

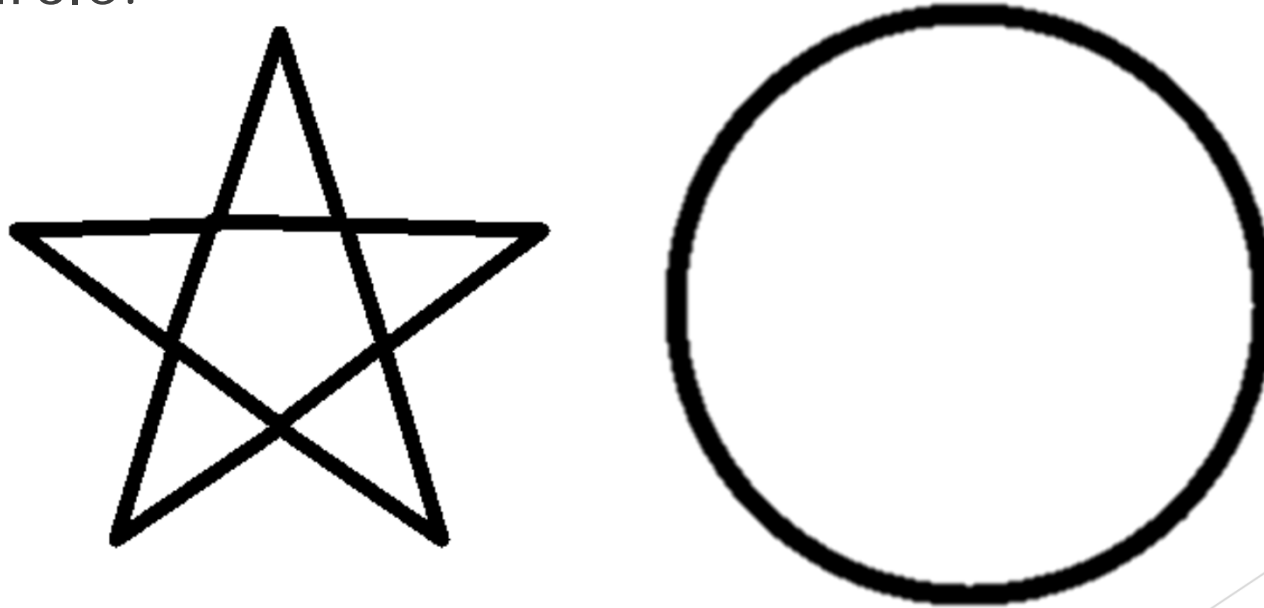


# The Picture Drawing Robot

A Microcontroller project  
By Garrett Hoch and Sarah Holmes

# Robot Objective

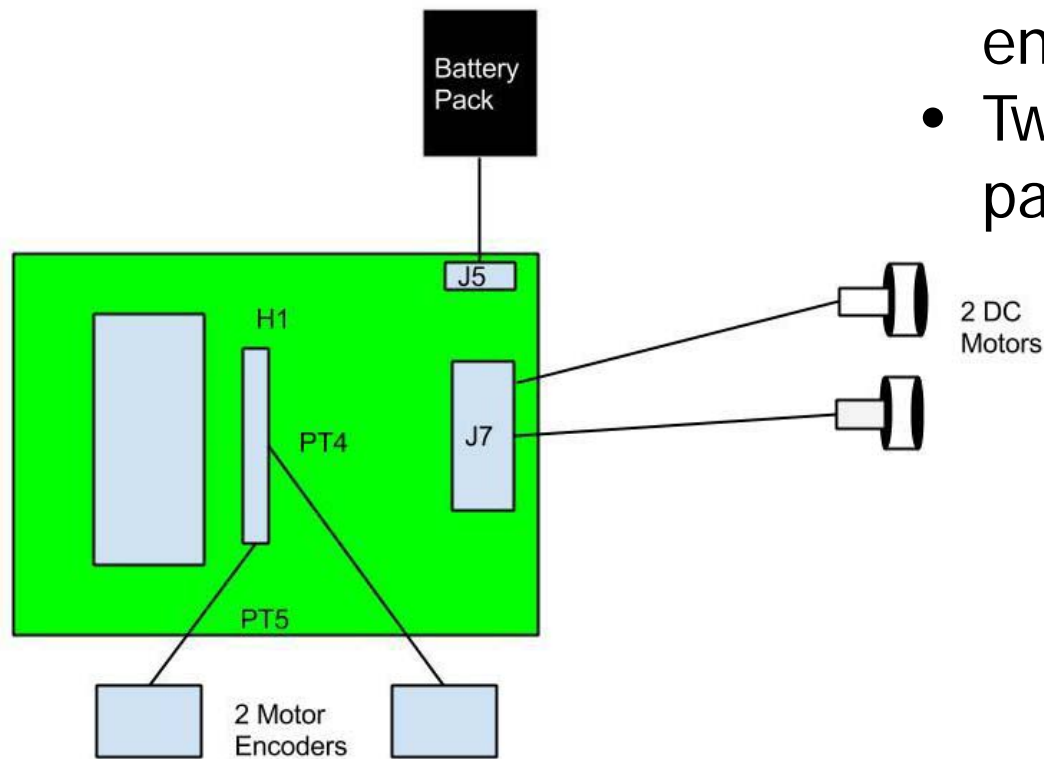
To move around to create two different figures. We will have the robot draw the star first then move backwards to draw the circle.



# Approach

- Use two DC Encoders to measure the distance the robot travels.
- Relate the circumference of the wheels to the encoder outputs.
- Create the robot to run autonomously

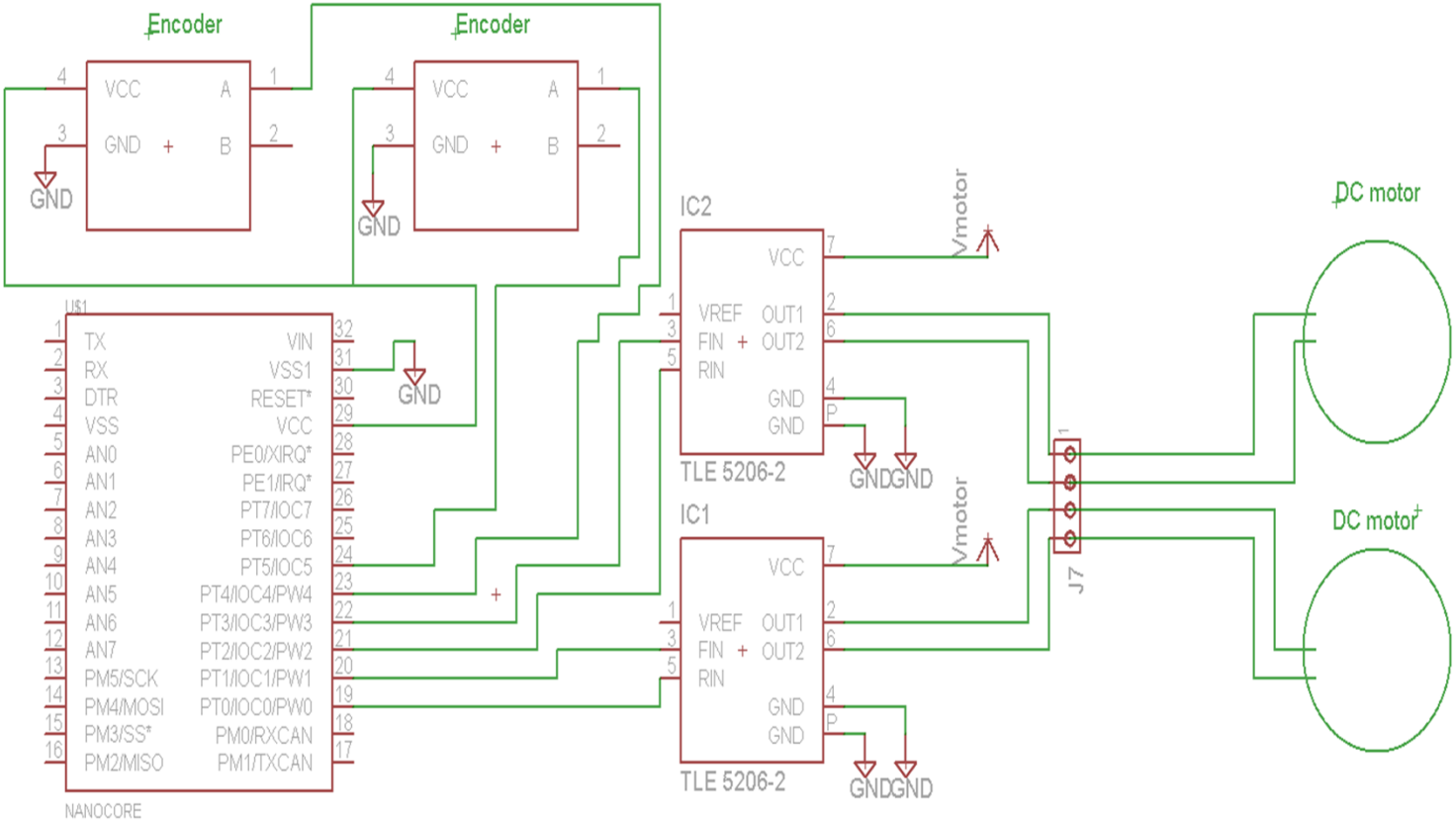
# Hardware Schematic



## External Hardware

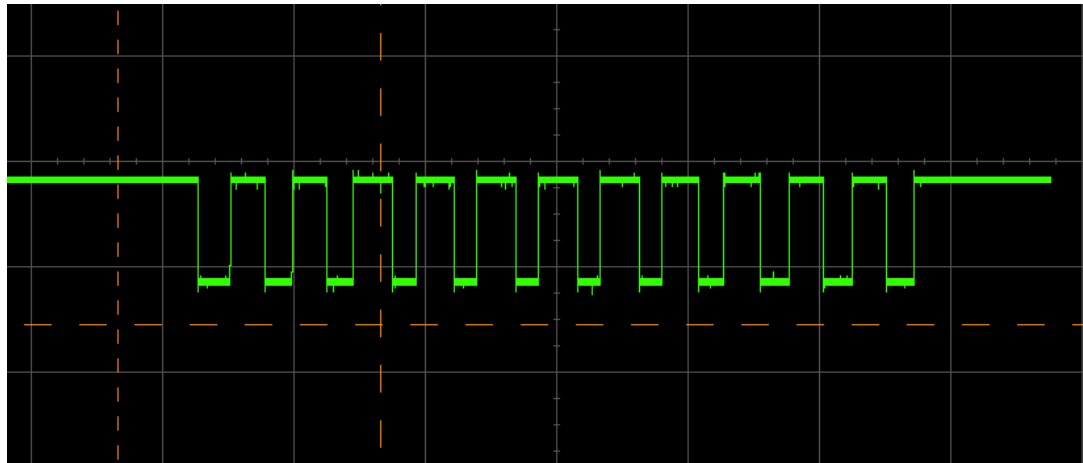
- DC motor and encoders
- Two 5V battery packs

# Pin Connections



# Encoder Output

- ▶ There are two encoders per wheel but for our purposes we are using only one on each wheel.
- ▶ Each wheel has 12 teeth.



# Wheels and H-Bridge Circuit

- ▶ The wheels have a circumference of 5.18" which is .43" per encoder signal.
- ▶ The H-Bridge requires a voltage of 5.3V to operate thus two batteries will be needed to meet that requirement.



# Pseudocode

Main

```
intialize PTT for 4 ouputs and 2 inputs
initialize Input capture for PT4 and PT5
enable interrupts

while linecount is less than 5 {
    while edgecount is less than distance {
        move both wheels forward
    }
    Stop right wheel rotate left wheel 324 degrees
    increment line count
}
while edgecount is less than distance {
    rotate left wheel quicker then right
    rotate right wheel slower then left
}
```



# Pseudocode Cont'd

```
ISR      Input capture {
        increment edgecount
        clear flag
        }

Function leftwheel{
        turn PT1 to 1
        delay for duty1
        turn PT1 to 0
        delay for period - duty1
        }

Function rightwheel{
        turn PT2 to 1
        delay for dutAy2
        turn PT2 to 0
        delay for period - duty2
        }
```

# Summary

## Challenge:

Create a robot to complete a predetermined pattern

## Result:

- ▶ The HCS912 microcontroller was the interface for 2 DC motors/encoders.
- ▶ The encoders track the distance traveled by the wheels
- ▶ The robot runs autonomously

# Questions?

