

Remote-Controlled Robot



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DECEMBER 2, 2013

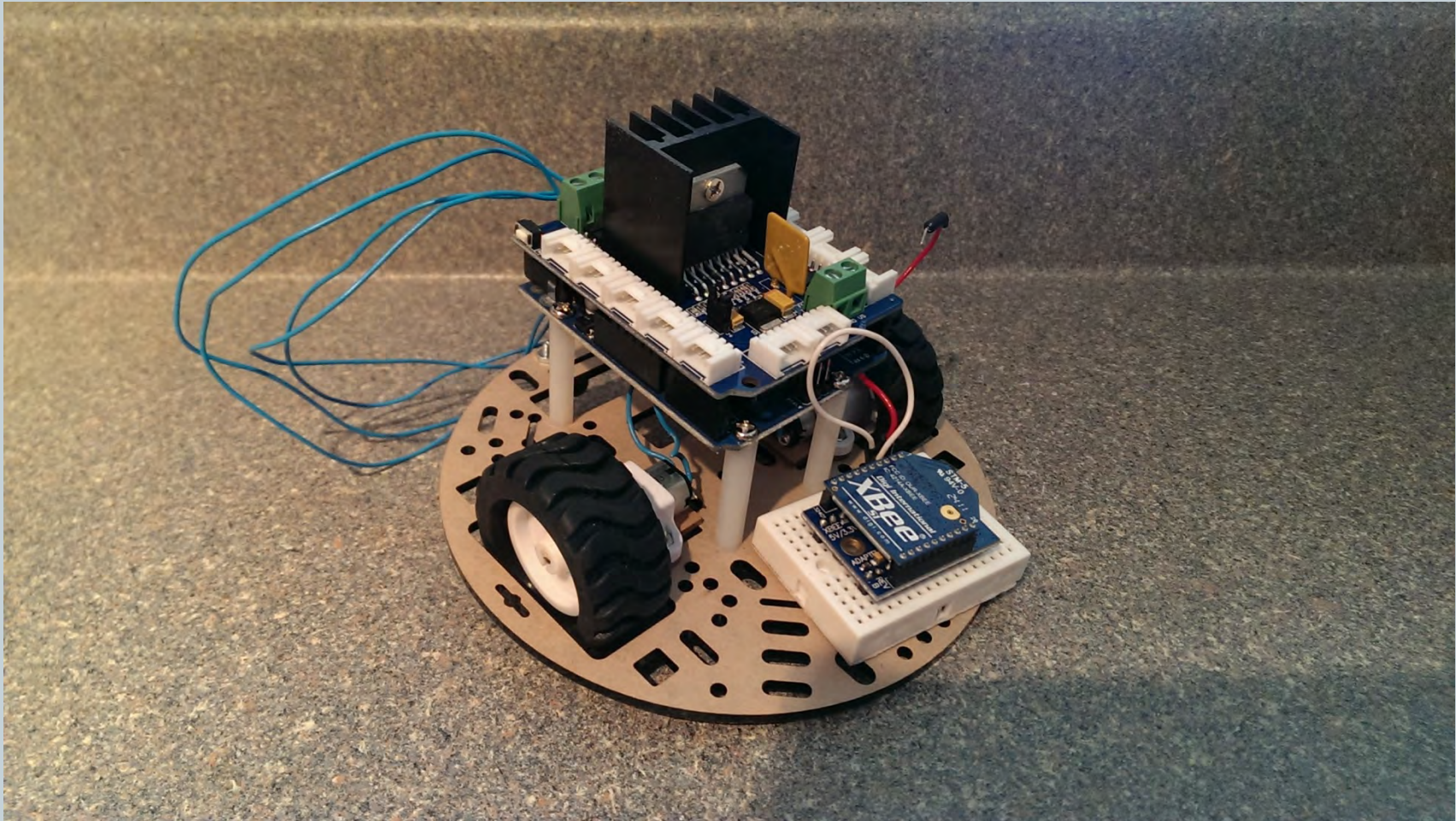
EENG 383

Hardware

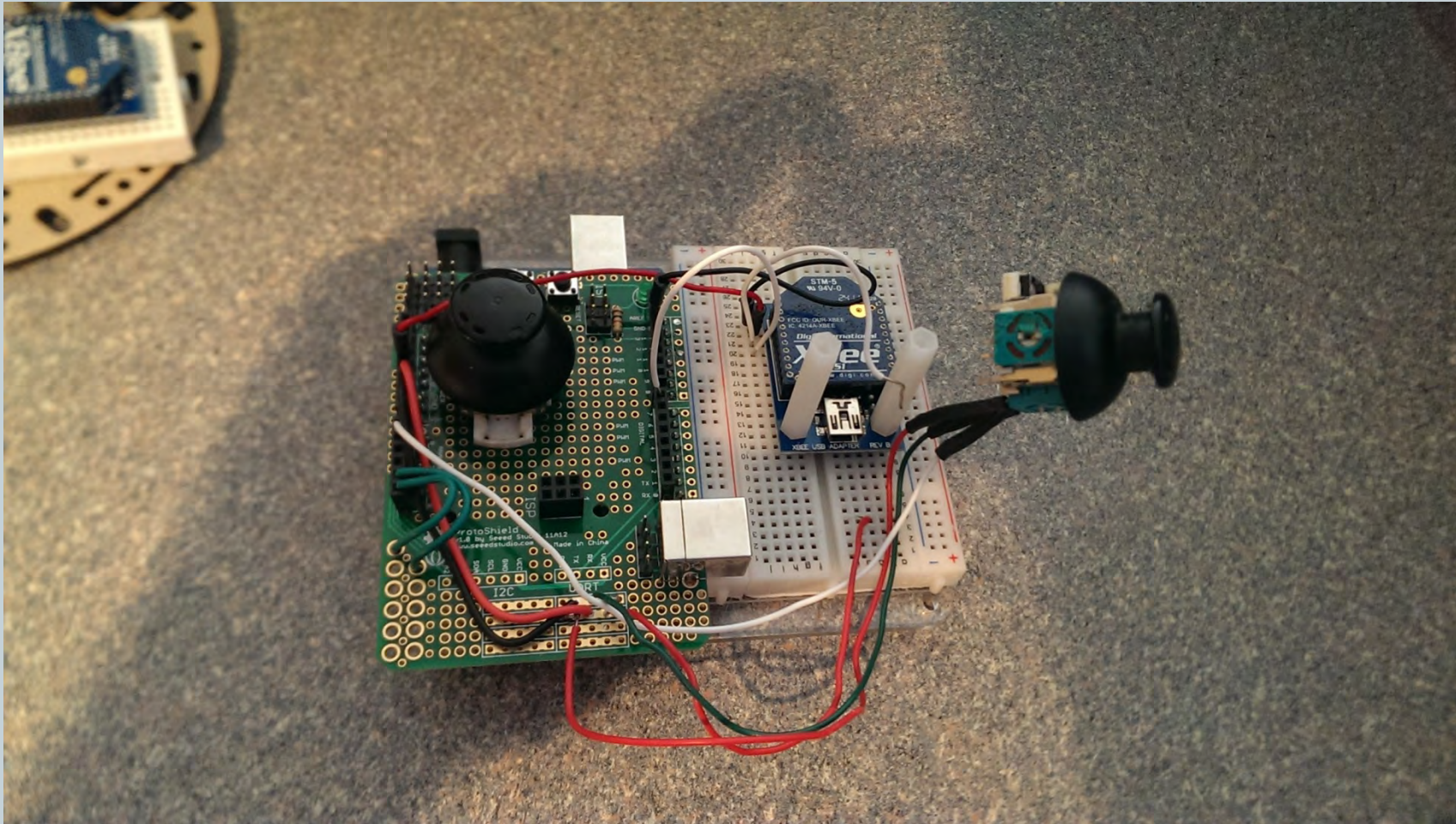


- Robot Chassis kit
- 2 5V DC motors (Wheels)
- 2 Control sticks
- 9V Battery (Controller)
- 12V (8 AA) Battery pack (Robot)
- Arduino (Uno, Xbee shields, Motor Shield)

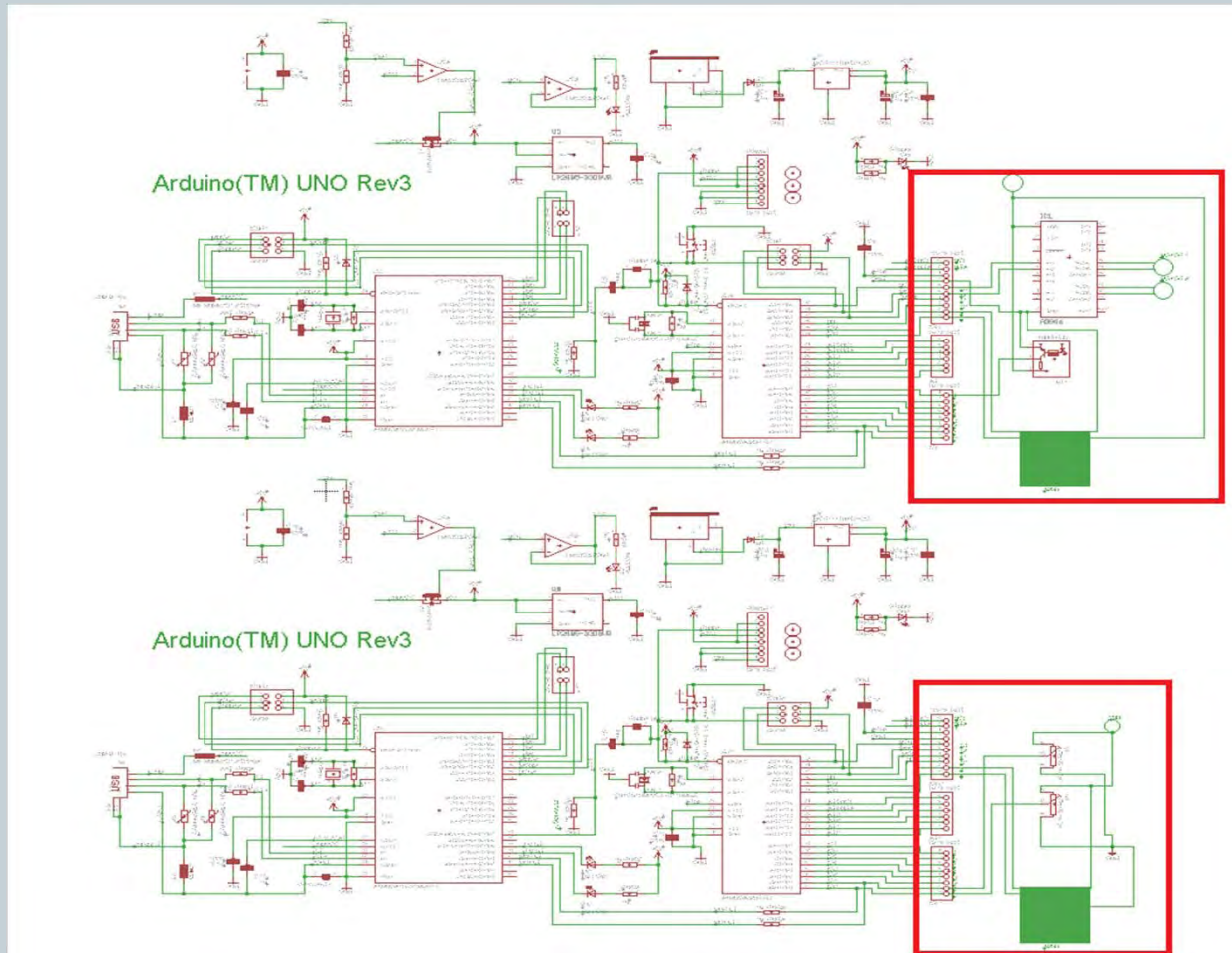
Robot



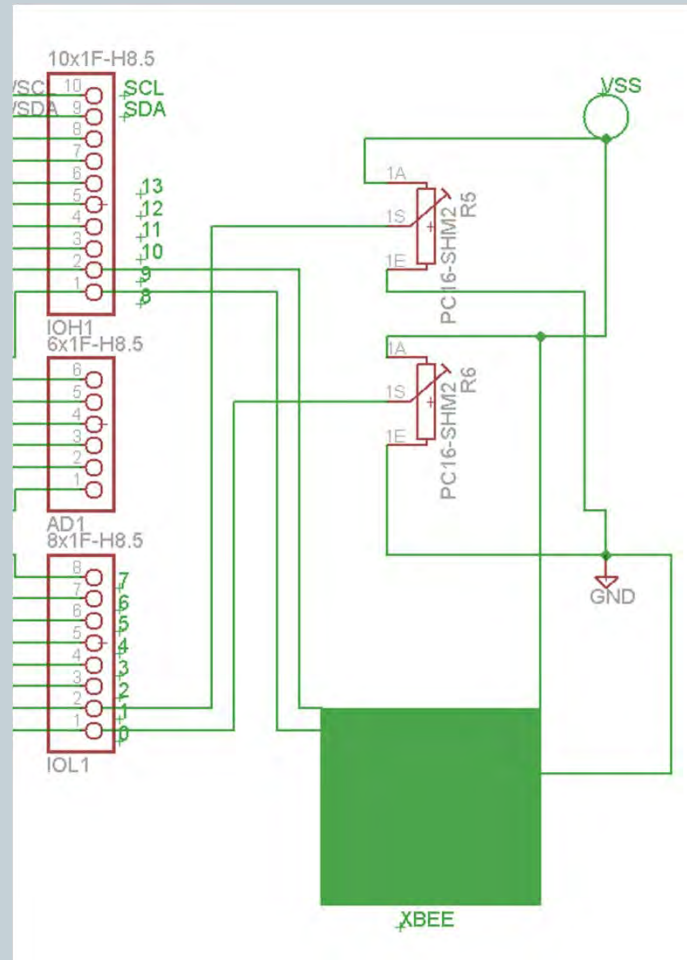
Controller



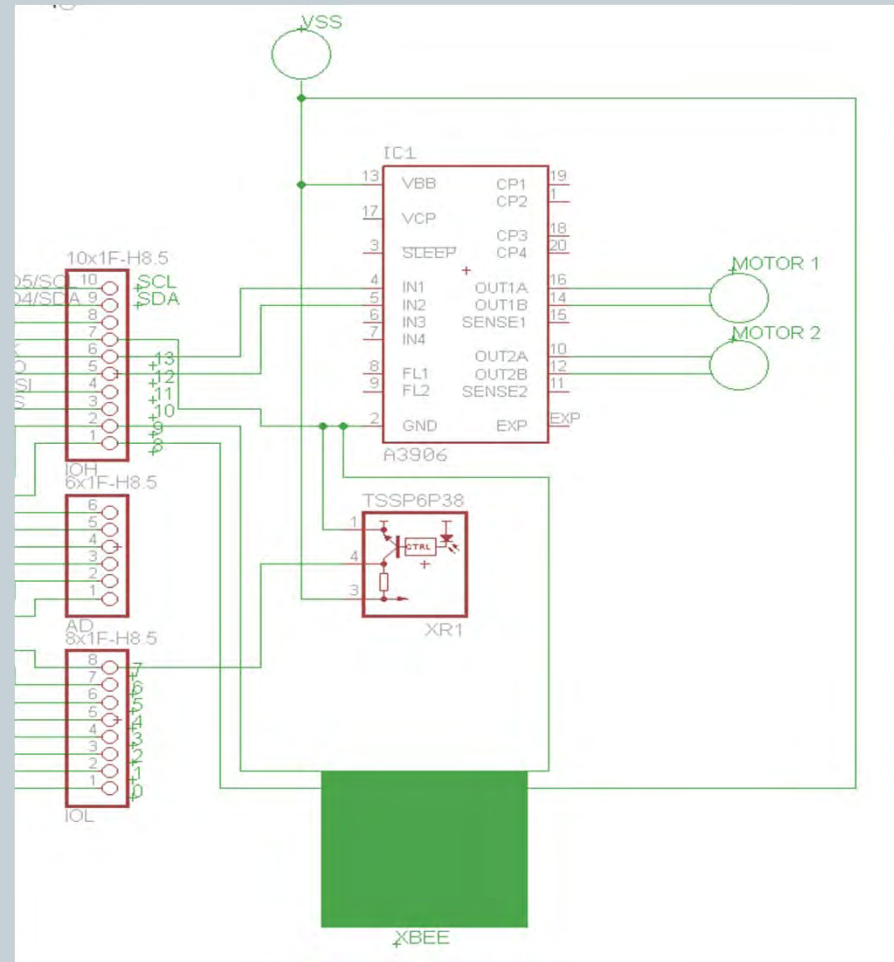
Wiring Diagram



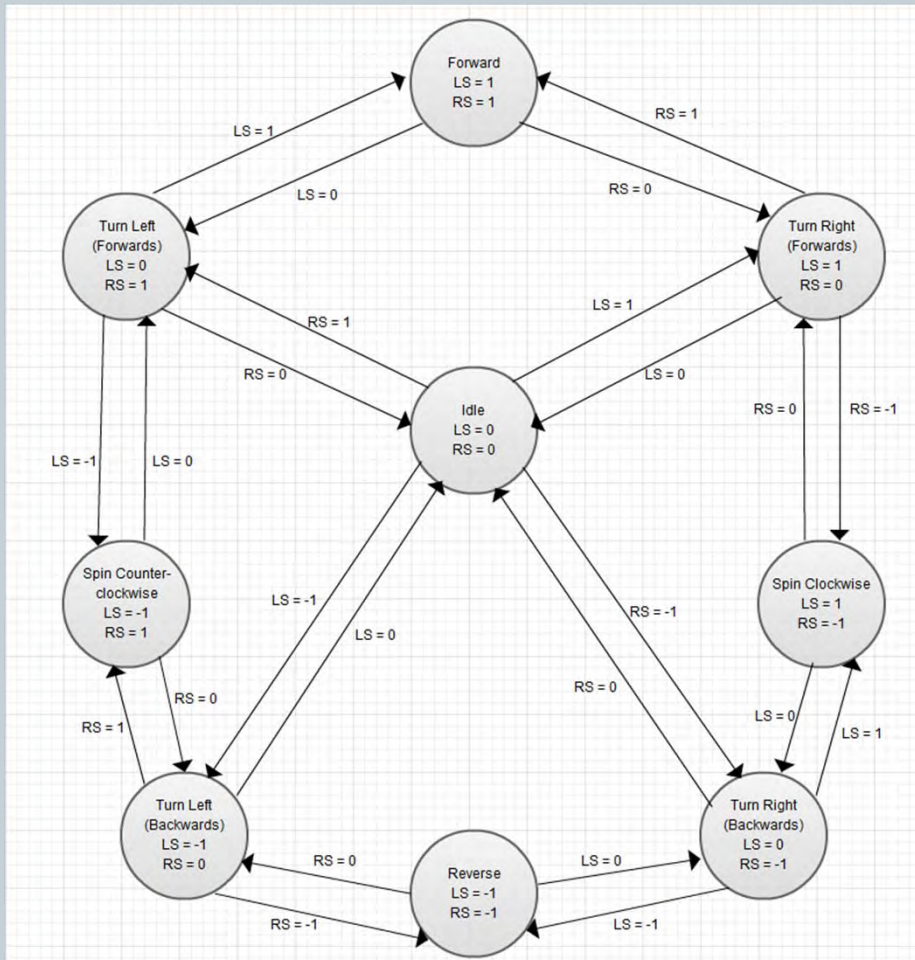
Controller Wiring Diagram



Robot Wiring Diagram

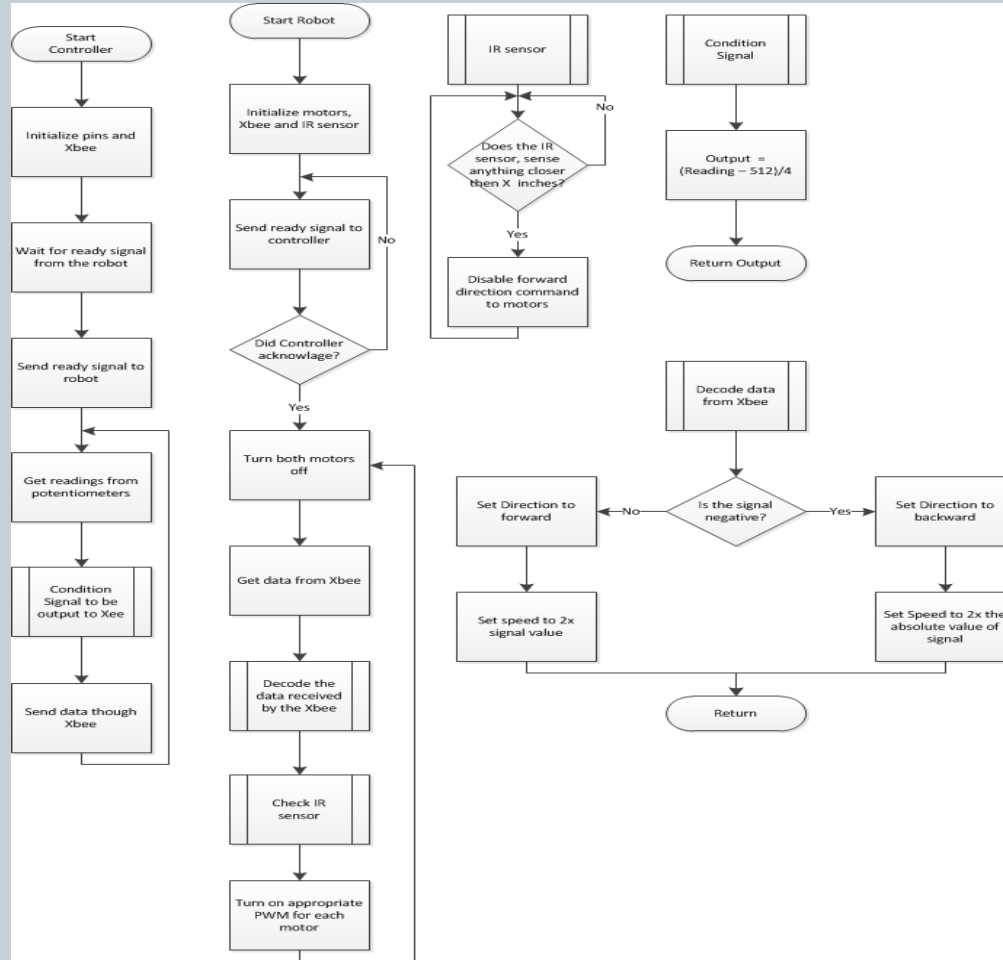


State Diagram

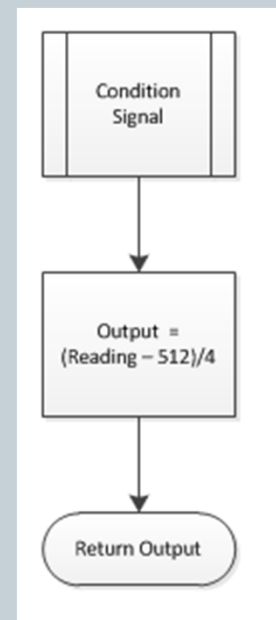
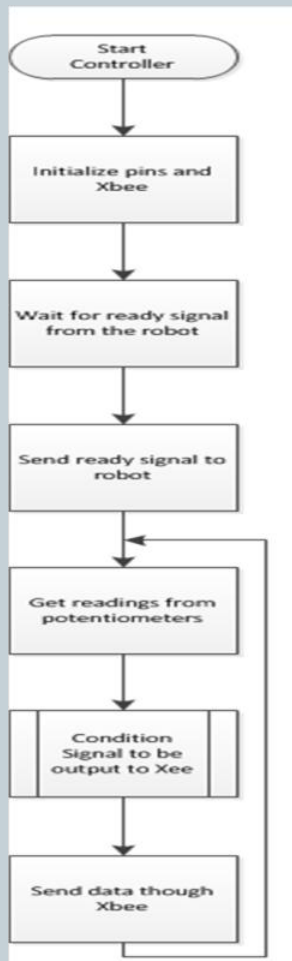


LS – Left Stick
RS – Right Stick
1 – Stick Forwards
0 – Stick Neutral
-1 – Stick Backwards

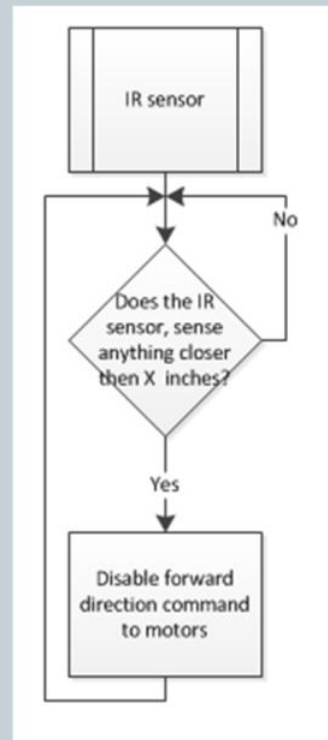
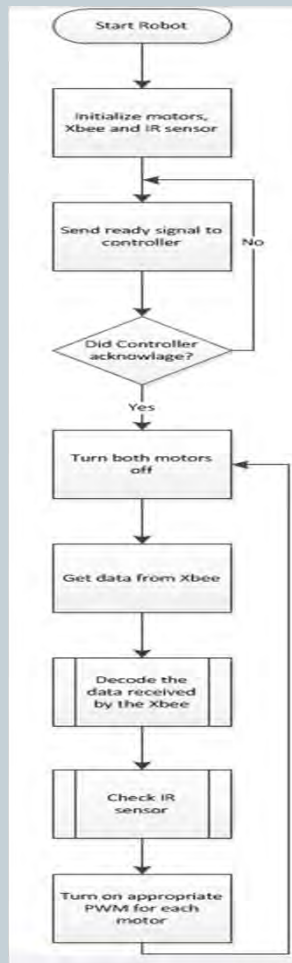
Flowchart



Controller Flowchart



Robot Flowchart



Code - Synchronization Protocol



```
void setup()
{
  Serial.begin(9600);
  Xbee.begin(9600);
  delay(500);
  char Ready = 0;
  while(!(Ready == 6)) //wait for other xbee to send a 6
  {
    if(Xbee.available())
    {
      Ready = Xbee.read();
    }
  }
  Xbee.print(6);
  delay(500);
  Xbee.print(count);
}
```


Code - Main Loop



```
void loop()
{
  LSvalue = analogRead(LS);
  outgoing = condition(LSvalue);
  if((count % 2) == 0) //send value if loop is on an even cycle
  {
    Xbee.print(outgoing);
  }
  RSvalue = analogRead(RS);
  outgoing = condition(RSvalue);
  if((count % 2) == 1) // send value if loop is on an odd cycle
  {
    Xbee.print(outgoing);
  }
  if(Xbee.available()) // serial monitor
  {
    char incoming = Xbee.read();
    Serial.println(incoming, DEC);
  }
  delay(50);
  ++count;
}
```

Problems Encountered



- Learning how to get the XBees to talk to each other
- Creating a protocol to synchronize the two systems
- Finding usable documentation for the motor controller

Possible Additions



- Store stick inputs in an array
- Recall inputs from the array

- Modify the array

Conclusions



- **Controller and Robot using Arduino**
- **IR collision prevention**
- **Wireless communication through Xbee shields**