

8051 FSM Assembly Code (Lemming Game)

```
ORG 0000H

SJMP START

WALK_LEFT    EQU 00H
WALK_RIGHT   EQU 01H
FALL_LEFT    EQU 02H
FALL_RIGHT   EQU 03H
DIG_LEFT     EQU 04H
DIG_RIGHT    EQU 05H
SPLAT        EQU 06H

START:
MOV SP, #70H
CLR P2

MOV R0, #WALK_LEFT

MAIN_LOOP:
ACALL READ_INPUTS
ACALL FSM_UPDATE
ACALL UPDATE_OUTPUTS
SJMP MAIN_LOOP

READ_INPUTS:
MOV A, P1
RET

FSM_UPDATE:
MOV B, A
```

CJNE R0, #WALK_LEFT, CHECK_WALK_RIGHT

JB ACC.2, TO_FALL_LEFT

JB ACC.3, TO_DIG_LEFT

JB ACC.0, TO_WALK_RIGHT

RET

TO_FALL_LEFT:

MOV R0, #FALL_LEFT

RET

TO_DIG_LEFT:

MOV R0, #DIG_LEFT

RET

TO_WALK_RIGHT:

MOV R0, #WALK_RIGHT

RET

CHECK_WALK_RIGHT:

CJNE R0, #WALK_RIGHT, CHECK_FALL_LEFT

JB ACC.2, TO_FALL_RIGHT

JB ACC.3, TO_DIG_RIGHT

JB ACC.1, TO_WALK_LEFT

RET

TO_FALL_RIGHT:

MOV R0, #FALL_RIGHT

RET

TO_DIG_RIGHT:

MOV R0, #DIG_RIGHT

RET

TO_WALK_LEFT:

MOV R0, #WALK_LEFT

RET

CHECK_FALL_LEFT:

CJNE R0, #FALL_LEFT, CHECK_FALL_RIGHT

MOV R0, #WALK_LEFT

RET

CHECK_FALL_RIGHT:

CJNE R0, #FALL_RIGHT, CHECK_DIG_LEFT

MOV R0, #WALK_RIGHT

RET

CHECK_DIG_LEFT:

CJNE R0, #DIG_LEFT, CHECK_DIG_RIGHT

JB ACC.2, STILL_DIG_LEFT

MOV R0, #FALL_LEFT

RET

STILL_DIG_LEFT:

RET

CHECK_DIG_RIGHT:

CJNE R0, #DIG_RIGHT, DONE

JB ACC.2, STILL_DIG_RIGHT

MOV R0, #FALL_RIGHT

RET

STILL_DIG_RIGHT:

RET

DONE:

RET

UPDATE_OUTPUTS:

CLR P2

MOV A, R0

CJNE A, #WALK_LEFT, CHK_WALK_RIGHT

SETB P2.0

RET

CHK_WALK_RIGHT:

CJNE A, #WALK_RIGHT, CHK_FALL

SETB P2.1

RET

CHK_FALL:

CJNE A, #FALL_LEFT, CHK_FALL2

SETB P2.2

RET

CHK_FALL2:

CJNE A, #FALL_RIGHT, CHK_DIG

SETB P2.2

RET

CHK_DIG:

CJNE A, #DIG_LEFT, CHK_DIG2

SETB P2.3

RET

CHK_DIG2:

CJNE A, #DIG_RIGHT, CHK_SPLAT

SETB P2.3

RET

CHK_SPLAT:

SETB P2.4

RET

END