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// Interrupt Exercise (SDCC)

#include <at89c51RC2.h>
#include <stdio.h>

#define BUSY_MASK          0x80
#define WRITE_OPERATION    0x22
#define READ_OPERATION     0x44
#define COMMAND_REGISTER ((xdata unsigned char *) 0xF000)
#define DATA_REGISTER     ((xdata unsigned char *) 0xF001)
#define STATUS_REGISTER    ((xdata unsigned char *) 0xF002)

void device_write(unsigned char); //Function prototype
extern void init_interrupts(void);
extern void serinit(int);

unsigned char ii; //Loop variable
xdata unsigned char *eptr; //Pointer to external data memory space

main()
{
    serinit(9600); //Initialize serial to 9600 baud
    EA = 1; //Enable interrupts
    init_interrupts(); //Assume this function exists
    ii=0; //Initialize loop variable
    while(1) {
        device_write(ii++); //Write value, then increment ii
        ii=ii%254; //ii sequences from 0 to 254
    }
}

// To write to this device, first you wait until the busy flag is
// clear. Then send the write command to the command register and
// then you send the data value to the data register
void device_write(unsigned char value)
{
    eptr=STATUS_REGISTER;
    while((*eptr & BUSY_MASK) != 0); //Wait until busy flag clear
    eptr=COMMAND_REGISTER;
    *eptr=WRITE_OPERATION; //Identify this as a write operation
    eptr=DATA_REGISTER;
    *eptr=value; //Write the value
}

// Assume Timer 0 interrupt occurs every 20ms
void timer0int(void) __interrupt (1){
    printf("Timer 0 Interrupt\n");
}

// Assume external interrupt 0 occurs every 2 seconds
void ext0int(void) __interrupt (0) {
    device_write(0xff); //write value 255
}

// Assume external interrupt 1 occurs every 10 seconds
void ext1int(void) __interrupt (2) {
    _asm
    CPL P1.1
    RET
    _endasm;
}

```