

Example of littst

This example shows a firmware program calling into a memory-mapped hardware register implemented in Verilog.

Firmware

We would like to toggle a register:

```
<Toggle the register>≡  
GPIO_REG ^= 1;
```

Let's write a C program that defines and toggles this register continually in a loop:

```
<main.c>≡  
#include <stdint.h>  
#define GPIO_REG (*volatile uint32_t*)0x40000000  
  
int main(void)  
{  
    GPIO_REG = 1;  
    while (1)  
        <Toggle the register 1>  
}
```

Hardware

The following Verilog code describes the hardware implementation of the same register:

```
<Output data on clock>≡  
always @(posedge clk)  
begin  
    if (write_en)  
        gpio_out <= data_in;  
end
```

Of course we have to put the code into a module:

```
<gpio.v>≡  
module gpio_reg (  
    input wire clk,  
    input wire write_en,  
    input wire data_in,  
    output reg gpio_out  
);  
<Output data on clock 1>  
endmodule
```