

EE 629 – IoT using Raspberry Pi

Lesson 2 – Exercises – Done

1.Lab A: Serial: Did serial loopback testing using minicom

2.Lab B: SPI and I2C:

1. Connected the SPI MOSI and MISO pins (the 10th and 11th pins from the left of the bottom row) using one DuPont female-to-female jump wire, and used the `spidev_test.c` file to configure the device setting, then used the MOSI to send the data and received the same data in MISO. Verified all the results in SSH Terminal

2. Connected I2C devices (ADXL345 and BMP180) using four DuPont female-to-female jump wires with 3V3, GND, SDA, and SCL, install `i2c-tools`, and found that I2C addresses 53 has been used to connect the ADXL345 with raspberry pi on SSH Terminal

3.Lab C: Fritzing : Installed Fritzing application and followed the steps to make the connections and saved the image file

4. Lab D: GPIO and LED: Connected an LED on a breadboard to the Raspberry Pi GPIO using two DuPont male-to-female jump wires, then entered the mentioned commands to switch an LED on/off

5. Lab E: 1-Wire: The DS18B20 digital thermometer provides 9-bit to 12-bit Celsius temperature measurements and has an alarm function with nonvolatile user-programmable upper and lower trigger points. The DS18B20 communicates over a 1-Wire bus that requires only one data line (and ground) for communication with a central microprocessor. In addition, the DS18B20 can derive power directly from the data line ("parasite power"), eliminating the need for an external power supply.

Connected the raspberry pi to the DS18B20 as mentioned and as each device Has a Unique 64-Bit Serial Code Stored in On-Board ROM, read the values in the 64 bit address

6. Lab F: USB Webcam: Connected a USB webcam and to use it on the Raspberry Pi. Then installed `fswebcam`, and save the images. In order to use the webcam on Raspbian, we need to install the `fswebcam` package. Once the package is installed, we can take a simple image by launching the command. Since the default resolution is very low. We can increase it using the following command `fswebcam -r 1280x720 image2.jpg` and then specified the desired resolution level.