Mechatronics: Progress Report 1

ECOR1044 C: Mechatronics

Group 1044-C2-23

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2a.

Raspberry Pi

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games.

The Raspberry Pi has the ability to interact with the outside world as well, it is used in a wide array of digital maker projects, such as music machines and parent detectors, weather stations, tweeting bird houses with infra-red cameras e.t.c

It runs a Linux operating system and is able to interface with other components using its GPIO pins alongside ethernet, USB, built-in Wi-Fi and Bluetooth, Micro-HDMI, DSI display port, and CSI camera port.

Its various interfaces/components include,

1. The Raspberry Pi Power Cable for power.
2. A micro SD card as its 'hard drive'. Being a microprocessor, Raspberry Pis' are able to run as a standalone computer with an operating system using large external memory.
3. A case for protection.
4. Mouse and keyboard
5. Display and cables
6. A heatsink/ Fan to keep it cool.

2b.

i. Mkdir: This command creates an empty directory (folder) with the name you pass it.

E.g mkdir name_of_dictionary where name_of_dictionary is the name of the directory one wants to create.

ii. Man:This command provides the manual for another command that you pass it, it is therefore arguably the most important command you can learn.

Syntax:

$ man [command name]->

This displays the whole section of a manual.

iii. Tail: This command is for reading files. It reads the last few lines of the file and you can specify a number of lines read by adding -n 5 (or any other number). Note: by default it prints the last 10 lines of each file to standard output.

Syntax:

$ tail [OPTION]...[FILE]...

iv. Touch: This command updates the last modified time-stamp of a file, however if no file with the name exists it can be used to create the file

SYNTAX:

$ touch -c -d DATE FILE

v. Cp:This command creates a copy of a desired file, this is done by writing the name of the file or directory that is to be copied (or it's full path if it is in a different folder than the one you are currently working in, shown on the left of the terminal) then the name of the copied version of the file (or its full path if it is being copied to a different location, using '.' denotes the current folder location. This is the same functionality of copy/pasting a file in Windows.

SYNTAX:

$ cp -fip -R -H|-L|-P SOURCE DEST

2c.

- In order to access the Raspberry Pi in the lab, the 'Remote Desktop Connection' application on the workstation PCs was used.
- Once logged in into my Labs PC workstation, Remote Desktop application was launched.
- My Computer field "Pi23.VLSI" was then entered.
- In the window that showed up next, the username: pi and password: password was entered.
- BASIC LED IMPLEMENTATION: Here the Raspberry Pi is used to test
- an implemented resistor and LED in order to switch the LED on and off.
- Using a small prototyping board and the breadboard, the anode side of the LED strip is connected to GPIO pins.
- The Thonny Python IDE in Raspberry Pi was used to program the turning off and on of LED 5 TIMES with 5 second pauses between.
- The Thonny Python IDE in Raspberry Pi was also used to turn on and off 8 LEDs in order. Instead of using 8 individual LEDs and resistors the LED strip and a SIP resistor was used.
- The Thonny Python IDE in Raspberry Pi was also used to create an 8-bit binary counter which made it count up from 0 to approximately 255 using LEDs, resistors too.
- To see the Raspberry Pi's current directory, the command 'pwd' was used.
- To display all of the files and directories for my current file path the 'ls' command was used.
- The 'mkdir' command was used to create a directory with my surname (Obikwelu). Once created, the directory was visible on the desktop.
- The 'touch' command was used to create a file with my first name(Uchenna) in the Obikwelu directory
- The 'touch' command was also used to create a file with a title of the last 3 digits of my student number (887)in the Obikwelu directory
- Then the 'rm' command was used to delete the file with the title of my student number.
- Record the file-path shown in your terminal window and the name of the remaining file.- Appendix B

2d.

I feel raspberry pi is a very innovative technology. It is literally a mini computer that can be used for anything. I do feel that practising with it would be a great way to learn the integration of software and hardware. Just like how I was able to write a program that switches off and on lights led light bulbs. I also feel Raspberry pi is a great alternative as it is cheap and small sized. Raspberry pi, is also a great way to monitor things.i.e a prototype before programming on the main technology to be developed. It has ports for connectivity, and can be used just like a computer.

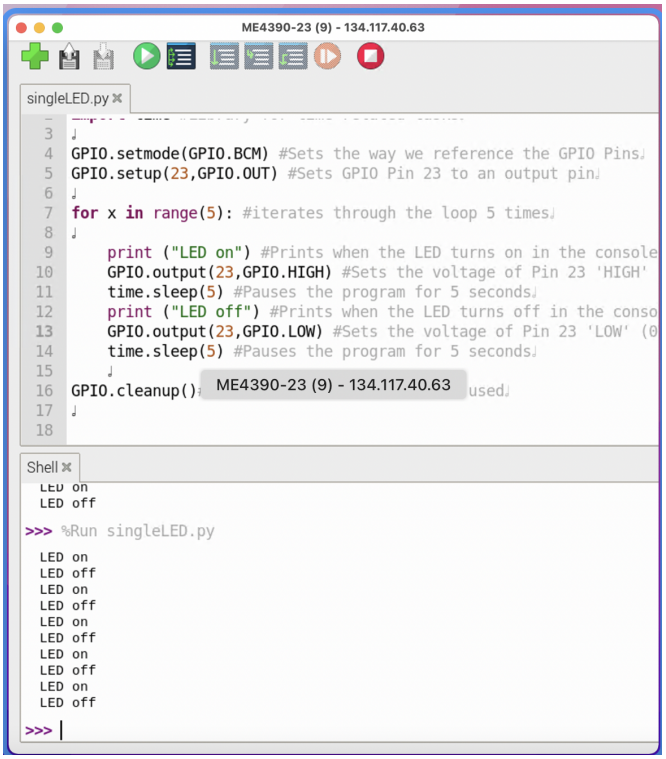
Appendix A-Experiment Scripts

6.3

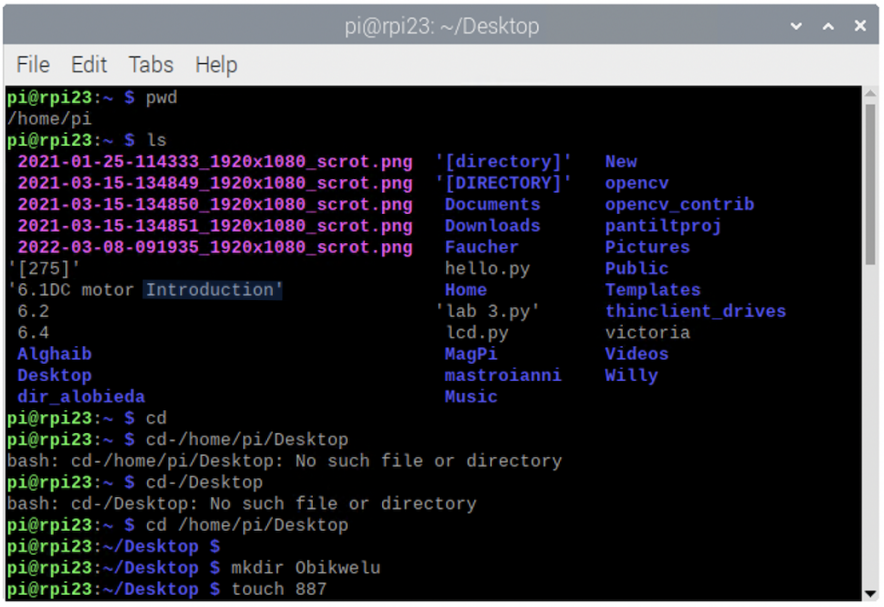
```
#libraries
import RPi. GPIO as GPIO
import time

#Setup
GPIO.setmode(GPIO.BCM)

def LedControl(pin,func):
    GPIO.output(pin,func)
    time.sleep(1)
pins=(23,24,25,8,7,1,12,16)
for i in pins:
    GPIO.setup(i, GPIO.OUT)
    LedControl(i,1)
pin=(23,25,7,12,24,8,1,16)
for i in pin:
    LedControl(i,0)
```

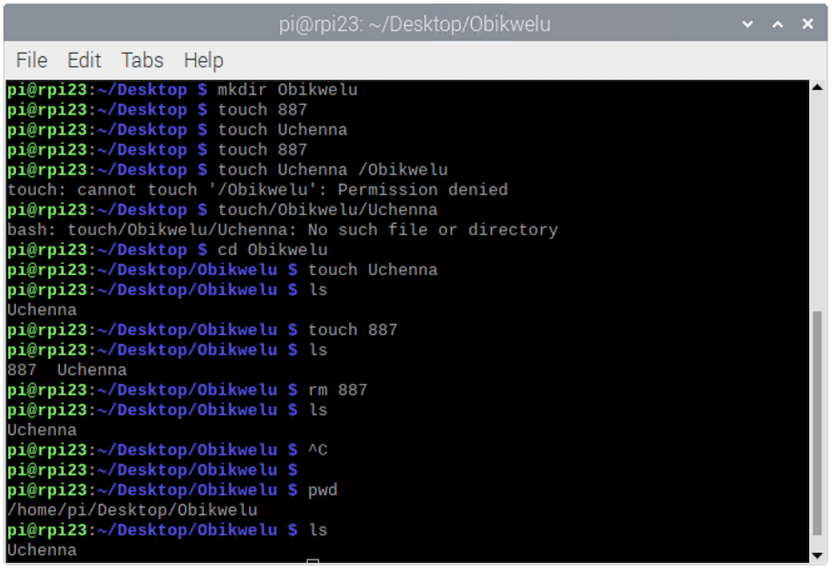
Appendix B-Experiment Photos

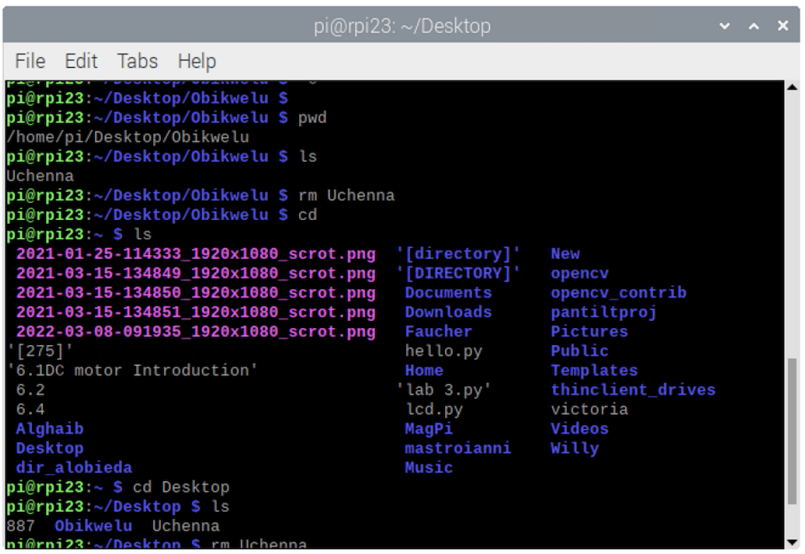
6.2



6.1







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3. ‘ECOR1044 Lab 1 Instructions’ *Bright Space ECOR 1044* [Online] Available: https://brightspace.carleton.ca/d2l/le/content/57180/viewContent/2550925/View.[Accessed: 12-Mar-2022].