000H,BELUM_SELESAI_31
    LJMP SELESAI_UJIAN_MODUL31
BELUM_SELESAI_31:
    CJNE A,006H,PAS_TUNGGU_SW_MODUL31
    LJMP LOOP_MODUL31
PAS_TUNGGU_SW_MODUL31:

```

```

        JB    PENGETUK,TUNGGU_SW_MODUL31
        PUSH 0
        MOV  A,#001H
M31_MULAI_LOOP_SW_KETUK:
        CLR  TR2
        JB   ACC.5,M31_LANGSUNG_HASIL
        MOV  R0,#DOT_TIME + DASH_TIME
        MOV  R1,#0
        SETB BUZZER
        LCALL    DELAY2
        JNB  TF0,$
        CLR  TR0
        SETB TR2
M31_LOOP_SW_KETUK:
        MOV  R2,MORSE_TIME1
        MOV  R3,MORSE_TIME2
M31_LOOP_SW_CEK:
        LCALL    DELAY
M31_WAIT_SW:
        SETB BUZZER
        JB   PENGETUK,M31_KELUAR_LOOP_SW_KETUK
        JNB  TF0,M31_WAIT_SW
        CLR  TF0
        CLR  TR0
        CJNE R3,#0,M31CEK_R3_LOOP
        MOV  R3,#0FFH
        CJNE R2,#0,M31CEK_R2_LOOP
        AJMP M31CEK_R0
M31CEK_R2_LOOP:
        DEC  R2
        AJMP M31_LOOP_SW_CEK
M31CEK_R3_LOOP:

```

```

    DEC R3
    AJMP M31_LOOP_SW_CEK
M31CEK_R0:
    DJNZ R0,M31_LOOP_SW_KETUK
    CLR BUZZER
    JNB PENGETUK,$
M31_KELUAR_LOOP_SW_KETUK:
    CLR BUZZER
    LCALL DELAY2
    JNB TF0,$
    CLR TR0
    CLR TR2
    LCALL CATAT_KETUKAN
    SETB TR2
    MOV R0,#000H
M31_LOOP_CEK_KOSONG:
    MOV R2,SPACE_TIME1
    MOV R3,SPACE_TIME2
M31_LOOP_SW_KO:
    LCALL DELAY
M31_LOOP_CEK_SW_KO:
    JNB PENGETUK,M31_MULAI_LOOP_SW_KETUK
    JNB TF0,M31_LOOP_CEK_SW_KO
    CLR TR0
    CJNE R3,#0,M31_CEK_R3_KO
    MOV R3,#0FFH
    CJNE R2,#0,M31_CEK_R2_KO
    AJMP M31_CEK_R0_KO
M31_CEK_R2_KO:
    DEC R2
    AJMP M31_LOOP_SW_KO
M31_CEK_R3_KO:

```

```

    DEC R3
    AJMP M31_LOOP_SW_KO
M31_CEK_R0_KO:
    INC R0
    CJNE R0,#LETTER_TIME,M31_LOOP_CEK_KOSONG
M31_LANGSUNG_HASIL:
    CLR TR2
    LCALL HASIL
    PUSH ACC
    MOV A,#0CBH
    LCALL KIRIM_PERINTAH
    POP ACC
    POP 0
    LCALL JAWABAN_UJIAN
    LJMP LOOP_MODUL31
    CLR TEST
SELESAI_UJIAN_MODUL31:
    CLR TR2
    CLR ARROW
    LCALL LIHAT_DATA_HASIL
    LCALL AMBILKARAKTERKEYBOARD
    JB ARROW,CEK_ARROW
CEK_TOMBOL_F1:
    CJNE A,#0F1H,CEK_TOMBOL_ESC
    LJMP M31_MULAI_TEST
CEK_TOMBOL_ESC:
    CJNE A,#00DH,SELESAI_UJIAN_MODUL31
    POP MORSE_TIME1
    POP MORSE_TIME2
    POP SPACE_TIME1
    POP SPACE_TIME2
    RET

```

CEK\_ARROW:

CJNE A,#072H,CEK\_TOMBOL\_ATAS

CPL TEST

AJMP SELESAI\_UJIAN\_MODUL31

CEK\_TOMBOL\_ATAS:

CJNE A,#075H,SELESAI\_UJIAN\_MODUL31

CPL TEST

AJMP SELESAI\_UJIAN\_MODUL31

TAMPIL\_JUDUL\_MODUL31:

DB ' UJIAN '

DB 'LETTER KE MORSE '

START\_MODUL32:

MOV DPTR,#TAMPIL\_JUDUL\_MODUL32

LCALL TAMPIL\_JUDUL\_MODUL

M32\_MULAI\_TEST:

LCALL SIAP\_TEST

LOOP\_MODUL32:

LCALL BERSIH\_LAYAR

LCALL TAMPIL\_M\_K

LCALL AMBIL\_RANDOM\_TEST

MOV JAWABAN\_UJI,A

PUSH ACC

LCALL JUMLAH\_SOAL

MOV A,#08BH

LCALL KIRIM\_PERINTAH

POP ACC

SETB TR2

LCALL KODEMORSE

MOV A,#0CBH

LCALL KIRIM\_PERINTAH



```

CLR TR2
LCALL HITUNG_PENALTI
SETB TR2
SETB IE.0
MOV BUFFER4,#0
TUNGGU_JWB_MODUL32:
PUSH ACC
MOV A,BUFFER4
JNZ JAWAB_TEST
POP ACC
CJNE A,006H,PAS_TUNGGU_KEY_MODUL32
CLR IE.0
LJMP LOOP_MODUL32
PAS_TUNGGU_KEY_MODUL32:
CJNE R5,#000H,TUNGGU_JWB_MODUL32
CLR IE.0
LJMP SELESAI_UJIAN_MODUL32
JAWAB_TEST:
POP ACC
MOV A,BUFFER4
CLR IE.0
CLR TR2
LCALL JAWABAN_UJIAN
LJMP LOOP_MODUL32
CLR TEST
SELESAI_UJIAN_MODUL32:
CLR TR2
CLR ARROW
LCALL LIHAT_DATA_HASIL
LCALL AMBILKARAKTERKEYBOARD
JB ARROW,CEK_ARROW_M32
CJNE A,#0F1H,CEK_TOMBOL_ESCM32

```

```

        LJMP M32_MULAI_TEST
CEK_TOMBOL_ESCM32:
        CJNE A,#00DH,SELESAI_UJIAN_MODUL32
        RET
CEK_ARROW_M32:
        CJNE A,#072H,CEK_TOMBOL_ATASM32
        CPL TEST
        AJMP SELESAI_UJIAN_MODUL32
CEK_TOMBOL_ATASM32:
        CJNE A,#075H,SELESAI_UJIAN_MODUL32
        CPL TEST
        AJMP SELESAI_UJIAN_MODUL32

TAMPIL_JUDUL_MODUL32:
        DB ' UJIAN '
        DB 'MORSE KE LETTER '

```

## 8. Listing program menu keempat

-----Menu 4-----

ORG \$

START\_MENU4:

MOV R1,#000H

MOV R0,#000H

LCALL TANDA\_PANAH

LIST\_MENU\_4:

MOV A,#081H

LCALL KIRIM\_PERINTAH

MOV DPTR,#TAMPIL\_MENU\_41

LCALL KIRIMPESAN\_LCD

MOV A,#0C1H

LCALL KIRIM\_PERINTAH

MOV DPTR,#TAMPIL\_MENU\_42

LCALL KIRIMPESAN\_LCD

LOOP\_MENU\_4:

LCALL POSISI\_TANDA

LCALL AMBILKARAKTERKEYBOARD

JNB ARROW,CEK\_TOMBOL\_MENU41

CJNE A,#075H,CEK\_BAWAH\_4

MOV R1,#000H

AJMP LOOP\_MENU\_4

CEK\_BAWAH\_4:

CJNE A,#072H,LOOP\_MENU\_4

MOV R1,#001H

AJMP LOOP\_MENU\_4

CEK\_TOMBOL\_MENU41:

CJNE A,#00DH,BUKAN\_ESC\_MENU4

RET

BUKAN\_ESC\_MENU4:

CJNE A,#00AH,LOOP\_MENU\_4

```

        LCALL    BERSIH_LAYAR
        PUSH 1
        CJNE R1,#001H,MENU41
        SETB PICTURE
        LCALL    START_MODUL42
        CLR  PICTURE
SELESAI_MENU4:
        POP  1
        LCALL    BERSIH_LAYAR
        AJMP LIST_MENU_4
MENU41:
        LCALL    START_MODUL41
        AJMP SELESAI_MENU4

TAMPIL_MENU_41:
        DB  'LETTER',00FH
TAMPIL_MENU_42:
        DB  'MORSE',00FH

START_MODUL42:
        CLR  BUZZER
        MOV  DPTR,#TAMPIL_JUDUL_MODUL42
        LCALL    TAMPIL_JUDUL_MODUL
        LCALL    BERSIH_LAYAR
        MOV  DPTR,#TAMPIL_JUDUL_MODUL42A
        LCALL    TAMPIL_JUDUL_MODUL
        MOV  A,#00DH
        LCALL    KIRIM_PERINTAH
LAGI_MODUL42:
        MOV  R1,#0
        LCALL    BERSIH_LAYAR
        LCALL    BARIS1

```

```

LOOP_MODUL42:
    MOV  BUFFER4,#0
    SETB IE.0
LOOP_SW_MODUL42:
    MOV  A,BUFFER4
    JNZ  CEK_TOMBOL_42
    JB   PENGETUK,LOOP_SW_MODUL42
MULAI_KETUK:
    CLR  IE.0
    LCALL    AMBIL_SW_KETUK
    CJNE  A,#00FH,KARAKTER_ADA
    AJMP  LOOP_MODUL42
KARAKTER_ADA:
    LCALL    KIRIM_KARAKTER
    INC  R1
    CJNE  R1,#17,LEWAT_BARIS_42
    LCALL    BARIS2
LEWAT_BARIS_42:
    MOV  R2,SPACE_TIME1
    MOV  R3,SPACE_TIME2
    MOV  R4,#WORD_TIME
TUNGGU_SPACE:
    LCALL    DELAY
TUNGGU_SPACE2:
    JNB  PENGETUK,MAU_MULAI_KETUK
    JNB  TF0,TUNGGU_SPACE2
    CLR  TR0
    CJNE  R3,#0,DEC_KO_R3
    MOV  R3,#0FFH
    CJNE  R2,#0,DEC_KO_R2
    AJMP  KEL_R3_R2
DEC_KO_R2:

```

```

        DEC R2
        AJMP TUNGGU_SPACE
DEC_KO_R3:
        DEC R3
        AJMP TUNGGU_SPACE
KEL_R3_R2:
        DJNZ R4,TUNGGU_SPACE
        MOV A,#' '
        LCALL KIRIM_KARAKTER
        INC R1
MAU_MULAI_KETUK:
        CJNE R1,#32,LOOP_MODUL42
        AJMP LAGI_MODUL42
CEK_TOMBOL_42:
        CLR IE.0
        CJNE A,#00DH,CEK_F1_42
        MOV A,#00CH
        LCALL KIRIM_PERINTAH
        RET
CEK_F1_42:
        CJNE A,#0F1H,LOOP_MODUL42
        AJMP LAGI_MODUL42

TAMPIL_JUDUL_MODUL42A:
        DB 'F1->BERSIH LAYAR'
        DB 'ESC->KELUAR '
TAMPIL_JUDUL_MODUL42:
        DB 'MENGETIK MORSE '
        DB 'DIUBAH KE LETTER'

```

```

START_MODUL41:
    CLR  BUZZER
    MOV  DPTR,#TAMPIL_JUDUL_MODUL41
    LCALL  TAMPIL_JUDUL_MODUL
    LCALL  BERSIH_LAYAR
    MOV  DPTR,#TAMPIL_JUDUL_MODUL41A
    LCALL  TAMPIL_JUDUL_MODUL
LAGI_MODUL41:
    LCALL  BERSIH_LAYAR
    MOV  A,#00DH
    LCALL  KIRIM_PERINTAH
    LCALL  BARIS1
    MOV  R0,#BENAR1
    MOV  R1,#32
LOOP_DELETED:
    MOV  @R0,#000H
    INC  R0
    DJNZ R1,LOOP_DELETED
    MOV  R0,#BENAR1
    MOV  R1,#32
LOOP_MODUL41:
    LCALL  AMBILKARAKTERKEYBOARD
    CLR  C
    CJNE A,#00AH,CEK_MENGULANG
    ACALL  UBAH_KE_MORSE
    AJMP  TUNGGU_PERINTAH_41
CEK_MENGULANG:
    CJNE A,#0F1H,CEK_KELUAR
    AJMP  LAGI_MODUL41
CEK_KELUAR:
    CJNE A,#00DH,CEK_YG_LAIN
    AJMP  KELUAR_MODUL41

```

```

CEK_YG_LAIN:
    CLR    C
    CJNE  A,#' ',CEK_ANGKA_0
    AJMP  SIMPAN_KARAKTER
CEK_ANGKA_0:
    CJNE  A,#'0',CEK_ANGKA_99
    AJMP  SIMPAN_KARAKTER
CEK_ANGKA_99:
    JC    LOOP_MODUL41
    CJNE  A,#'9',CEK_ANGKA_09
    AJMP  SIMPAN_KARAKTER
CEK_ANGKA_09:
    JNC   CEK_HURUF_A
    AJMP  SIMPAN_KARAKTER
CEK_HURUF_A:
    CJNE  A,#'A',CEK_HURUF_ZZ
    AJMP  SIMPAN_KARAKTER
CEK_HURUF_ZZ:
    JC    LOOP_MODUL41
    CJNE  A,#'Z',CEK_HURUF_AZ
    AJMP  SIMPAN_KARAKTER
CEK_HURUF_AZ:
    JNC   LOOP_MODUL41
SIMPAN_KARAKTER:
    MOV   @R0,A
    INC   R0
    LCALL KIRIM_KARAKTER
    CJNE  R1,#17,LEWAT_BARIS2_41
    LCALL BARIS2
LEWAT_BARIS2_41:
    DJNZ  R1,LOOP_MODUL41
TUNGGU_PERINTAH_41:

```



```

MOV A,#00CH
LCALL    KIRIM_PERINTAH
LCALL    AMBILKARAKTERKEYBOARD
CJNE A,#00AH,CEK_ESC_41
ACALL    UBAH_KE_MORSE
AJMP TUNGGU_PERINTAH_41
CEK_ESC_41:
    CJNE A,#00DH,CEK_F1_41
KELUAR_MODUL41:
    MOV A,#00CH
    LCALL    KIRIM_PERINTAH
    RET
CEK_F1_41:
    CJNE A,#0F1H,TUNGGU_PERINTAH_41
    AJMP LAGI_MODUL41
UBAH_KE_MORSE:
    MOV A,#00EH
    LCALL    KIRIM_PERINTAH
    LCALL    BARIS1
    CLR C
    MOV R1,#32
    MOV R0,#BENAR1
    MOV R2,#080H
    MOV BUFFER4,#0
    SETB IE.0
LOOP_TRANS_LETMOR:
    MOV A,BUFFER4
    JNZ SELESAI_TRANS_LETMOR
    MOV A,R2
    LCALL    KIRIM_PERINTAH
    INC R2
    CJNE R1,#17,MASIH_BARIS

```

```

MOV R2,#0C0H
MASIH_BARIS:
MOV A,@R0
JZ SELESAI_TRANS_LETMOR
INC R0
CJNE A,#',TRANS_LETMOR
MOV R4,#WORD_TIME - 3
MOV TIMER1,SPACE_TIME1
MOV TIMER2,SPACE_TIME2
LCALL DELAY_KETUK
DJNZ R1,LOOP_TRANS_LETMOR
AJMP SELESAI_TRANS_LETMOR
TRANS_LETMOR:
LCALL IDENTIFIKASI
CJNE A,#00FH,KIRIM_TRANS_LETMOR
LJMP SELESAI_TRANS_LETMOR
KIRIM_TRANS_LETMOR:
LCALL KETUK_MORSE
MOV R4,#LETTER_TIME
MOV TIMER1,SPACE_TIME1
MOV TIMER2,SPACE_TIME2
LCALL DELAY_KETUK
DJNZ R1,LOOP_TRANS_LETMOR
SELESAI_TRANS_LETMOR:
CLR IE.0
RET
TAMPIL_JUDUL_MODUL41:
DB 'MENGETIK LETTER '
DB 'DIUBAH KE MORSE '
TAMPIL_JUDUL_MODUL41A:
DB 'ENTER->MORSE '
DB 'F1->MENGULANG '

```

## 9. Listing program menu kelima

-----Menu 5-----

ORG \$

START\_MENU5:

MOV R1,#000H

MOV R0,#000H

LCALL TANDA\_PANAH

LIST\_MENU\_5:

MOV A,#081H

LCALL KIRIM\_PERINTAH

MOV DPTR,#TAMPIL\_MENU\_51

LCALL KIRIMPESAN\_LCD

MOV A,#0C1H

LCALL KIRIM\_PERINTAH

MOV DPTR,#TAMPIL\_MENU\_52

LCALL KIRIMPESAN\_LCD

LOOP\_MENU\_5:

LCALL POSISI\_TANDA

LCALL AMBILKARAKTERKEYBOARD

JNB ARROW,CEK\_TOMBOL\_MENU51

CJNE A,#075H,CEK\_BAWAH\_5

MOV R1,#000H

LJMP LOOP\_MENU\_5

CEK\_BAWAH\_5:

CJNE A,#072H,LOOP\_MENU\_5

MOV R1,#001H

LJMP LOOP\_MENU\_5

CEK\_TOMBOL\_MENU51:

CJNE A,#00DH,BUKAN\_ESC\_MENU5

RET

BUKAN\_ESC\_MENU5:

CJNE A,#00AH,LOOP\_MENU\_5

```

        LCALL    BERSIH_LAYAR
        PUSH 1
        CJNE R1,#001H,MENU51
        SETB PICTURE
        LCALL    START_MODUL5B
        CLR  PICTURE
SELESAI_MENU5:
        POP  1
        LCALL    BERSIH_LAYAR
        LJMP LIST_MENU_5
MENU51:
        LCALL    START_MODUL5A
        LJMP SELESAI_MENU5

TAMPIL_MENU_51:
        DB  'KECEPATAN (WPM)',00FH
TAMPIL_MENU_52:
        DB  'UJIAN',00FH

START_MODUL5A:
        MOV R1,#000H
        MOV R0,#000H
        MOV A,#081H
        LCALL    KIRIM_PERINTAH
        MOV DPTR,#TAMPIL_MENU_5A1
        LCALL    KIRIMPESAN_LCD
        MOV A,#0C1H
        LCALL    KIRIM_PERINTAH
        MOV DPTR,#TAMPIL_MENU_5A2
        LCALL    KIRIMPESAN_LCD
        MOV A,#08BH
        LCALL    KIRIM_PERINTAH

```

```

MOV ACCUMULATOR1,#0
MOV ACCUMULATOR3,#0
MOV ACCUMULATOR2,OVERALL
LCALL      KONVER_HEX_DEC
MOV A,#0CBH
LCALL      KIRIM_PERINTAH
MOV A,FRANSWOTH
CJNE A,#9,ADA_FRANSWOTH
MOV DPTR,#OFF_FR
LCALL      KIRIMPESAN_LCD
AJMP START_MENU_5A
ADA_FRANSWOTH:
MOV ACCUMULATOR1,#0
MOV ACCUMULATOR3,#0
MOV ACCUMULATOR2,FRANSWOTH
LCALL      KONVER_HEX_DEC
START_MENU_5A:
MOV R1,#000H
MOV R0,#000H
LOOP_MENU_5A:
LCALL      POSISI_TANDA
LCALL      AMBILKARAKTERKEYBOARD
JNB  ARROW,CEK_TOMBOL_MENU5A
CJNE A,#075H,CEK_BAWAH_5A
MOV R1,#000H
AJMP LOOP_MENU_5A
CEK_BAWAH_5A:
CJNE A,#072H,CEK_KANAN_5A
MOV R1,#001H
AJMP LOOP_MENU_5A
CEK_KANAN_5A:
CJNE A,#074H,CEK_KIRI_5A

```

```

        LCALL    EDIT
        AJMP LOOP_MENU_5A
CEK_KIRI_5A:
        CJNE A,#06BH,LOOP_MENU_5A
        LCALL    EDIT
        AJMP LOOP_MENU_5A
CEK_TOMBOL_MENU5A:
        CJNE A,#00DH,LOOP_MENU_5A
        ACALL    KAL_OV_FR
        RET

EDIT:
        CJNE R1,#0,IN_FRANSWOTH
        CJNE A,#074H,DEC_OVERALL
        INC    OVERALL
        AJMP CEK_OVERALL
DEC_OVERALL:
        DEC    OVERALL
        AJMP CEK_OVERALL
IN_FRANSWOTH:
        PUSH ACC
        MOV  A,FRANSWOTH
        CJNE A,#9,LANJUT_FRANSWOTH
        POP  ACC
        CJNE A,#074H,LANGSUNG_BESAR
        PUSH ACC
        MOV  A,OVERALL
        CJNE A,#10,CEK_OFF_ON
        POP  ACC
JADI_ON:
        MOV  FRANSWOTH,OVERALL
        AJMP CEK_OVERALL

```

```

CEK_OFF_ON:
    POP  ACC
    JC   JADI_10FR
    AJMP JADI_ON
JADI_10FR:
    MOV  FRANSWOTH,#10
    AJMP CEK_OVERALL
LANGSUNG_BESAR:
    MOV  FRANSWOTH,#20
    AJMP CEK_OVERALL
LANJUT_FRANSWOTH:
    POP  ACC
    CJNE A,#074H,DEC_FRANSWOTH
    INC  FRANSWOTH
    AJMP CEK_OVERALL
DEC_FRANSWOTH:
    DEC  FRANSWOTH
CEK_OVERALL:
    CLR  C
    MOV  A,OVERALL
    CJNE A,#2,CEK_OVE20
CEK_OVE3_IN:
    MOV  OVERALL,#20
    AJMP CEK_FRANSWOTH
CEK_OVE20:
    JC   CEK_OVE3_IN
    CJNE A,#21,CEK_KUR_OVE
CEK_OVE20IN:
    MOV  OVERALL,#3
    AJMP CEK_FRANSWOTH
CEK_KUR_OVE:
    JNC  CEK_OVE20IN

```

```

CEK_FRANSWOTH:
    CLR  C
    MOV  A,OVERALL
    CJNE A,FRANSWOTH,CEK_OVE_FR
    AJMP CEK_DATAOVFR
CEK_OVE_FR:
    JC   CEK_DATAOVFR
    MOV  FRANSWOTH,#009H
    AJMP EXIT_OVE_FR
CEK_DATAOVFR:
    CLR  C
    MOV  A,FRANSWOTH
    CJNE A,#8,CEK_FR20
CEK_FR3_IN:
    MOV  FRANSWOTH,#9
    AJMP EXIT_OVE_FR
CEK_FR20:
    JC   CEK_FR3_IN
    CJNE A,#21,CEK_KUR_FR
CEK_FR20_IN:
    MOV  FRANSWOTH,#9
    AJMP EXIT_OVE_FR
CEK_KUR_FR:
    JNC  CEK_FR20_IN
EXIT_OVE_FR:
    MOV  A,#08BH
    LCALL KIRIM_PERINTAH
    MOV  DPTR,#BERSIH_DULU
    LCALL KIRIMPESAN_LCD
    MOV  A,#08BH
    LCALL KIRIM_PERINTAH
    MOV  ACCUMULATOR1,#0

```



```

MOV ACCUMULATOR3,#0
MOV ACCUMULATOR2,OVERALL
LCALL      KONVER_HEX_DEC
MOV A,#0CBH
LCALL      KIRIM_PERINTAH
MOV DPTR,#BERSIH_DULU
LCALL      KIRIMPESAN_LCD
MOV A,#0CBH
LCALL      KIRIM_PERINTAH
MOV A,FRANSWOTH
CJNE A,#009H,FR_ON
MOV DPTR,#OFF_FR
LCALL      KIRIMPESAN_LCD
AJMP EXIT_OVE_FR_KN

```

FR\_ON:

```

MOV A,#0CBH
LCALL      KIRIM_PERINTAH
MOV ACCUMULATOR1,#0
MOV ACCUMULATOR3,#0
MOV ACCUMULATOR2,FRANSWOTH
LCALL      KONVER_HEX_DEC

```

EXIT\_OVE\_FR\_KN:

```

RET

```

KAL\_OV\_FR:

```

MOV ACCUMULATOR1,#0
MOV ACCUMULATOR2,#0
MOV ACCUMULATOR3,#0
MOV OPERATOR1,#0
MOV OPERATOR2,#0
MOV OPERATOR3,#0
MOV A,FRANSWOTH

```

```

CJNE A,#009H,YES_FRANSWOTH
MOV OPERATOR2,#50
MOV ACCUMULATOR2,OVERALL
LCALL KALI
MOV OPERATOR3,ACCUMULATOR3
MOV OPERATOR2,ACCUMULATOR2
MOV OPERATOR1,ACCUMULATOR1
MOV ACCUMULATOR3,#0
MOV ACCUMULATOR2,#060H
MOV ACCUMULATOR1,#0EAH
LCALL BAGI
MOV MORSE_TIME2,ACCUMULATOR2
MOV MORSE_TIME1,ACCUMULATOR1
MOV SPACE_TIME1,ACCUMULATOR1
MOV SPACE_TIME2,ACCUMULATOR2
RET

```

YES\_FRANSWOTH:

```

MOV ACCUMULATOR2,#050H
MOV ACCUMULATOR1,#091H
MOV OPERATOR2,FRANSWOTH
LCALL BAGI
MOV OPERATOR3,#0
MOV OPERATOR1,#0
MOV OPERATOR2,OVERALL
LCALL KALI
MOV OPERATOR1,ACCUMULATOR1
MOV OPERATOR2,ACCUMULATOR2
MOV OPERATOR3,ACCUMULATOR3
MOV ACCUMULATOR3,#0
MOV ACCUMULATOR1,#0EAH
MOV ACCUMULATOR2,#060H
LCALL KURANG

```

```

PUSH ACCUMULATOR3
PUSH ACCUMULATOR2
PUSH ACCUMULATOR1
MOV ACCUMULATOR2,#19
MOV ACCUMULATOR1,#0
MOV ACCUMULATOR3,#0
MOV OPERATOR1,#0
MOV OPERATOR3,#0
MOV OPERATOR2,OVERALL
LCALL KALI
MOV OPERATOR3,ACCUMULATOR3
MOV OPERATOR2,ACCUMULATOR2
MOV OPERATOR1,ACCUMULATOR1
POP ACCUMULATOR1
POP ACCUMULATOR2
POP ACCUMULATOR3
LCALL BAGI
MOV SPACE_TIME2,ACCUMULATOR2
MOV SPACE_TIME1,ACCUMULATOR1
MOV OPERATOR1,#0
MOV OPERATOR3,#0
MOV OPERATOR2,#050
MOV ACCUMULATOR1,#0
MOV ACCUMULATOR3,#0
MOV ACCUMULATOR2,FRANSWOTH
LCALL KALI
MOV OPERATOR3,ACCUMULATOR3
MOV OPERATOR2,ACCUMULATOR2
MOV OPERATOR1,ACCUMULATOR1
MOV ACCUMULATOR3,#0
MOV ACCUMULATOR2,#060H
MOV ACCUMULATOR1,#0EAH

```

```
LCALL    BAGI
MOV  MORSE_TIME2,ACCUMULATOR2
MOV  MORSE_TIME1,ACCUMULATOR1
RET
```

KALI:

```
MOV  R7,#0
MOV  R6,#0
MOV  R7,OPERATOR2
MOV  R6,OPERATOR1
MOV  OPERATOR3,ACCUMULATOR3
MOV  OPERATOR1,ACCUMULATOR1
MOV  OPERATOR2,ACCUMULATOR2
MOV  ACCUMULATOR1,#0
MOV  ACCUMULATOR2,#0
MOV  ACCUMULATOR3,#0
CJNE R7,#000H,LOOP_KALI
CJNE R6,#000H,LOOP_KALI
AJMP SELESAI_KALI
```

LOOP\_KALI:

```
CLR  C
ACALL TAMBAH
DEC  R7
CJNE R7,#000H,LOOP_KALI
CJNE R6,#000H,BAG_2
```

SELESAI\_KALI:

```
RET
```

BAG\_2:

```
DEC  R6
AJMP LOOP_KALI
```

```

BAGI:
    MOV R7,#0
    MOV R6,#0
    MOV R5,#0
LOOP_BAGI16:
    CLR C
    ACALL KURANG
    JC SELESAI_BAGI
    CJNE R7,#0FFH,BIL_2
    MOV R7,#0
    CJNE R6,#0FFH,BIL_1
    MOV R6,#0
    INC R5
    AJMP LOOP_BAGI16
BIL_2:
    INC R7
    AJMP LOOP_BAGI16
BIL_1:
    INC R6
    AJMP LOOP_BAGI16
SELESAI_BAGI:
    MOV ACCUMULATOR2,R7
    MOV ACCUMULATOR1,R6
    MOV ACCUMULATOR3,R5
    RET

KURANG:
    CLR C
    MOV A,ACCUMULATOR2
    SUBB A,OPERATOR2
    MOV ACCUMULATOR2,A

```

```
MOV A,ACCUMULATOR1
SUBB A,OPERATOR1
MOV ACCUMULATOR1,A
MOV A,ACCUMULATOR3
SUBB A,OPERATOR3
MOV ACCUMULATOR3,A
RET
```

TAMBAH:

```
MOV A,ACCUMULATOR2
ADD A,OPERATOR2
MOV ACCUMULATOR2,A
MOV A,ACCUMULATOR1
ADDC A,OPERATOR1
MOV ACCUMULATOR1,A
MOV A,ACCUMULATOR3
ADDC A,OPERATOR3
MOV ACCUMULATOR3,A
RET
```

TAMPIL\_MENU\_5A1:

```
DB 'OVERALL :',00FH
```

TAMPIL\_MENU\_5A2:

```
DB 'FRANSWOTH:',00FH
```

OFF\_FR:

```
DB 'OFF',00FH
```

BERSIH\_DULU:

```
DB ' ',00FH
```

START\_MODUL5B:

```
MOV R1,#000H
```

```
MOV R0,#000H
```

```

MOV A,#081H
LCALL    KIRIM_PERINTAH
MOV DPTR,#TAMPIL_MENU5B1
LCALL    KIRIMPESAN_LCD
MOV A,#0C1H
LCALL    KIRIM_PERINTAH
MOV DPTR,#TAMPIL_MENU5B2
LCALL    KIRIMPESAN_LCD
MOV A,#08CH
LCALL    KIRIM_PERINTAH
MOV ACCUMULATOR1,#0
MOV ACCUMULATOR3,#0
MOV ACCUMULATOR2,TEST_TIME
LCALL    KONVER_HEX_DEC
MOV A,#0CCH
LCALL    KIRIM_PERINTAH
MOV A,PENALTI
MOV ACCUMULATOR1,#0
MOV ACCUMULATOR3,#0
MOV ACCUMULATOR2,PENALTI
LCALL    KONVER_HEX_DEC
START_MENU_5B:
MOV R1,#000H
MOV R0,#000H
LOOP_MENU_5B:
LCALL    POSISI_TANDA
LCALL    AMBILKARAKTERKEYBOARD
JNB  ARROW,CEK_TOMBOL_MENU5B
CJNE A,#075H,CEK_BAWAH_5B
MOV R1,#000H
AJMP LOOP_MENU_5B
CEK_BAWAH_5B:

```

```

        CJNE A,#072H,CEK_KANAN_5B
        MOV R1,#001H
        AJMP LOOP_MENU_5B
CEK_KANAN_5B:
        CJNE A,#074H,CEK_KIRI_5B
        LCALL EDIT_MENU5B
        AJMP LOOP_MENU_5B
CEK_KIRI_5B:
        CJNE A,#06BH,LOOP_MENU_5B
        LCALL EDIT_MENU5B
        AJMP LOOP_MENU_5B
CEK_TOMBOL_MENU5B:
        CJNE A,#00DH,LOOP_MENU_5B
        ACALL KAL_OV_FR
        RET

EDIT_MENU5B:
        CJNE R1,#0,IN_PENALTI
        CJNE A,#074H,DEC_LAMA_TEST
        CLR C
        MOV A,TEST_TIME
        ADD A,#5
        MOV TEST_TIME,A
        CJNE A,#35,EXIT_EDIT_5B
        MOV TEST_TIME,#5
        AJMP EXIT_EDIT_5B
DEC_LAMA_TEST:
        CLR C
        MOV A,TEST_TIME
        SUBB A,#5
        MOV TEST_TIME,A
        CJNE A,#0,EXIT_EDIT_5B

```



```

MOV TEST_TIME,#30
AJMP EXIT_EDIT_5B
IN_PENALTI:
CJNE A,#074H,DEC_LAMA_PENALTI
CLR C
INC PENALTI
MOV A,PENALTI
CJNE A,#11,EXIT_EDIT_5B
MOV PENALTI,#3
AJMP EXIT_EDIT_5B
DEC_LAMA_PENALTI:
CLR C
DEC PENALTI
MOV A,PENALTI
CJNE A,#2,EXIT_EDIT_5B
MOV PENALTI,#10
EXIT_EDIT_5B:
MOV A,#08CH
LCALL KIRIM_PERINTAH
MOV DPTR,#BERSIH_DULU
LCALL KIRIMPESAN_LCD
MOV A,#08CH
LCALL KIRIM_PERINTAH
MOV ACCUMULATOR1,#0
MOV ACCUMULATOR3,#0
MOV ACCUMULATOR2,TEST_TIME
LCALL KONVER_HEX_DEC
MOV A,#0CCH
LCALL KIRIM_PERINTAH
MOV DPTR,#BERSIH_DULU
LCALL KIRIMPESAN_LCD
MOV A,#0CCH

```

```
LCALL    KIRIM_PERINTAH
MOV  ACCUMULATOR1,#0
MOV  ACCUMULATOR3,#0
MOV  ACCUMULATOR2,PENALTI
LCALL    KONVER_HEX_DEC
RET
```

TAMPIL\_MENU5B1:

```
DB  'LAMA TEST: M',00FH
```

TAMPIL\_MENU5B2:

```
DB  'PENALTI : S',00FH
```