Python

@42students

Summary: This project will teach you the basics of Python.
Using a Raspberry Pi minicomputer you will learn to control stepper motors, LED´s , a camera and much more.

Version 1.0

Contents

Chapter I

Instructions

- Each member of the group can register the whole group to defense.

· These exercises are carefully laid out by order of difficulty - from easiest to hardest. We will not take into account a successfully completed harder exercise if an easier one is not perfectly functional.

· If your program doesn't compile, you'll get 0.

· Exercises have to be carried out by group of 2, 3 or 4.

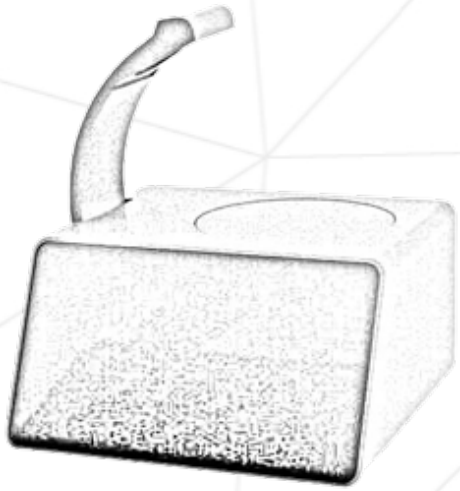
· You project must be done by the time you get to defense. The purpose of defense is for you to present and explain any and all details of your work.

· Each member of your group must be fully aware of the works of the project. Should you choose to split the workload, make sure you all understand what everybody's done.
During defense, you'll be asked questions, and the final grade will be based on the worst explanations.

HAVE FUN!

Chapter II

Foreword



It's time for pie!

Raspberry pie to be exact!

Why this recipe is so great:

Easy to make –

This pie is ready for the oven in less than 10 minutes. All you have to do is toss together 4 filling ingredients, pour it into your pastry-lined pie plate, dot with butter, and cover with the top pie crust.

Loaded with raspberries –

This pie is filled with 5 cups of fresh raspberries so it's the ultimate raspberry lover's dream.

Perfect for any occasion –

With its gorgeous crimson red filling, this pie is perfect for any occasion or gatherings like Valentine's (or Galentine's), Mother's Day, or a special brunch.

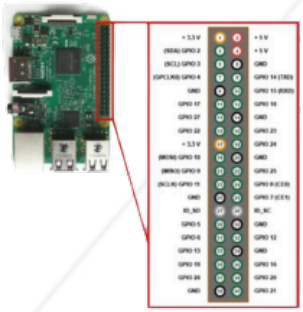
Expert tips:

Bake on the lower third of the oven – This helps the bottom bake evenly with the top crust.

Bake the pie on a cookie sheet – This prevents the filling from spilling and burning onto the bottom of your oven. It also helps brown and crisp up the bottom crust.

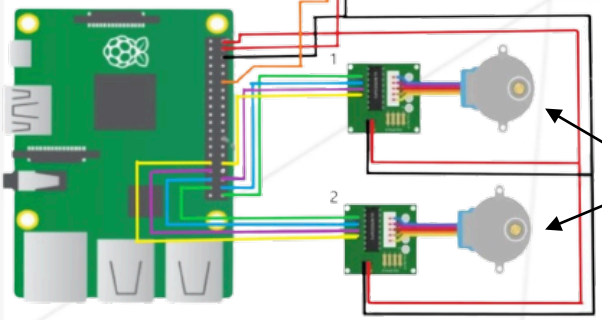
It's always been our dream!

Raspberry Pi

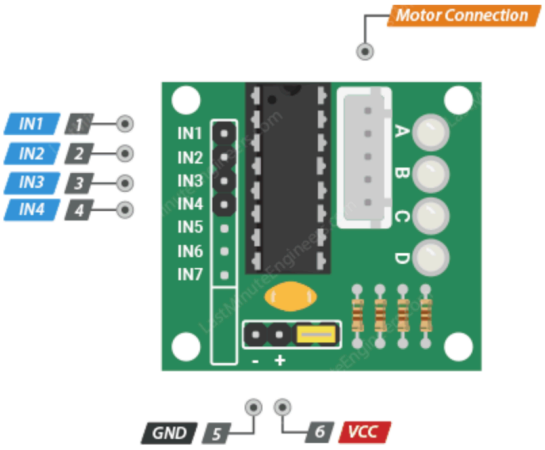


GPIO

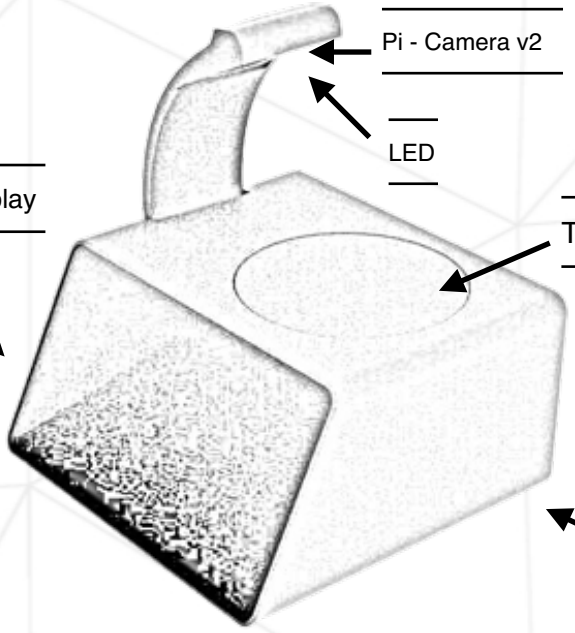
Neopixel LED 5V RGB LED Ring WS2812B



28BYJ-48 Stepper Motor



Stepper Motor Driver Module



Pi - Camera v2

LED

7-Inch Touchscreen Display

Turntable

3D printed Case

Chapter IV

Main subject

	Exercice : 00
Turn-in directory : *ex*00/	
Files to turn in : scanner.py	
Allowed functions : GPIO, time	
Remarks : only while-loops	

- Files to submit: scanner.py
- The class named Motor shall receive the number of steps and then rotate the turntable.
- Example:

```
GPIO.setmode(GPIO.BCM)
motor_pins = [26,19,13,6]      //pins are used to drive the motor.

Motor.turn(2450)
```

- The challenge is to rotate the turntable 360 degrees.
  Attention ! The motor has to rotate ~4.8 times to make a full rotation.

ssh pi@10.18.200.144

Main subject

	Exercice : 01
Turn-in directory : *ex*01/	
Files to turn in : scanner_rev.py	
Allowed functions : GPIO, time	
Remarks : only while-loops	

- Files to submit: scanner_rev.py
- The method „turn“ in the class named Motor should be able to handle negative values and change the direction of rotation.
- Example:

```
Motor.turn(-2450)    //the turntable should rotate in the opposite direction
```

Main subject

	Exercice : 02
Turn-in directory : *ex*02/	
Files to turn in : scanner_home.py	
Allowed functions : GPIO, time	
Remarks : only while-loops	

- Files to submit: scanner_home.py

- It's time to start counting!
- The command Motor.home() should rotate the turntable back to the starting position.

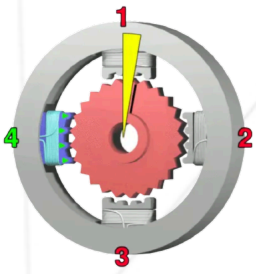
- Example:

```
Motor.turn(512)
Motor.home()
```

- Print the steps in the console

- The class named „Motor“ should now be able to handle everything.

- What are full steps and what are half steps?



Chapter IV

Bonus part

If you completed the main part, do not hesitate to go further by doing this extra one. It will bring bonus points if passed successfully.

	Exercice : 03
Turn-in directory : *ex*03/	
Files to turn in : scanner_input.py	
Allowed functions : GPIO, time	
Remarks : only while-loops	

- Files to submit: scanner_input.py
- Ask in the console how many degrees the turntable should rotate.
- Example:

```
var = input("Please enter something: ")
```

The bonus part will only be assessed if the mandatory part is PERFECT. Perfect means the mandatory part has been integrally done and works without malfunctioning. If you have not passed ALL the mandatory requirements, your bonus part will not be evaluated at all.