Internet of Things

Lab Report

Lab 1

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Goal of the laboratory:

During the laboratory we were asked to run simple blinking mode from Arduino program to our board. Then we got two tasks to do:

1) Write blinking mode using timer function.
2) Write the program which sends "Hello world" from board using serial port.

Simple blink:

```
#define LED_BUILTIN 14  // const for the PIN used by built-in LED in WeMos D1R2


void setup() {
pinMode(LED_BUILTIN, OUTPUT);
}

// the loop function runs over and over again forever void
loop() {
digitalWrite(LED_BUILTIN, HIGH); // turn the LED on (HIGH is the voltage level)
delay(1000); // wait for a second
digitalWrite(LED_BUILTIN, LOW); // turn the LED off by making the voltage LOW
delay(1000); // wait for a second


}
```

Blinking by timer:

```
#include <Ticker.h>

#define LED_BUILTIN 14 // const for the PIN used by built-in LED in WeMos D1R2
// the setup function runs once when you press reset or power the board
Ticker blinker;
void ICACHE_RAM_ATTR onTimerISR(){
digitalWrite(LED_BUILTIN,!(digitalRead(LED_BUILTIN))); //Toggle LED Pin
timer1_write(600000);//12us


}
void setup() {
```

```
// initialize digital pin LED_BUILTIN as an output.
pinMode(LED_BUILTIN, OUTPUT); timer1_attachInterrupt(onTimerISR);
timer1_enable(TIM_DIV16, TIM_EDGE, TIM_SINGLE); // start Timer1
timer1_write(600000); //120000 us
}

// the loop function runs over and over again forever void
loop() {
}
```

"Hello world" by serial port:

```
void setup() {
// set up the LCD's number of columns and rows:
lcd.begin(16, 2);
Serial.begin(9600); //opens serial port, sets data rate to 9600 bps
Serial.print("Hello world."); }

void loop() {
}
```

Result:

We chose our board from tools and the com4 port which is used by our board. In our first task of simple blinking, we followed the instruction of lab, just added the pin of our board in constant variable ***LED_BUILTIN***.

To solve the second task we followed example from ***circuits4you.com*** – page. To use timer method we included ***<Ticker.h>*** library on our header file. We declared function ***onTimerISR()***, which will be called every 0.5 second and this function will change the state of our LED.

The TIMER1 module gives an interface to a 16bit HW timer which can be used for custom application purposes. This module offers us:

- COUNTER mode - exact timing with callback functions and granularity 0.062 us pro tick using 16MHz clock. The counter tick can be adjusted using a 1, 2, 4 postscaler.
- PWM mode - PWM signal generation on the SCSEDIO0 or ADIO0 or ADIO4 pin

To solve third task we went to **Arduino web-page** and found an example, by **Serial.begin(speed)** we are opening serial port, sets data rate to byte/c. Then

by **Serial.print("Hello world.")** we are printing **"Hello world"** to the serial port. We run the program and to see what appeared in Serial port we opened Serial monitor from **Tools -> Serial Monitor**.

Conclusion:

 On this lab we got know some basics of Arduino, our board WeMos D1R2, the simply way to send data to serial port and blinking Red LED by timer function.