ACKNOWLEDGEMENT

First of all we thank **God Almighty** for his abundant grace and mercy which enabled us in the finalization of this project.

We wish to express our profound sense of gratitude to **Prof.Jyothi John**, **Principal**, College of Engineering Chengannur for his encouragement and all support to complete this project.

We have immense pleasure in expressing our thanks and deep sense of gratitude to **Dr.Smitha Dharan**, Head Of the Department of Computer Science Engineering for her invaluable support.

We express our gratitude to our guide **Ms.Santhi**, Lecture in Department of Computer Science Engineering for her guidance and suggestions without which this project would have been just a dream.

We also express our heartfelt gratitude to our Project Coordinators **Mrs.Jyothirmayi Devi C**, Assistant Professor in Department of Computer Science Engineering for their guidance and advice to complete this project.

Last but not the least,I extend my heartfelt gratitude to our parents for their support and assistance.

ABSTRACT

Now days in many shopping malls and large work places, finding a free car parking slot is a real pain. There will be many floors and lanes for car parking, so to park a car one has to search and roam around to find a free slot. And to effectively manage parking, there is a lot of men labor used currently which is a huge recurring investment. Use of automated system for car parking monitoring will reduce the human efforts. It would reduce average fuel consumption, carbon foot print and time to park a car. Parking management system available in the market today uses sensors in each parking slot and use the data from sensors to show free slots.This approach is very costly because you need sensor in every parking slot.In this project we are creating a proof of concept for an intelligent car parking system model which uses sensors only at the entrance of each lane and uses an intuitive algorithm to determine free slots. This reduces the product and installation cost by 90compared to current solutions in the market.The project involves a system including motion detector at every entrance and exit of lanes and LEDs to indicate vacant slots in each lane. We are planning to use Rasperry pi for the programming and communication between sensors. We are also looking for options like using micro controllers instead of Rasperry pi to reduce cost further.

Contents

Chapter 1

INTRODUCTION

1.1 EXISTING SYSTEM

This submitted project is an attempted system which was implemented using electronic circuits and more dependent on hardware.

1.2 PROPOSED SYSTEM

In this project we are creating a proof of concept for an intelligent car parking system model which uses sensors only at the entrance of each lane and uses an intuitive algorithm to determine free slots. This reduces the product and installation cost by 90

1.3 SCOPE

The parking guidance system can be used in shopping malls, hospitals, colleges. In future, we hope that this technology will be widely used in kerala too.

1.4 ADVANTAGES

- Will reduce the human efforts. It would reduce average fuel consumption, carbon foot print and time to park a car

- Reduce average fuel consumption
- Reduce carbon foot print
- Reduce time to park a car
- Saves energy

Chapter 2

SOFTWARE REQUIREMENT SPECIFICATION

2.1 INTRODUCTION

A software requirements specification (SRS) is a description of a software system to be developed, laying out functional and non-functional requirements, and may include a set of use cases that describe interactions the users will have with the software. The software requirements specfication document enlists enough and necessary requirements that are required for the project development.

2.1.1 PURPOSE

Nowadays in many shopping malls and large work places, finding a free car parking slot is a real pain. There will be many floors and lanes for car parking, so to park a car one has to search and roam around to find a free slot. This project aims at providing automated guidance system for car parking and will thus reduce the human efforts.

2.1.2 SCOPE OF PRODUCT

Parking management system available in the market today uses sensors in each parking slot and uses the data from sensors to show free slots. This approach is very costly because you need sensor in every parking slot. In this project we are creating a proof of concept for an intelligent car parking system model which uses sensors only at the entrance of each lane and uses an intuitive algorithm to determine free slots. This reduces the product and installation cost by 90

2.2 GENERAL DESCRIPTION

This document covers both software and hardware requirements. It also covers the functional requirements and non functional require requirements which is required for the completion of this project.

2.2.1 PRODUCT PERSPECTIVE

Nowadays in many shopping malls and large work places, finding a free car parking slot is a real pain. There will be many floors and lanes for car parking, so to park a car one has to search and roam around to find a free slot. This project aims at providing automated guidance system for car parking and will thus reduce the human efforts.

2.3 PRODUCT FUNCTIONS

Following is a list of functionalities of the system:

- Finding void slots
- Detecting presence of cars
- Displaying directions using LEDs

2.4 OPERATING ENVIORNMENT

We are using raspberry pi for the programming and communication between sensors by using Raspbian as the operating system. We are considering c for the coding purposes.

2.5 DESIGN AND IMPLEMENTATION CONSTRAIN

Only one car should be allowed to enter the parking lot at a time.

2.6 ASSUMPTIONS AND DEPENDENCIES

This project is based on the assumption that only one car should allowed entering the parking lot at a time.

2.7 SPECIFIC REQUIREMENTS

2.7.1 SOFTWARE REQUIREMENTS

Operating system: DEBIAN RASPBIAN WHEEZY LINUX FRONT END : C PROGRAMMING

2.7.2 HARDWARE REQUIREMENTS

Raspberry Pi model B+
Memory : 512 MB of RAM Storage : SD card slot,8 GB Power Supply : 5V 1A-2A Processor : SoC is Broadcom BCM2835 GPU **Raspberry Pi**
The Raspberry Pi is a credit card-sized single-board computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools. The Raspberry Pi is manufactured in four board configurations through licensed manufacturing agreements with Newark element14 (Premier Farnell), RS Components and Egoman. These companies sell the Raspberry Pi online. Egoman produces a version for distribution solely in China and Taiwan, which can be distinguished from other Pis by their red coloring and lack of FCC/CE marks. The hardware is the same across all manufacturers. In 2014, the Raspberry Pi Foundation launched the Compute Module, which packages a Raspberry Pi Model B into a module for use as a part of embedded systems, to encourage their use. The Raspberry Pi is based on the Broadcom BCM2835 system on a chip (SoC),which includes an ARM1176JZF-S700 MHz processor, VideoCore IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded (Model B Model B+) to 512 MB. The system has Secure Digital (SD) or MicroSD (Model A+ and B+) sockets for boot media and persistent storage. The Foundation provides Debian and Arch Linux ARM distributions for download. Tools are available for Python as the main programming language, with support for BBC BASIC (via the RISC OS image or the Brandy Basic clone

for Linux),C, C++, Java, and Ruby.

2.7.3 SECURITY REQUIREMENTS

The details of the programming of raspberry pi are secure. Editing of the program by the unauthorized user should be restricted by the administrator. The administrator can only edit the program and only he can the alter the algorithm.

2.7.4 SAFETY REQUIREMENTS

- A very stable power-supply is the most important thing
- Don't use rpi-update if you don't know what you're doing.
- Don't overclock over 900 MHz.
- Don't unplug the power at the Pi side, but on the other side of the cable.

Chapter 3

DESIGN AND IMPLEMENTATION DETAILS

3.1 DESIGN

3.1.1 ALGORITHM

- START
- LED A-GREEN,HIGH and LED B-RED,HIGH
- Capacity of A=5,count A=0 and Capacity of B=5,count B=0
- IF Count of A¡5 LED A-GREEN,HIGH
- ELSE LED A-RED,HIGH
- IF Count of B¡5 and Count of A=5 LED B-GREEN,HIGH
- ELSE LED B-RED,HIGH
- IF Entry sensor A Detects CountA++
- Entry Sensor B Detects CountB++
- IF Exit sensor A Detects CountA- -

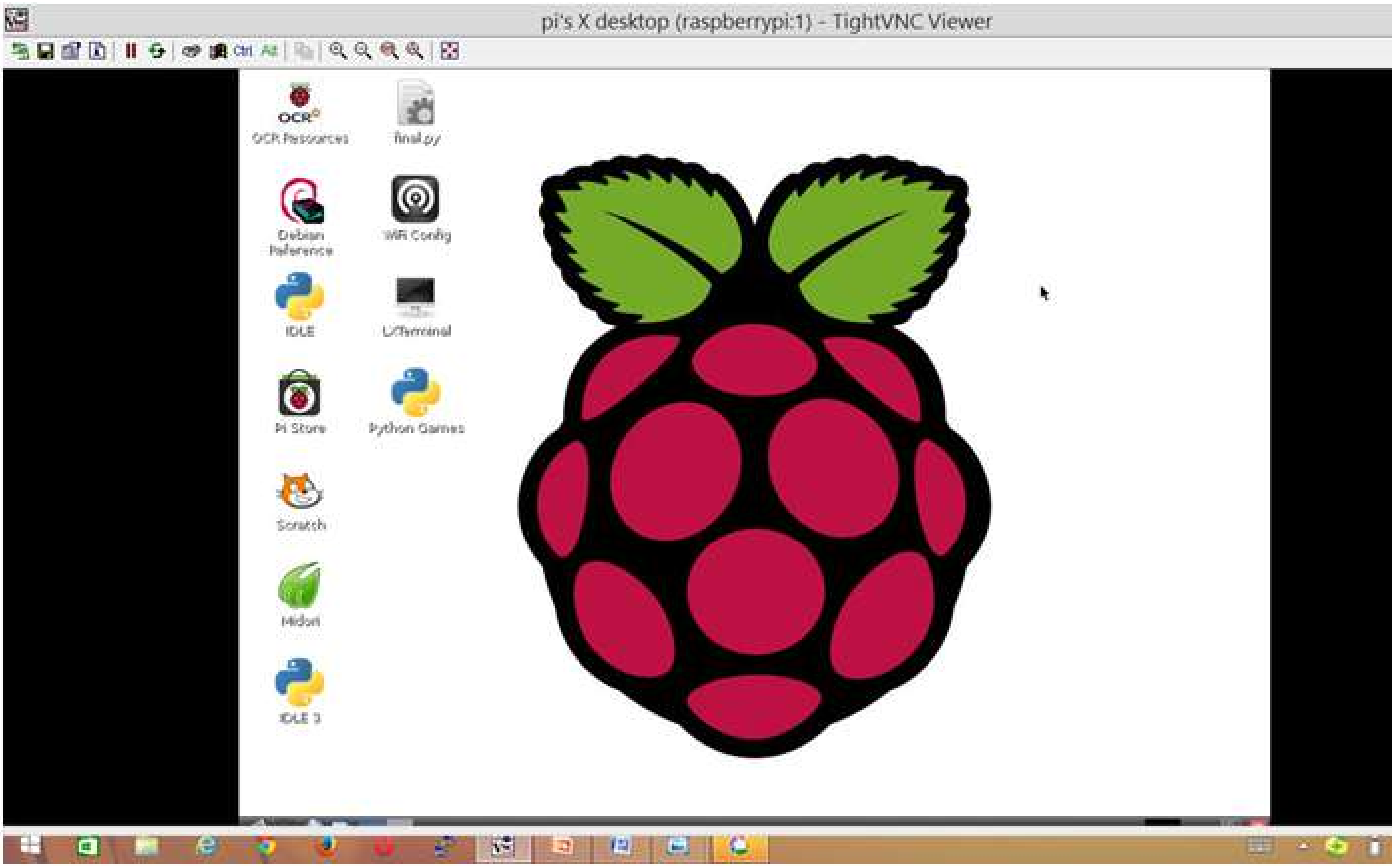
- IF Exit sensor B Detects CountB- -
- IF Capacity of A!=0 Parking light A-High
- IF Capacity of B!=0 Parking light B-High
- Goto Step4
- Stop

3.2 PROJECT IMPLEMENTATION

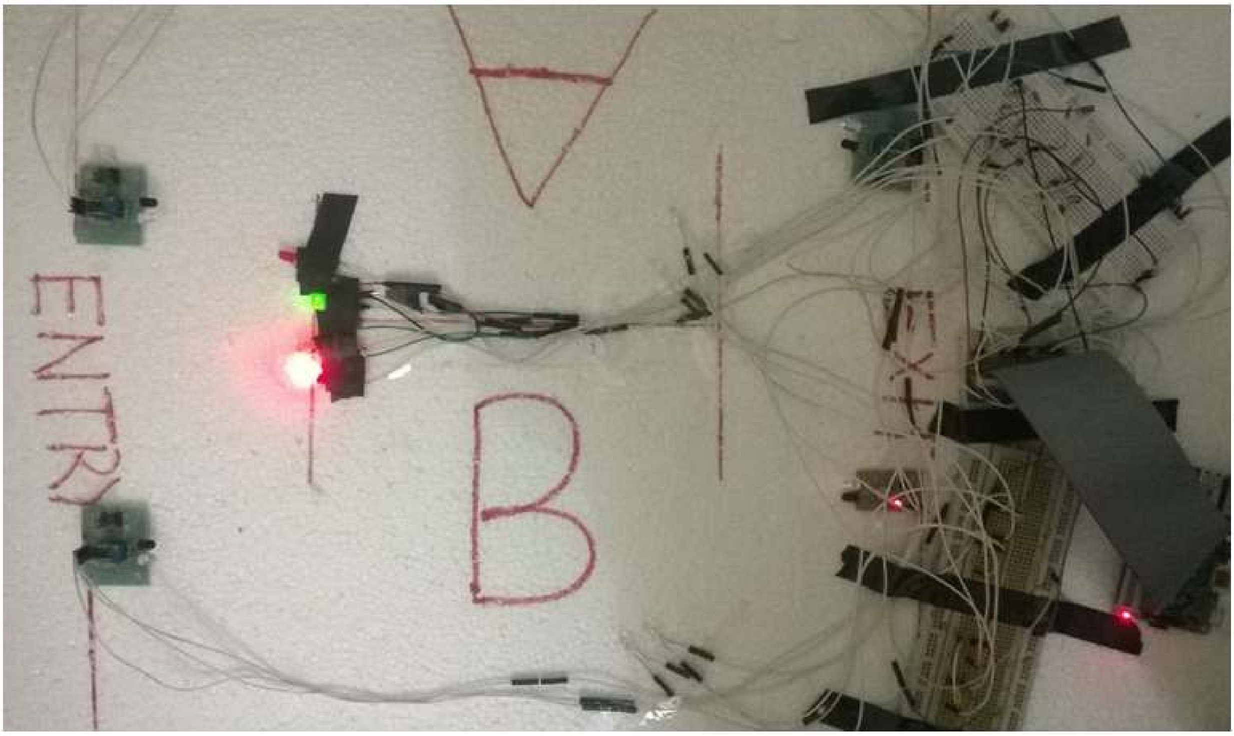
In parking guidance system,

- Displaying the availability of void slots using LEDs.
- Each parking blocks have sensors at their entry and exit.
- If the parking block is empty then the parking light switches off
- The priority of filling blocks are in the order A,B respectively

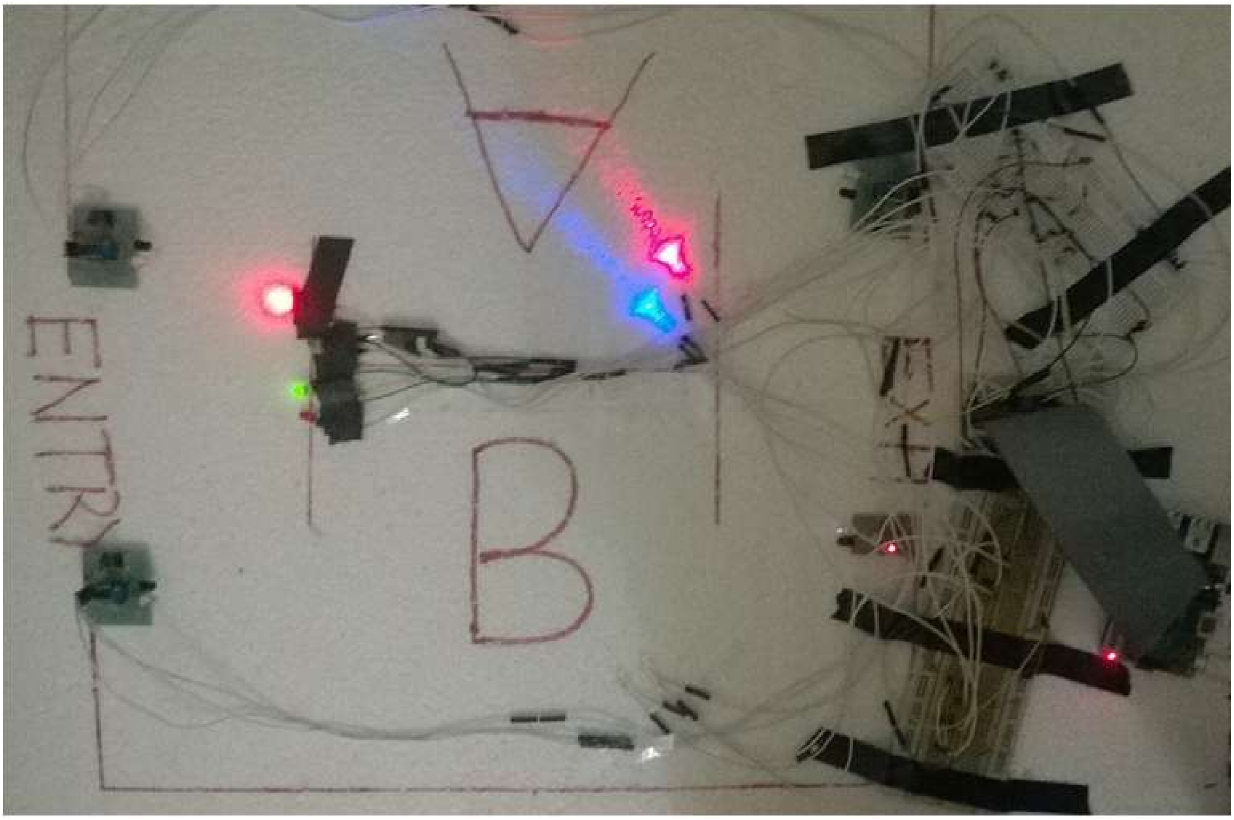
3.3 RESULTS AND DISCUSSION



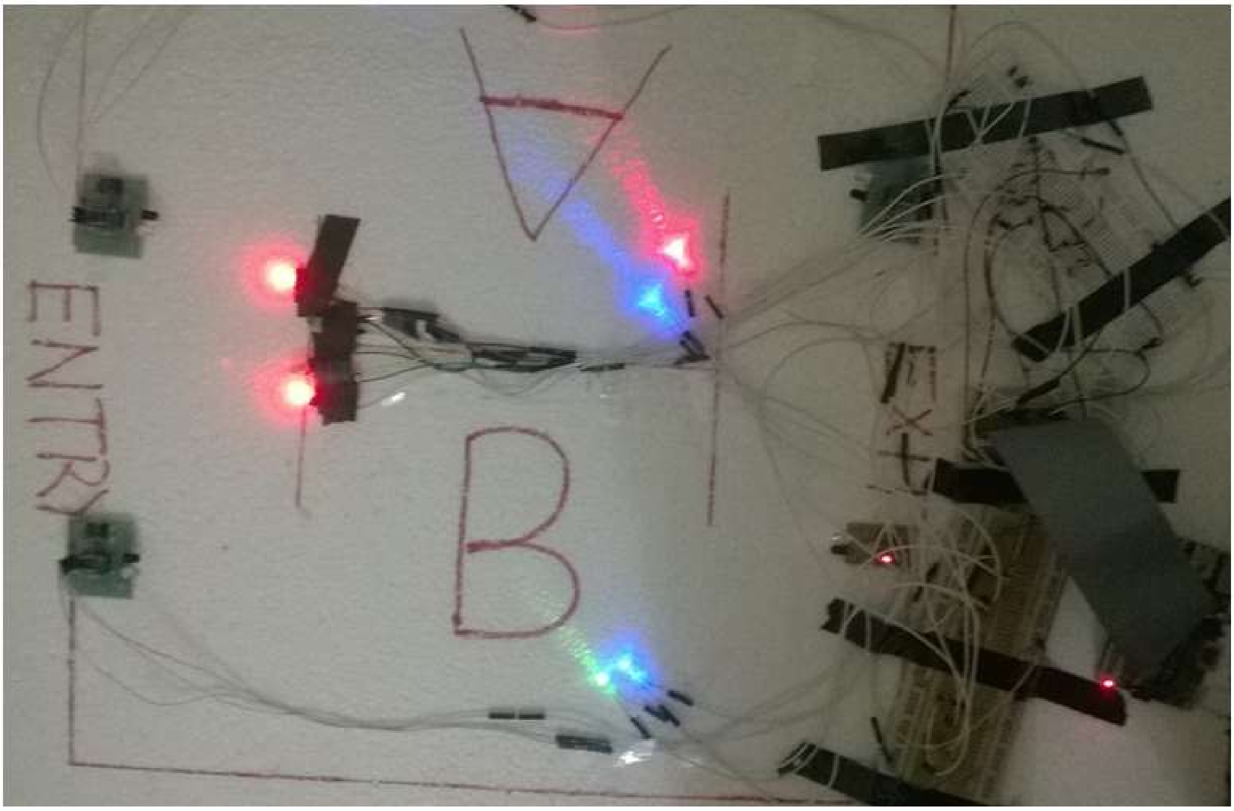
3.3.1 Initial condition



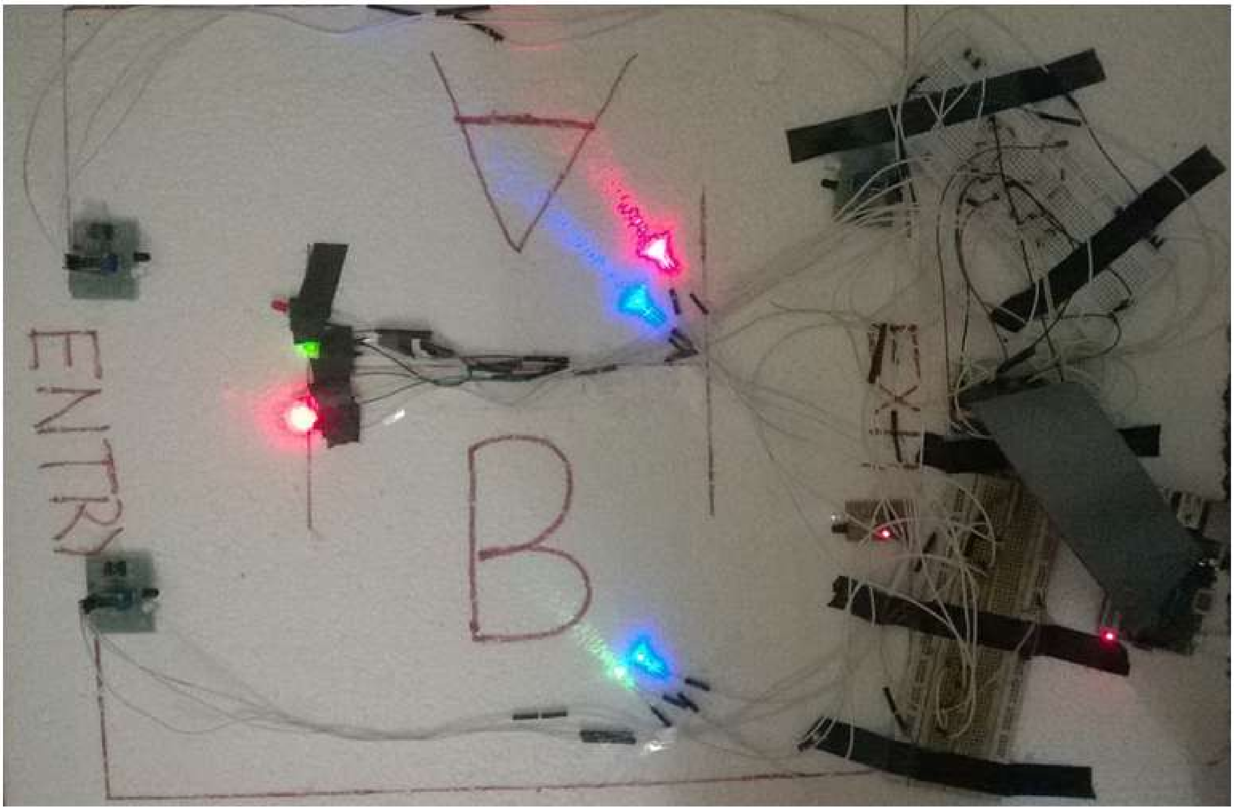
3.3.2 block full and B block has slots



3.3.3 AB block full



3.3.4 A car left from block A



Chapter 4

CONCLUSION AND FUTURE SCOPE

While working on the development of Car Parking management system using Raspberry Pi we found that with little modification in the project several new features could be added. Following are the things that can be done with few modifications.

- Fitting sensors at each slots
- Providing lcd displays showing exact directions to the slots

Chapter 5

REFERENCES

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- www.neil-black.co.uk/raspberry-pi-beginners-guide.VNrQNfnogtA