# Urban-Octo-Robot

# Introduction

- Why the name “Urban-Octo-Robot”
  - Urban-Octo-Robot is the name github suggested
- Project Goal
  - Create an inexpensive robot for prorammer training
  - Students program a First Robotics framework
  - But the robot runs on actual hardware
  - The actual robot isn’t intimidating

# Robot Hardware

- Robot Hardware
  - $5 ESP8266 micro-controller (this is an IOT device)
  - $12 Motor Controller & Wheels
  - $6 Encoders
  - $5 Maybe some Sensors
  - $15 USB Battery Pack
  - <$5 3D Printed Body
  - It looks under $50, with parts from Amazon

# Coding & Communication

- Two pieces of hardware
  - A Windows Laptop & the Robot
  - Hardware will communicate through wifi
    - Either the robot can create a WIFI hotspot, or
    - It can connnect to an existing WIFI hotspot
  - TODO – get a better idea of the latency we can expect

# Windows Hardware

- Windows Laptop
  - Runs the standard First Robotics Java environment
  - Students run their code in FRC Emulation Mode
  - Robot “device driver” Java libraries will be created
    - These will emulated the interfaces students would typically use when programming a robot
  - The libraries will talk to the robot via TCP/IP
    - Example:  The library might send the text “motora=50” to the robot to set the robot’s “A” motor to 50% power

# Robot Hardware

- Robot Firmware will act on commands
  - The Robot's "brain" is an ESP8266 board
  - These boards are programmed like Arduinos
  - Link to the prototyping repository
    - Note - prototype adapted from another project
    - i.e., I think the C++ code is decent quality, but there are some consistency things that I'd want to clean up.

# Where are things right now

- The basic Firmware skeleton is done
  - Co-operative multi-tasking “Action” engine done
  - Network IO layers done
  - Non-blocking (hopefully) command processor
- Can set speed on a single motor via TCP/IP

# What needs to be done

- Robot has to be CADed & Printed
- Proof of concept for encoders
- Proof of concept Java Library
- Design & FAB a circuit board for the IOT device
- Tutorials (i.e., sample First Robotics project)

# These parts look pretty cheap...

- This is a “proof of concept” prototype
- If it accomplishes its goals, it’s good enough
- If it needs better quality parts...
  - We can burn that bridge when we come to it.