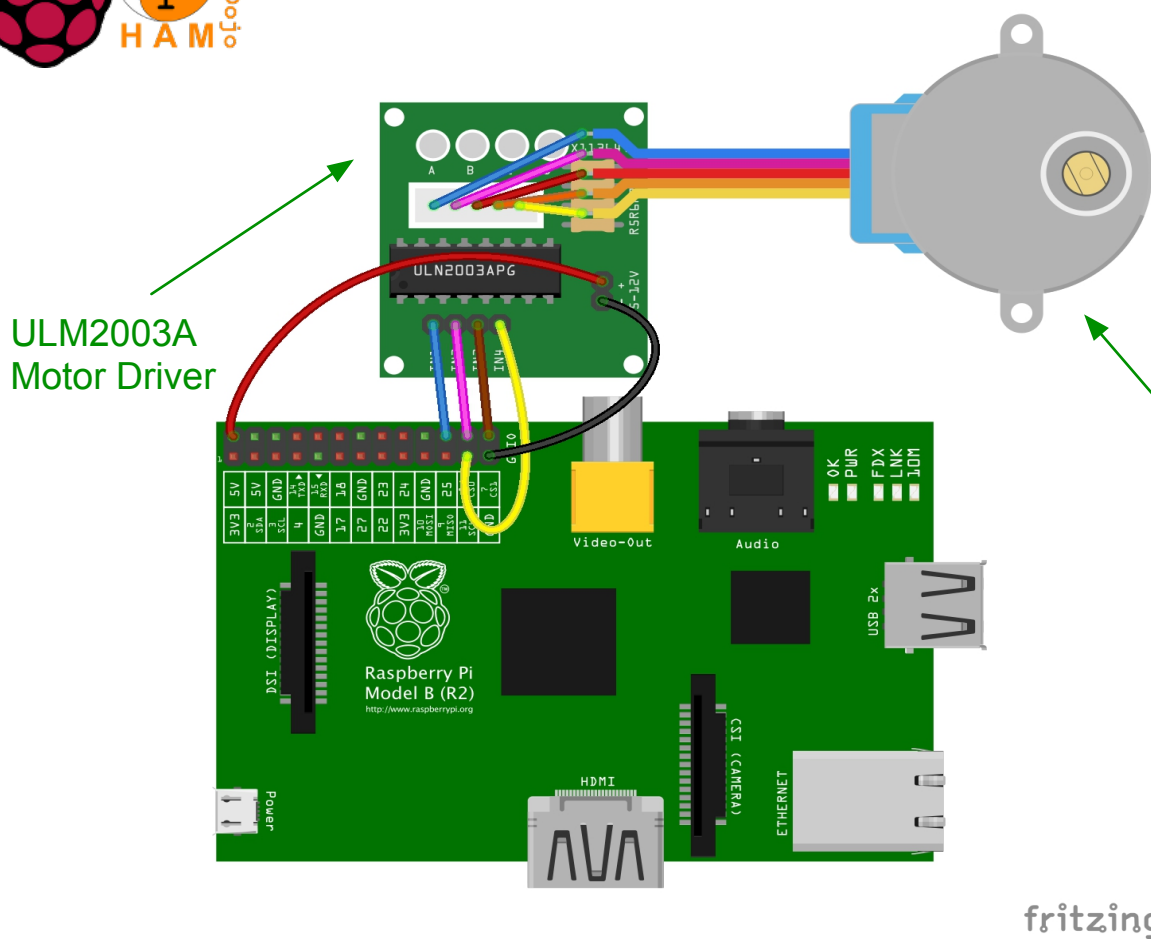
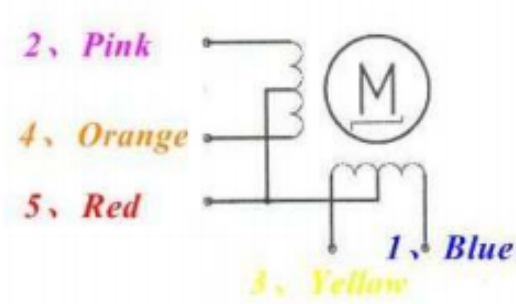
STEPPER MOTOR



Stepper motors are DC motors that move in steps. They have multiple coils that are organised in groups called "phases". By energising each phase in sequence, the motor will rotate, one step at a time.



We use a driver board which we can control from the Pi. This way we can reverse the current and turn the motor in both directions.

```
# Import required libraries
import time
from gpiozero import OutputDevice as stepper

IN1 = stepper(25)
IN2 = stepper(8)
IN3 = stepper(7)
IN4 = stepper(11)
StepPins = [IN1,IN2,IN3,IN4]

# Define sequence
# as shown in manufacturers datasheet
Seq = [[1,0,0,1],
       [1,0,0,0],
       [1,1,0,0],
       [0,1,0,0],
       [0,1,1,0],
       [0,0,1,0],
       [0,0,1,1],
       [0,0,0,1]]

StepCount = len(Seq)
StepDir = 1
WaitTime = 0.01
StepCounter = 0

while True:

  print(StepCounter)
  print(Seq[StepCounter])
  for pin in range(0, 4):
    xpin = StepPins[pin]
    if Seq[StepCounter][pin]!=0:
      xpin.on()
    else:
      xpin.off()

  StepCounter += StepDir

  # If we reach the end of the sequence
  # start again
  if (StepCounter>=StepCount):
    StepCounter = 0
  if (StepCounter<0):
    StepCounter = StepCount+StepDir

  # Wait before moving on
  time.sleep(WaitTime)
```

Make sure you don't get the variables '**StepCount**' and '**StepCounter**' muddled!

How can you make the motor turn the opposite way?

Can you make the motor turn faster?

How many steps will return the motor to its starting position?