Embedded Digital Counter

Setup Document

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Overview

This setup document aims at defining the steps to configure the full system.

Raspberry Pi Configuration

[Follow the instructions given below only one time]

- Open the terminal on Raspberry Pi and execute the following commands which are italicized and bold.
    - ***sudo raspi-config***
        - Then select Interfacing Options and press enter
        - Then select SPI and press enter and then Enable SPI and press enter
        - Again from Interfacing Options select and enable Camera and then I2C
    - ***sudo reboot***
- After the Raspberry Pi is rebooted open the terminal again and execute the following commands
    - sudo apt update
    - sudo apt upgrade
    - sudo pip3 install paho-mqtt
    - sudo apt-get install python-spidev python3-spidev
- Then copy RaspberryPiProgram folder to the Desktop of your Raspberry Pi

Running the Program

[Follow the instructions below everytime you want to run the program]

- Upload the code Firmware.ino to your Arduino Nano
- Connect Arduino Nano to the Raspberry Pi via USB Cable.

Open the terminal and execute the following command

- cd ~/Desktop/RaspberryPiProgram
- python3 Firmware.py

Details

For testing, I have set up a server and front-end dashboard, back-end and database are hosted on it.

Front-end

you can access the front-end from this link

http://edc-frontend.production.wrapdrive.tech/#/dashboard

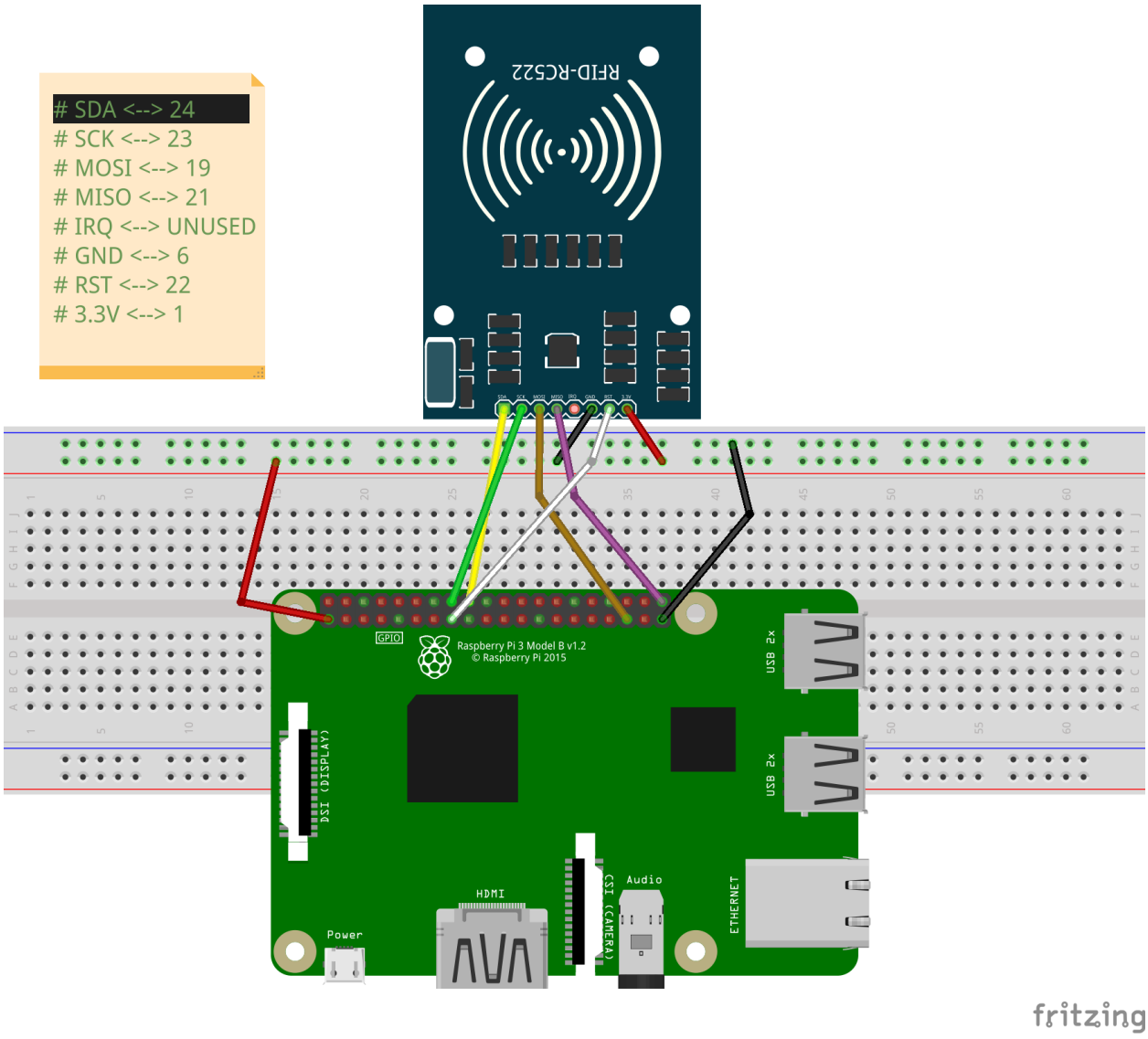
When the Firmware.py program is running you can head over to the front-end dashboard to see the changes happening in real time.

Optimizing the Raspberry Pi Performance

- Open the terminal and execute the following commands
    - *sudo apt-get remove --purge libreoffice**
    - *sudo apt-get remove --purge scratch**
    - *sudo apt-get remove --purge wolfram**
    - *sudo apt-get remove --purge geany**
    - *sudo apt-get remove --purge sonic-pi**
    - *sudo apt-get remove --purge minecraft-pi**
    - *sudo apt-get clean*
    - *sudo apt-get autoremove*
- sudo reboot

Attaching RFID Card Reader

Connect the RFID Reader to the raspberry pi as shown in the picture below



Backing-up whole SD Card

The simplest way to backup your Raspberry Pi is to copy the entire SD card as an image.

This technique is the reverse of flashing your SD card when installing an OS to it. Instead of copying an image file from your computer to the SD card, you copy the entire SD card to an image file on your computer.

This is, in fact, how image files are created in the first place.

Power down your Raspberry Pi and remove the SD card. Place it into an SD card reader and connect it to your computer.

Open a Terminal window on a Mac or Linux computer, and enter df. Take a look at what drives you have on your system. Now attach the SD card to your computer, and enter df again.

Spot the newly mounted drive: on a Linux machine, it will be something like /dev/sdb1, and on a Mac it will say /dev/disk2s1. The numbers may be different, so be sure to check carefully.

On Linux:

sudo dd bs=4M if=/dev/sdb of=raspbian.img

On a Mac:

sudo dd bs=4m if=/dev/rdisk2 of=raspbian.img

You can then use the raspbian.img file to restore your entire operating system (in its current state) to an SD card using dd in reverse, or by using an app such as Etcher (https://etcher.io) to flash the SD card.

In Windows, you back up the SD card using Win32 Disk Imager.

The backed-up *raspbian*.img file can be flashed on any SD-Card as it will behave exactly like the first raspberry pi image. The benefit of this process is that you won't have to run different commands on each raspberry pi in order to configure everything.

Profile

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I'm a Full-Stack IoT Developer and have done more than 150 hardware projects and running an IoT and Hardware Design House

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