Factually of Engineering

Computer Engineering Department

Embedded systems

Lab 2 Hw

By

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For

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Due to 3/12

Solution :

Code part1

```
#include <LPC11xx.h>

// Define GPIO registers
#define GPIO0DIR (*((volatile unsigned long *)0x50008000))
#define GPIO0DATA (*((volatile unsigned long *)0x50003FFC))
#define GPIO1DIR (*((volatile unsigned long *)0x50010000)) // Port 1 for Red LED
#define GPIO1DATA (*((volatile unsigned long *)0x50013FFC))
#define GPIO2DIR (*((volatile unsigned long *)0x50028000))
#define GPIO2DATA (*((volatile unsigned long *)0x50023FFC))

int seven_seg_encoder[] = {
    0xC0, // 0
    0xF9, // 1
    0xA4, // 2
    0xB0, // 3
    0x99, // 4
    0x92, // 5
    0x82, // 6
    0xF8, // 7
    0x80, // 8
    0x90  // 9
};

int main(void) {
    int num = 555;
    int i;

    GPIO2DIR |= 0xFF;
    GPIO1DIR |= 0x01;
    GPIO0DIR |= 0x0C;
    // Initialize the red LED to be off
    GPIO1DATA &= ~0x01; // Turn off the red LED (make sure it's initially off)

    while (1) {
        // Handle hundreds place
        GPIO0DATA = 0x04;  // Select the hundreds digit
        GPIO2DATA = seven_seg_encoder[num / 100]; // Display hundreds place
        for (i = 0; i < 5000; i++); // Delay
```

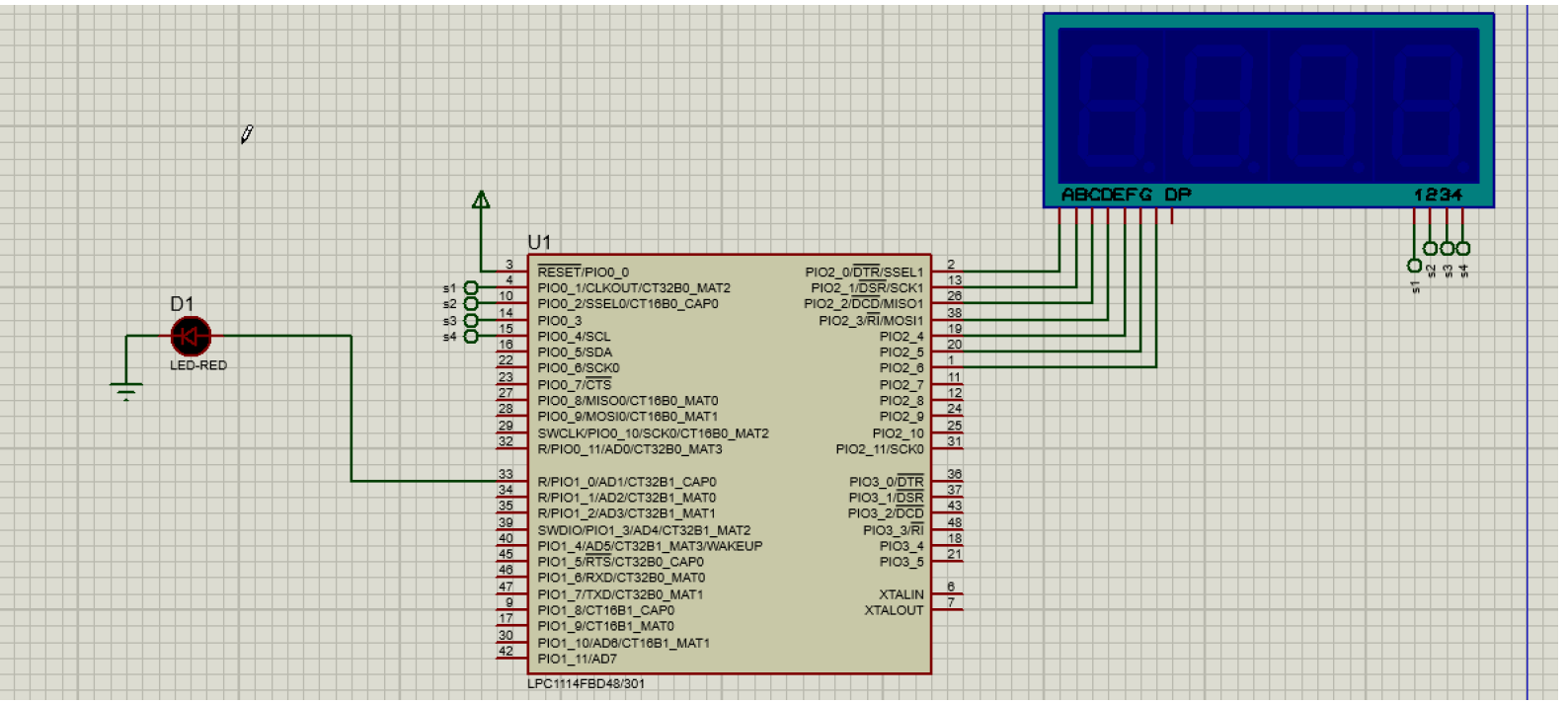
Code part1

Code part 2

```
    // Handle tens place
    GPIO0DATA = 0x08;
    GPIO2DATA = seven_seg_encoder[(num / 10) % 10]; // Display tens place
    for (i = 0; i < 5000; i++); // Delay

    // Handle ones place
    GPIO0DATA = 0x10;  // Select the ones digit
    GPIO2DATA = seven_seg_encoder[num % 10];  // Display ones place
    for (i = 0; i < 5000; i++); // Delay

    if (num > 0) {
        num--;
    }

    // When the count reaches 0, turn on the red LED
    if (num == 0) {
        GPIO1DATA |= 0x01; // Turn on the red LED
    }
  }

  return 0;
}
```

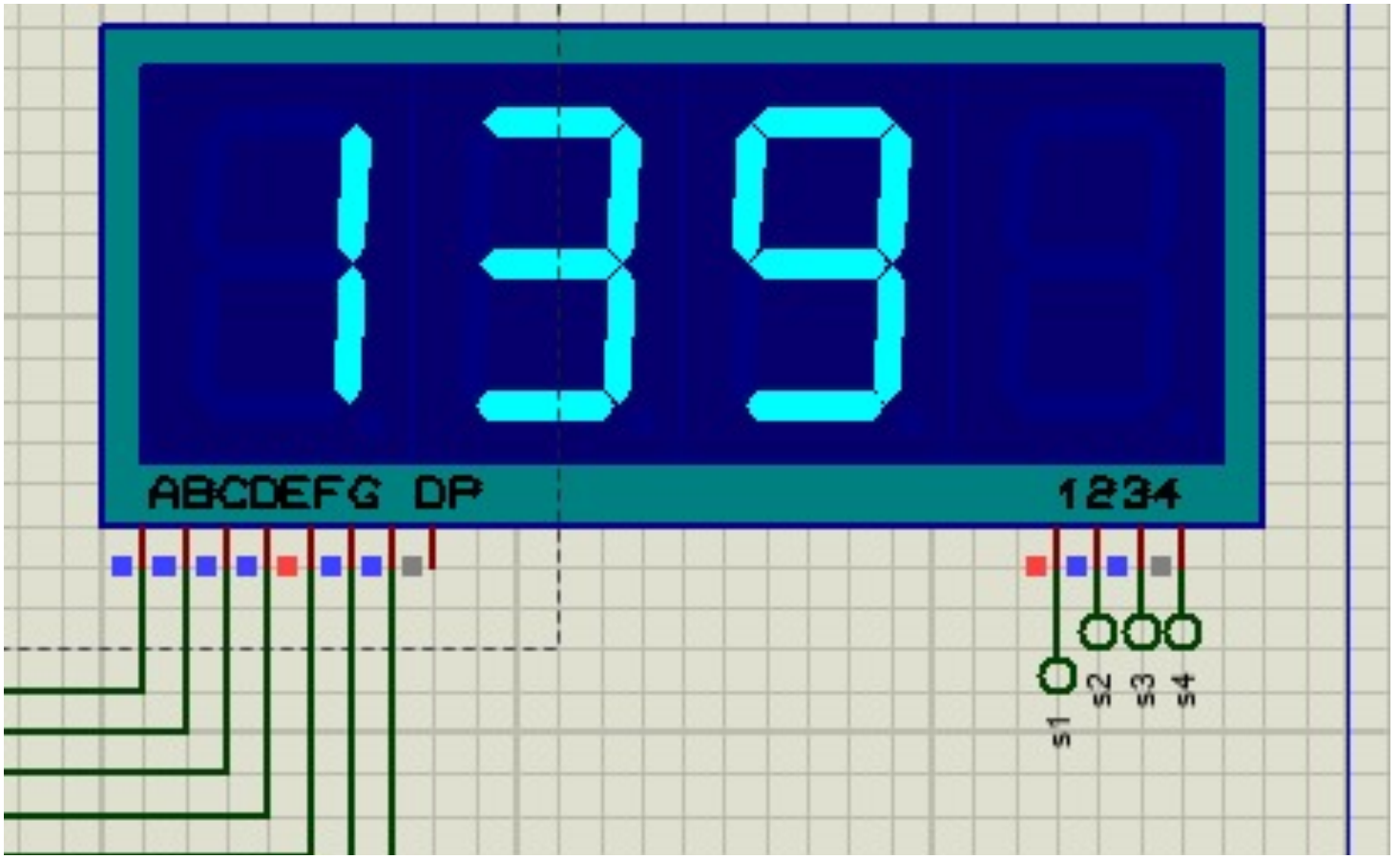
Code part 2

Component Connection :



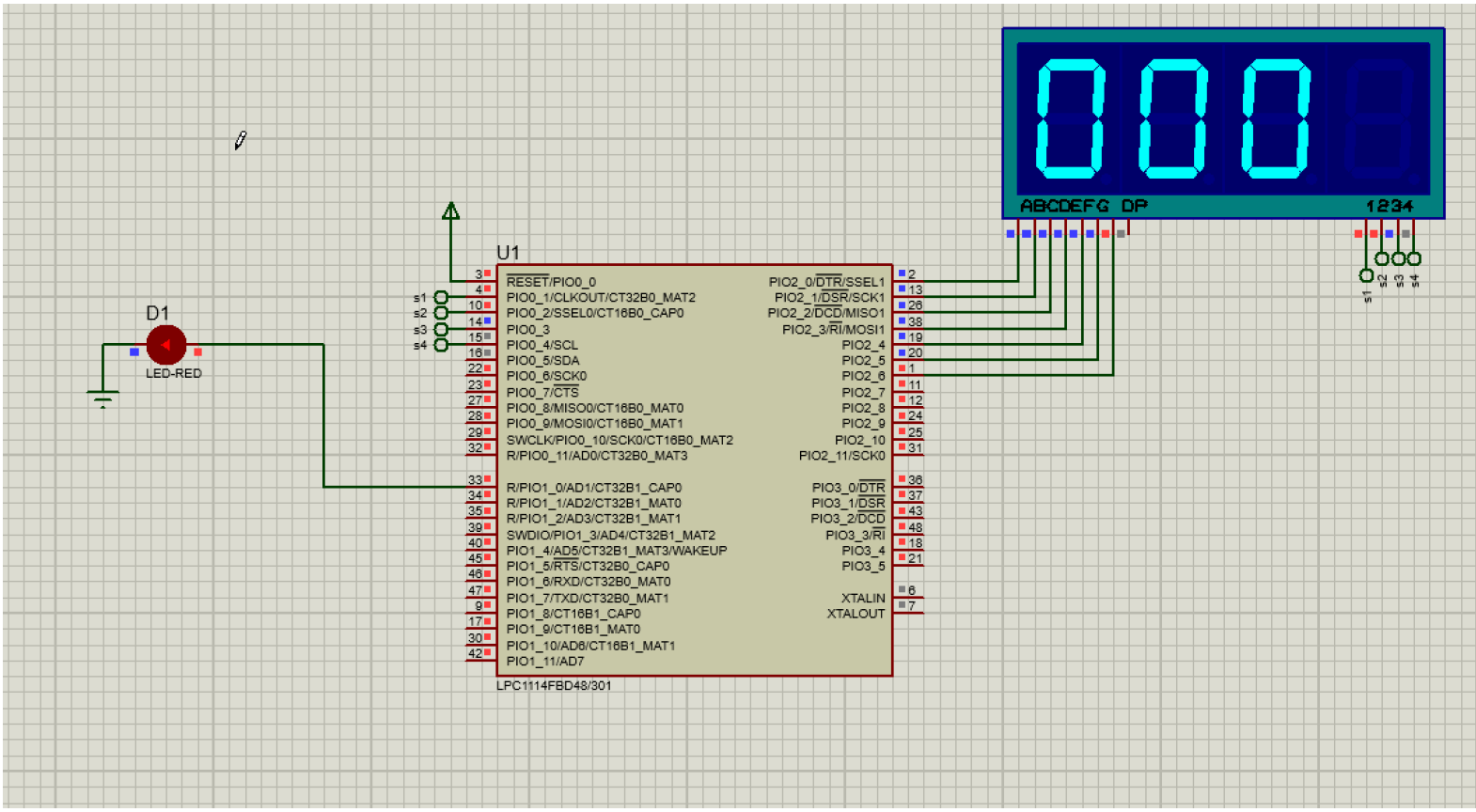
Componet connection

Simulation when the numbers decreasing from 555 to 000



Caption

Simulation when reaching 0 :



When reaching 0