Computer Engineering Department

Embedded systems lab 1

By

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Submitted for

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HW Question :

1- Implement a system that takes two buttons as input, if the first one is clicked you should shine 4 LEDs (the four LEDs should be connected to PORT2), then if you clicked the second one you should turn all the LEDs off.

Solution code:

```
#include <LPC11xx.h>

#define GPIO_PORT0_DIR (*((volatile unsigned long *)0x50008000))  // Direction register for Port 0
#define GPIO_PORT0_DATA (*((volatile unsigned long *)0x50003FFC)) // Data register for Port 0
#define GPIO_PORT2_DIR (*((volatile unsigned long *)0x50028000))  // Direction register for Port 2
#define GPIO_PORT2_DATA (*((volatile unsigned long *)0x50023FFC)) // Data register for Port 2

int main() {
  //setup phase
   // Configure P0.1 and P0.2 as input (buttons)
   GPIO_PORT0_DIR &= ~0b110;  // Set bits 1 and 2 as input for buttons (P0.1 and P0.2)

   // Configure P2.0 to P2.3 as output (LEDs)
   GPIO_PORT2_DIR |= 0b1111 ;  // Set bits 0 to 3 as output for LEDs
   GPIO_PORT2_DATA &= ~0b1111 ; // Initialize LEDs to off

   while (1) {
      // Check if Button 1 (P0.1) is pressed
      if (GPIO_PORT0_DATA & 0b10) {  // Button 1 is pressed
         // Turn on LEDs (P2.0 to P2.3)
         GPIO_PORT2_DATA |= 0b1111 ; // Set bits 0 to 3 (turn on LEDs)
          while (GPIO_PORT0_DATA & 0b10);  // Wait for Button 1 to be released
      }

      // Check if Button 2 (P0.2) is pressed
      if (GPIO_PORT0_DATA & 0b100) {  // Button 2 is pressed
         // Turn off LEDs (P2.0 to P2.3)
         GPIO_PORT2_DATA &= ~0b1111 ; // Clear bits 0 to 3 (turn off LEDs)
         // Wait until Button 2 is released
         while (GPIO_PORT0_DATA & 0b100);  // Wait for Button 2 to be released
      }
   }

   return 0;
}
```

Hw code

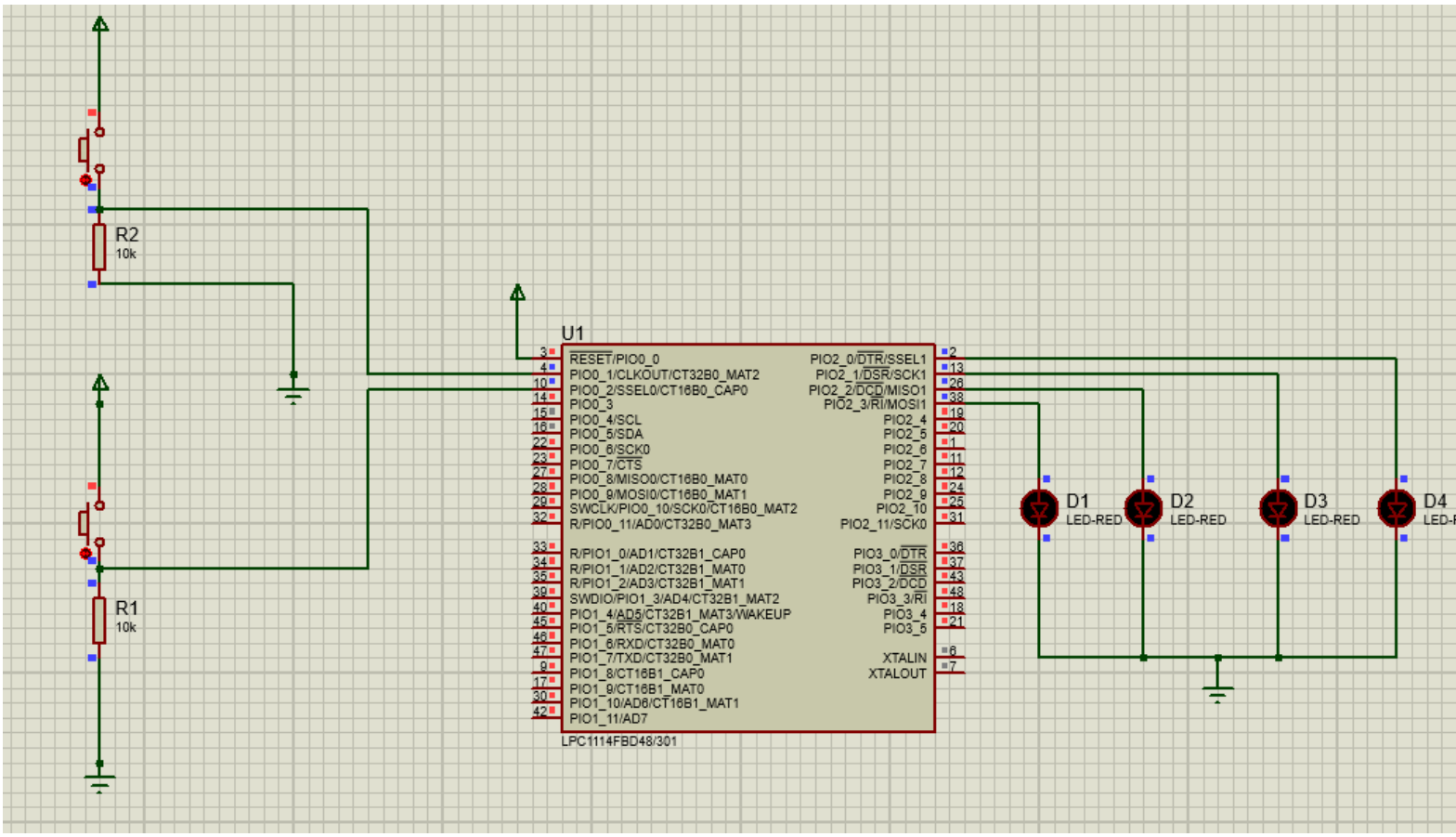
How I designed the code :

1) I define the addresses for my register data and directory Then because the leds must be at port 2 I made data, direction for port 0 to be for buttons and Another data ,direction for port 2
2) Then of course I specify who is the inputs and who is the outputs using directory register So I used &~ to make the values zeros for inputs because as we know that zero is for input T
3) Then I like to make initial state for leds by setting the data register for port 2 to zero

4) at my loop first I want to check if the first button is pressed I made the leds turned on and of course add a delay

5) Then if the second button is pressed I want to turn them off

Components Connection :



Components Connection

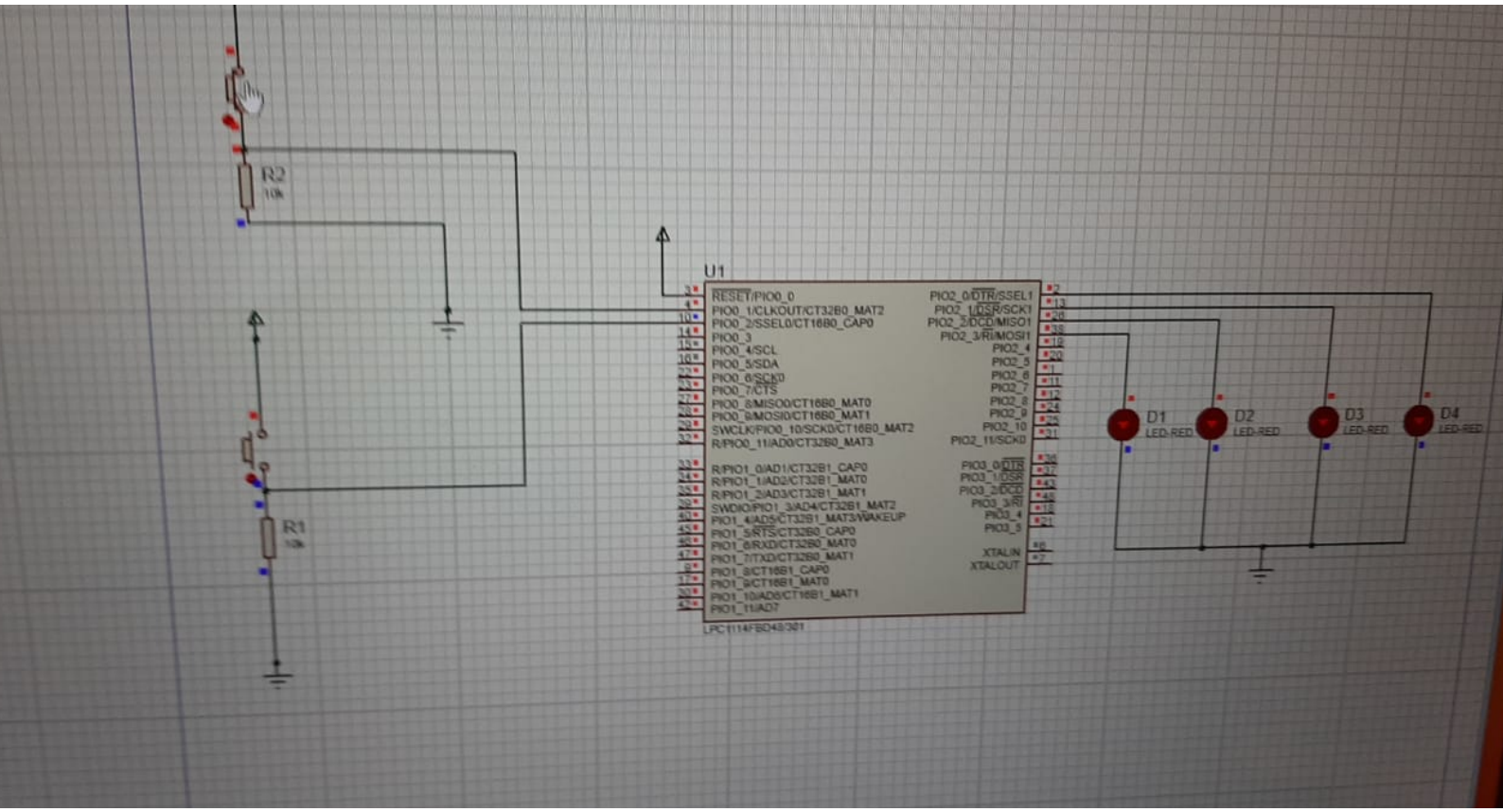
Simulation :

Video :

Please hit the link below to see live simulation video:

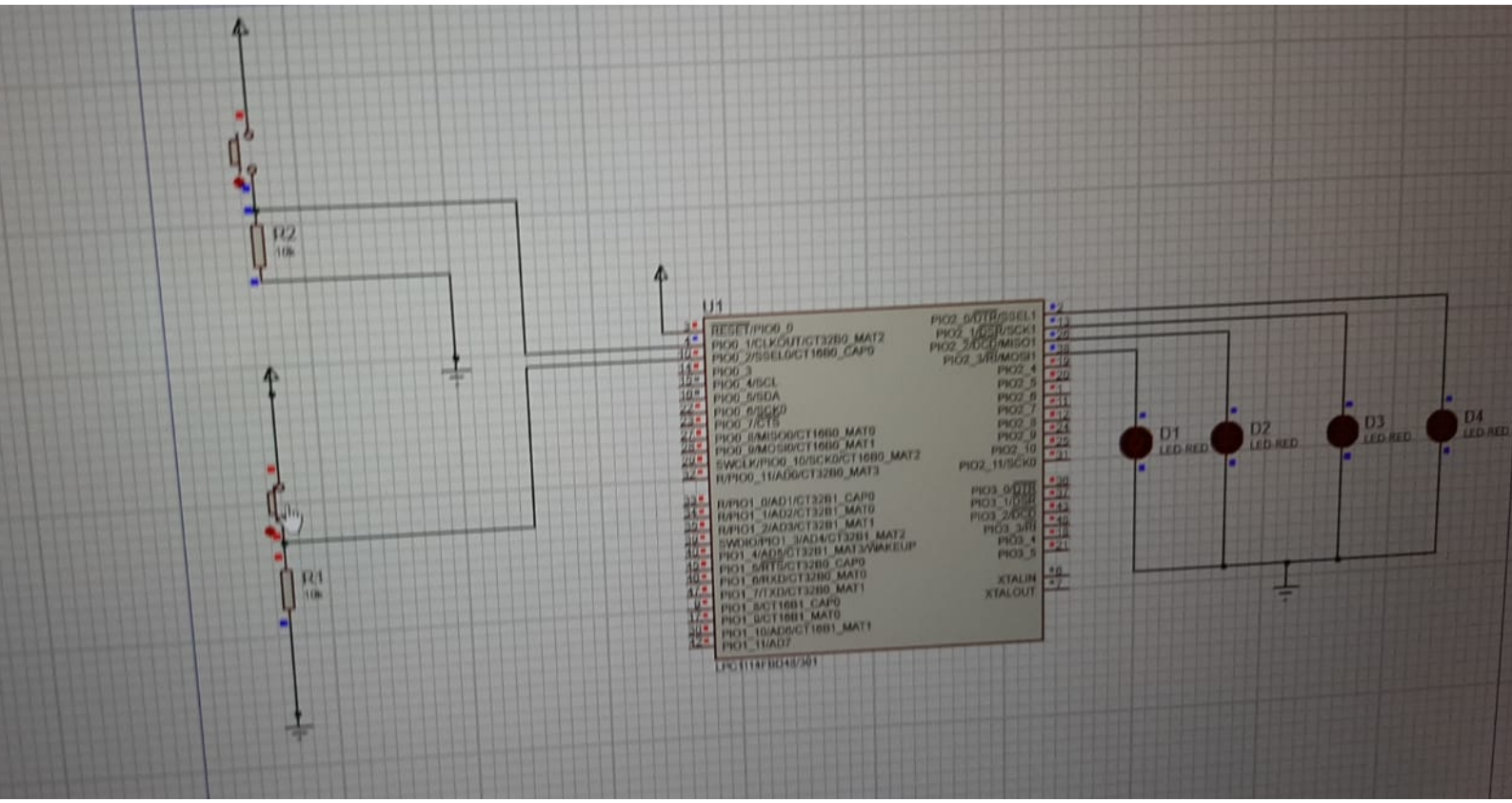
https://drive.google.com/file/d/1FV-Xt6hibFC8uNoDhOWT6wl95Y35YTRp/view?usp=sharing

Screenshot to what happen when I live click the first button :
As you see the leds are on



Live simulation when the first button is on all leds turned on

Screenshot to what happen when I live click the second button :
As you see the leds are off:



When button 2 is on all leds off