Advanced Project Tips

- Encoder
- Shorten the track
- Store and print out variables

Encoder Concept

- Counts wheel revolutions
- 360 pulses / wheel revolution
- Wheel diameter: 7 cm
- Count increases either direction

Why Encoder?

- You can create an odometer
  - Slow the car down for difficult sections
  - Speed the car up for easy sections
- 180° donut independent of speed
- Closed-loop control of speed
- Use switch to bypass encoder code

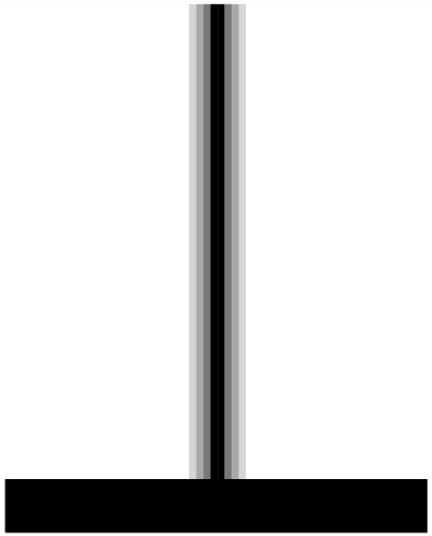
Encoder Code

```
int average()  //average pulse count
{
  int getL=getEncoderCount_left();
  int getR=getEncoderCount_right();
//  Serial.print(getL);Serial.print("\t");Serial.println(getR);
  return ((getEncoderCount_left() + getEncoderCount_right())/2);
}
```

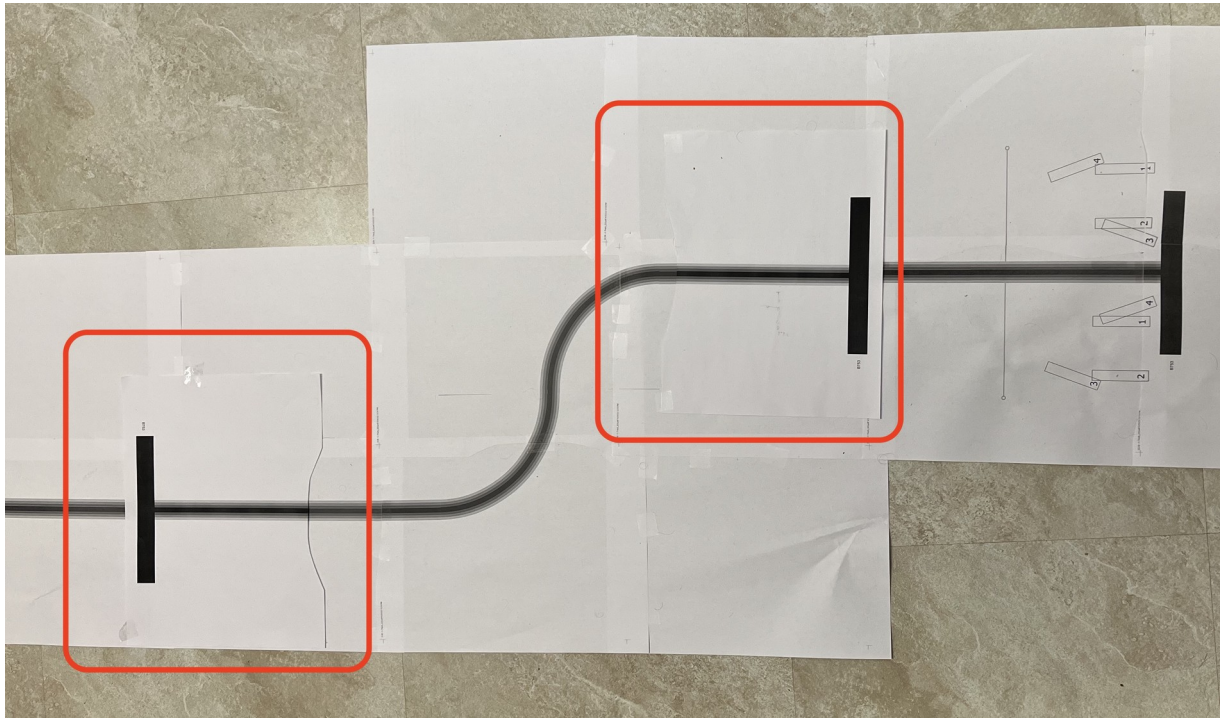
```
14
15 #include <ECE3.h>
16 #include <stdio.h>
17
18 const int left_nslp_pin=31;
19 const int right_nslp_pin=11;
20 const int left_dir_pin=29;
21 const int right_dir_pin=30;
22 const int left_pwm_pin=40;
23 const int right_pwm_pin=39;
24
25 const int LED_RF = 41;
26 int wheelSpd = 80;
27 int distance = 800;
28
29
30 ////////////////////////////
31 void setup() {
32 // put your setup code here,
33
34   ECE3_Init();
35
```

```
31 void setup() {
32 // put your setup code here, to run once:
33
34   ECE3_Init();
35
36   pinMode(left_nslp_pin,OUTPUT);
37   pinMode(left_dir_pin,OUTPUT);
38   pinMode(left_pwm_pin,OUTPUT);
39   pinMode(right_nslp_pin,OUTPUT);
40   pinMode(right_dir_pin,OUTPUT);
41   pinMode(right_pwm_pin,OUTPUT);
42
43   pinMode(LED_RF, OUTPUT);
44
45   digitalWrite(left_nslp_pin,HIGH);
46   digitalWrite(right_nslp_pin,HIGH);
47 //   digitalWrite(left_nslp_pin,LOW);
48 //   digitalWrite(right_nslp_pin,LOW);
49
50 // set the data rate in bits/second for serial data
51   Serial.begin(9600);
52
53   resetEncoderCount_left();
54   resetEncoderCount_right();
55
56   delay(2000); //Wait 2 seconds before starting
```

Shorten the Track

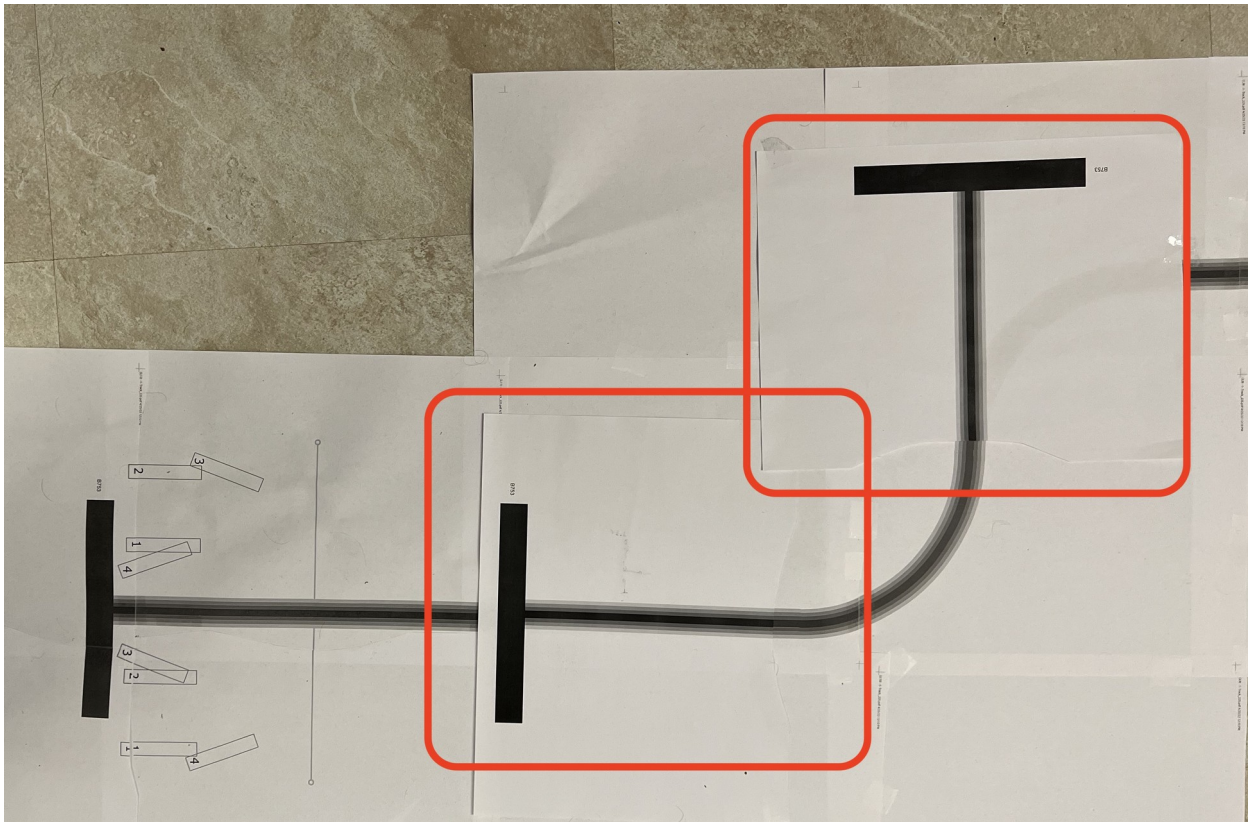


Use two
of these ...



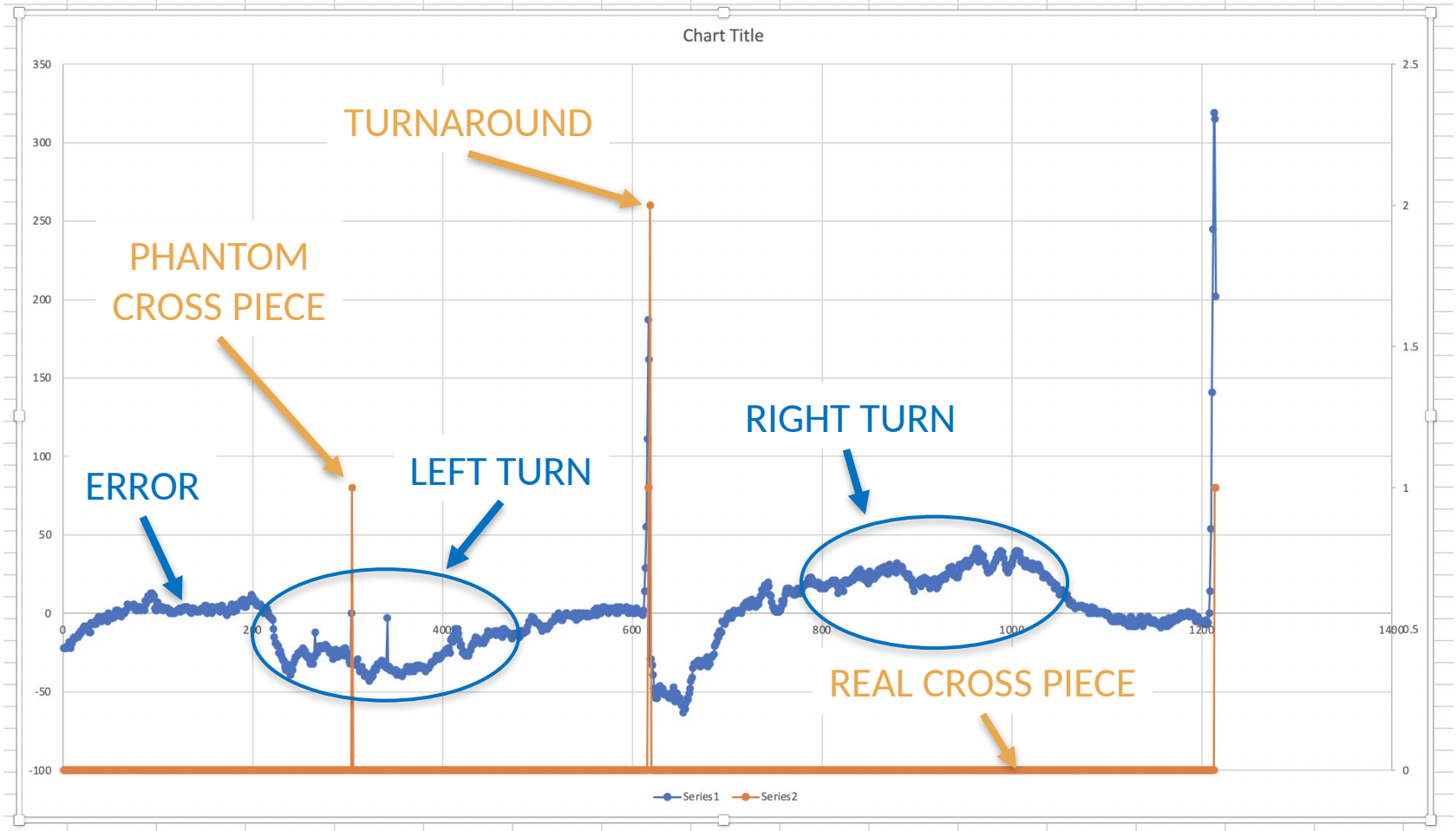
... to do this.

Shorten the Track



... or this.

Store and Print Out Variables



Store and Print Out Variables

```
Variable_Store[loopCount][0] = ErrFun;
Variable_Store[loopCount][1] = realCrossPiece;
if(loopCount < 1500) loopCount++;
```

```
void StopMotors()
{
  analogWrite(left_pwm_pin,0);
  analogWrite(right_pwm_pin,0);
  digitalWrite(LED_RF,HIGH);  // turn on yellow right front LED
  while(true) {
    if(!digitalRead(PUSH1)) {
      digitalWrite(LED_RR,HIGH);
      for(int i = 0; i < 1500; i++) {
        for(int k=0; k<numVarsToPrint-1; k++){
          Serial.print(Variable_Store[i][k]);Serial.print('\t');
        } // end of for k loop
        Serial.println(Variable_Store[i][numVarsToPrint-1]);
      } // end of for i loop
    } // end of if(!digitalRead(PUSH1))
  } // end of while(true)
} // end of void StopMotors()
```

FINIS