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#include "assert.h"
#include "pi.h"
#include "armtimer.h"
#include "gpio.h"
#include "uart.h"
#include "interrupts.h"
#include "printf.h"

// should not get called.
void impossible_handler(unsigned pc)
{
    printf("impossible exception at pc=%x\n", pc);
    pi_reboot();
}

volatile int counter = 0;

/*
 * we have only enabled timer interrupts
 */
void interrupt_handler(unsigned pc)
{
    armtimer_check_and_clear_interrupt();
    counter++;
}

void main(void)
{
    gpio_init();
    gpio_set_output(PI_ACT_LED);

    uart_init();
    printf("Executing program '%s'\n", __FILE__);

    // number of usecs between interrupts
    armtimer_init(1000000); // roughly 1 sec?
    armtimer_enable();      // enable timer

    armtimer_enable_interrupts();
    interrupts_enable_basic(INTERRUPTS_BASIC_ARM_TIMER_IRQ);

    assert( interrupts_attach_handler(interrupt_handler) );
    interrupts_global_enable();

    int last = 0;
    printf("Starting blink...\n");
    while(1) {
        if (last != counter) {
            last = counter;
            pi_led_toggle(PI_ACT_LED);
            printf("received %d interrupts\n", last);
        }
    }

    pi_reboot();
}

```

```

/*
 * Reference full implementation of C start sequence for CS107E. This
 * function is called from start.s. _cstart() zeroes out the BSS
 * (assignment 4) and installs interrupt vectors (assignment 7). If main()
 * returns, it turns on the green ACT LED on the Raspberry Pi board.
 *
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 *
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 */

// linker memmap places bss symbols at start/end of bss
extern int __bss_start__, __bss_end__;

// _vector and _vector_end are symbols defined in the interrupt
// assembly file, at the beginning and end of the vector and its embedded
// constants
extern int _vectors, _vectors_end;

extern void main();

// The C function _cstart is called from the assembly in start.s
// _cstart zeroes out the BSS section and then calls main.
// After main() completes, turns on the green ACT LED as
// a sign of successful execution.
void _cstart(void) {
    int *bss = &__bss_start__;
    int *bss_end = &__bss_end__;

    while (bss < bss_end) {
        *bss++ = 0;
    }

    static int * const RPI_INTERRUPT_VECTOR_BASE = 0x0;

    /* Copy in interrupt vector table and FIQ handler at end of table. */
    int* vectorsdst = RPI_INTERRUPT_VECTOR_BASE;
    int* vectors = &_vectors;
    int* vectors_end = &_vectors_end;
    while (vectors < vectors_end) {
        *vectorsdst++ = *vectors++;
    }

    main();

    // Turn on the green ACT LED (GPIO 47)
    volatile unsigned int *GPIO_FSEL4 = (unsigned int *)0x20200010;
    volatile unsigned int *GPIO_SET1 = (unsigned int *)0x20200020;
    *GPIO_FSEL4 = (1 << ((47-40)*3));
    *GPIO_SET1 = (1 << (47-32));
}

```