CubeSat Flight Software Workshop

Lab Project

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Lab Project – Raspberry Pi Robot Arm

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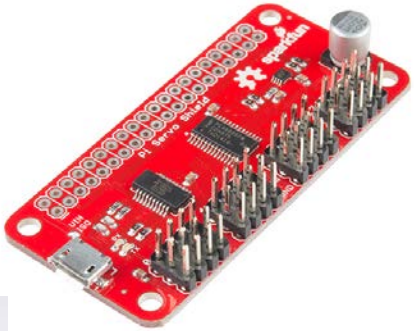
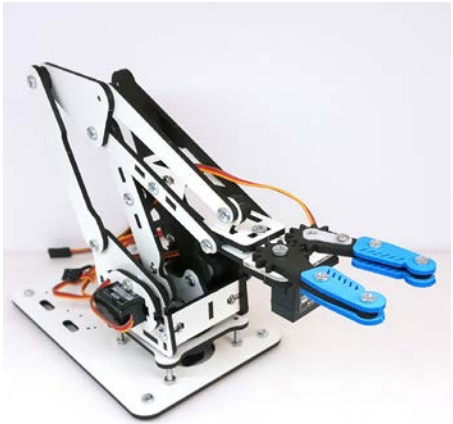
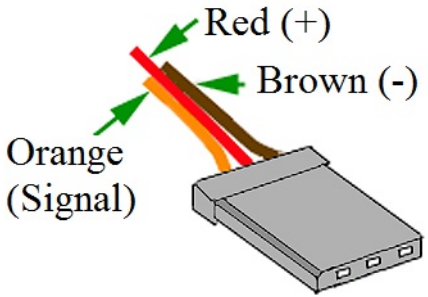




Hardware Description

- Robotic Arm
  - 4 servos
    - Yaw
    - Arm extension
    - Claw angle
    - Claw open/close
  - Assembly: https://microbotlabs.com/armuno-2.0-desktop-robotic-arm-kit.html
- Raspberry Pi
  - Target for F' application
- Sparkfun Pi servo hat:
  - https://www.sparkfun.com/products/14328



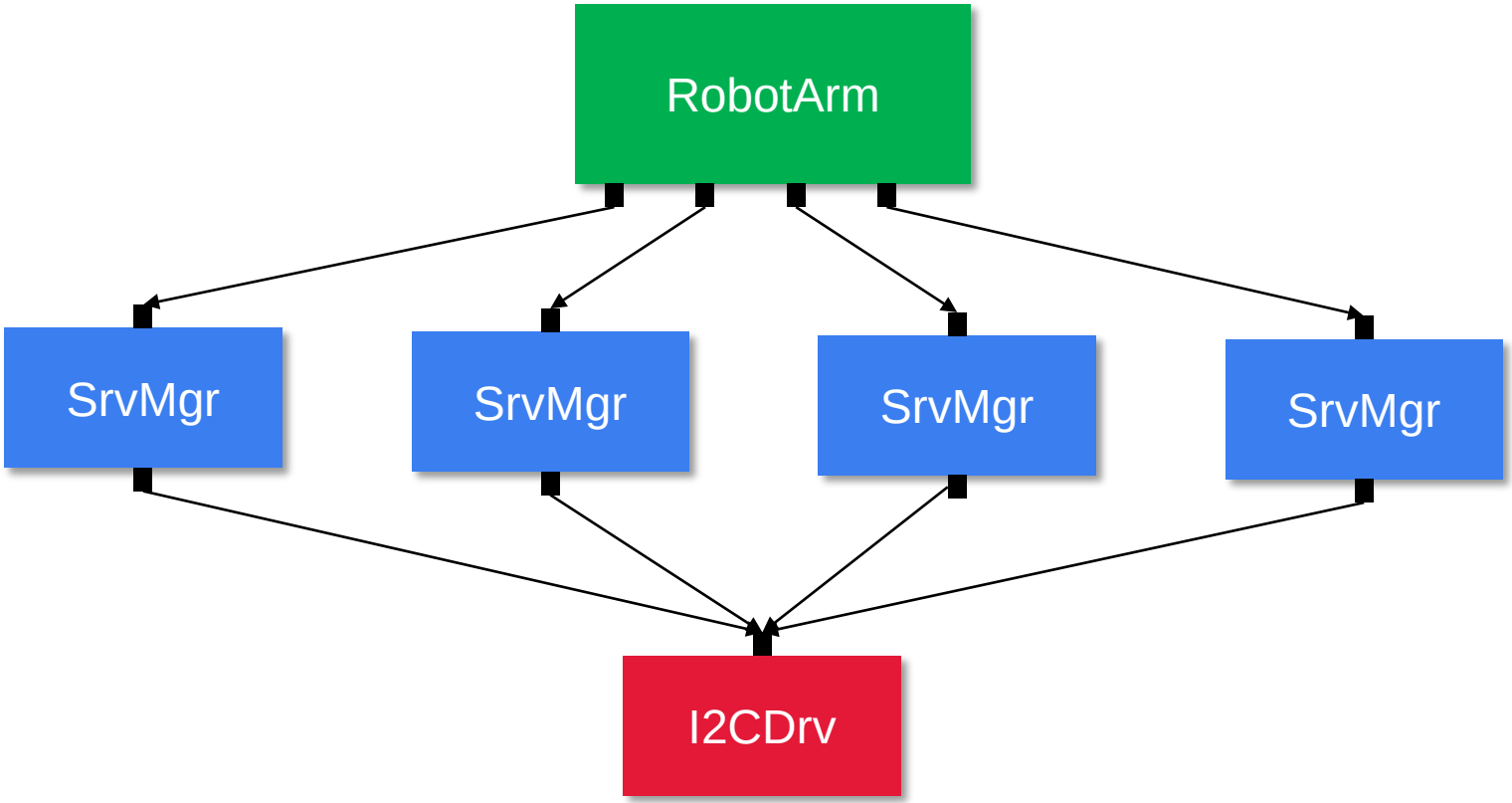
Lab Project - Objectives

- Follow the flight software processes and design a software application
- Come up with requirements for your task
- Decompose the system into the software layers from system engineering layers
  - Drivers, managers, applications and their interfaces
- Implement the software in the provided Fprime framework
  - Use the Raspberry Pi demo as a basis
- Organized into teams
  - One Pi/Arm set per team
- Use JPL host or your own laptop/VM for development
- Run ground system on host

Component Model

- Three components:
  - I2C driver (1x)
    - Linux I2C API
  - Servo Manager (4x)
    - Knows how to control SG90 servos
  - Application
    - Knows how to use robot arm
    - Team can decide behavior

Component Model



Plan

- Night 1 homework
  - Assemble the robot
- Night 2 finish application
  - Implementation
  - Testing
- Afternoon day 3 – finish and demo

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