Main

```
//Function    Direction   Speed (PWM)
//Motor 1     D 4         D 5
//Motor 2     D 7         D 6

//Motor 1
int directionL = 4;      //Pin controlling Left motor direction
int speedL = 5;          //Pin controlling Left motor speed
//Motor 2
int directionR = 7;      //Pin controlling Right motor direction
int speedR = 6;          //Pin controlling Right motor speed

void setup() {
  //Left Motor setup
  pinMode(directionL, OUTPUT);
  pinMode(speedL, OUTPUT);

  //Right Motor setup
  pinMode(directionR, OUTPUT);
  pinMode(speedR, OUTPUT);

  //Turns motor pins off until needed
  digitalWrite(speedL, LOW);
  digitalWrite(speedR, LOW);
}

void loop() {
          //run test() functions
//  test1();
//  test2();
//  test3();
  delay(3000);
}
```

Helpers

```
/***
 * This creates an easy way to set the speed of both motors
 * We assign the name 's' to be our integer input speed for the function
 * Instead of digitalWrite(), we'll use analogWrite()
 * digitalWrite() can only assign pins to two states: HIGH or LOW
 * analogWrite() can give pins a range of values, from 0-255 or 0-1023
 * In our case, the range of speed spans from 0 to 255
 */
void setspeed(int s){
analogWrite(speedL, s);          //Set the speed for the Left motor to 's'
analogWrite(speedR, s);          //Set the speed for the Right motor to 's'
}

/***
 * This allows us to easily control the brakes of both motors
 * Here we set the pin controlling speed to LOW, which means the pin is currently off
 * Since it receives no power, the motors won't rotate
 */
void brakeON(){
   // Setting the speed pin to be LOW
   // In LOW, it receives 0V, and so can't move
   digitalWrite(speedL, LOW);
   digitalWrite(speedR, LOW);
}

/***
 * This allows us to easily control the brakes of both motors
 * Here we set the pin controlling speed to HIGH
 * Which means it's able to receive power and rotate at the given speed
 */
void brakeOFF(){
   // Setting the speed pin to be HIGH
   // In HIGH, it receives +5V, and so can move
   digitalWrite(speedL, HIGH);
   digitalWrite(speedR, HIGH);
}

/***
 * This synchronizes the motors to turn in the same direction
 * The direction pin uses HIGH or LOW to represent the direction in which the motors will spin
 * In our case, LOW means forward
 */
void forward(){
  brakeOFF();
  digitalWrite(directionL, LOW);
  digitalWrite(directionR, LOW);
  setspeed(100);
}
```

```
/***
 * This synchronizes the motors to turn in the same direction
 * The direction pin uses HIGH or LOW to represent
 * the direction in which the motors will spin
 * In our case, HIGH means backward
 */
void backward(){
  brakeOFF();
  digitalWrite(directionL, HIGH);
  digitalWrite(directionR, HIGH);
  setspeed(100);
}

/***
 * This tells the motors to turn in opposite directions
 * This rotates the robot
 * In our case, rotating right involves
 * directionL = LOW and directionR = HIGH
 */
void rotateRight(){
  brakeOFF();
  digitalWrite(directionL, LOW);
  digitalWrite(directionR, HIGH);
  setspeed(100);
}

/***
 * This tells the motors to turn in opposite directions
 * This rotates the robot
 * In our case, rotating left involves
 * directionL = HIGH and directionR = LOW
 */
void rotateLeft(){
  brakeOFF();
  digitalWrite(directionL, HIGH);
  digitalWrite(directionR, LOW);
  setspeed(100);
}
```

Tests

```
void test1(){
  // Setting the speed pin to be HIGH
  // In HIGH, the speed pin receives +5V, and is able can move
  digitalWrite(speedL, HIGH);
  digitalWrite(speedR, HIGH);

  //Synchronizes rotation direction of both motors
  //Rotating in the same direction drives in that direction
  //Rotating in opposite directions makes it rotate
  digitalWrite(directionL, LOW);
  digitalWrite(directionR, LOW);

  analogWrite(speedL, 100);          //Set the speed for the Left motor to 's'
  analogWrite(speedR, 100);          //Set the speed for the Right motor to 's'

  //Freezes the states of pins for the amount of time
  //Using delay here allows the robot to drive for 2.5 seconds before exiting the loop
  delay(2500);

  //Setting the speed pin to be LOW. In LOW, the speed pin receives 0V
  //We take advantage of that feature by using it as our way to 'brake' the motors
  digitalWrite(speedL, LOW);
  digitalWrite(speedR, LOW);
}

void test2(){
  forward();                    //Does the same exact set of instructions as test1
  delay(2500);
}

void test3(){
  forward();
  delay(2000);

  brakeON();
  delay(1000);

  backward();
  delay(2000);

  rotateRight();
  delay(2000);

  rotateLeft();
  delay(2000);

  brakeON();
}
```

Tabs

```
/***
 * Tabs are convenient for organizing related functions
 * The main tab is the tab with the name of the sketch
 * In this case, twoMotorIntro is the main tab
 *
 * Only one thing to remember about tabs
 * The side tabs use somewhat independent
 * Variables used in the main tab must be declared inside the main tab
 * Variables from the main tab can be used in side tabs
 * BUT variables declared in side tabs exists only in that side tab
 * Variables used in the main tab
 *
 * If I declared a variable in this side tab,
 * it would be a 'local' variable because it can
 * only be used locally, in this tab
 *
 * If I declared a variable in the main tab,
 * it would be a 'global' variable because it can
 * be used by any other tabs or functions
 */
```