

CS 424 Lab Introduction

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Adapted from

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Lab Assignments

- 4 total
 - 4 iRobot Create
- Form groups of 4
 - Lecture, Piazza
 - Random assignment if you cannot find any
- iRobot labs
 - Use iRobot Create, Raspberry
 - You are expected to be familiar with C++, POSIX threads, and linux in general
 - Equipment like iRobot Create, Raspberry, Camera, SD card etc will be provided
 - Labs are incremental (later labs depends on features implemented in the previous one)
 - You should **ALWAYS START EARLY**

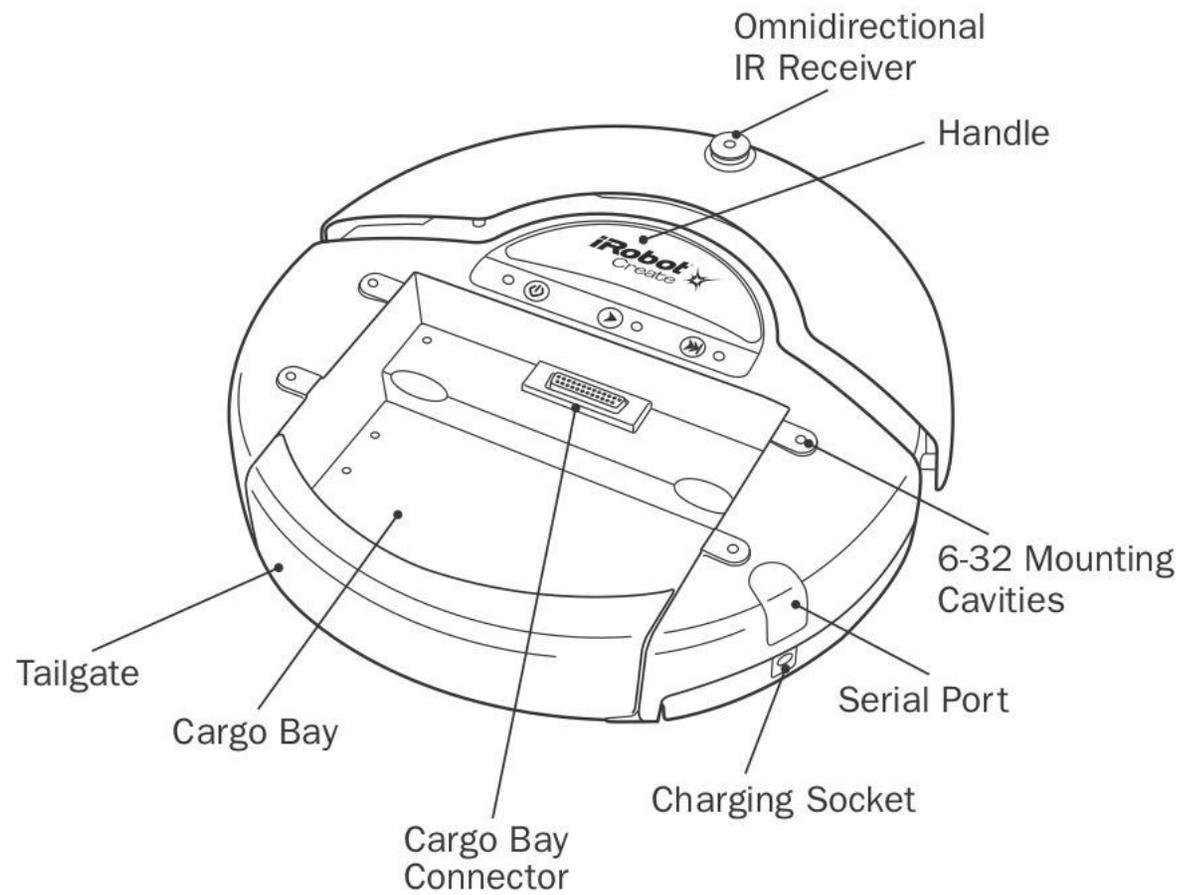
iRobot Create

- iRobot Create is a robot development kit
 - Program robot behaviors without worrying about mechanical assembly and low-level code
- Similar to Roomba 400 series Vacuum Cleaner
 - Does not include vacuum related components
 - Dustbin replaced by cargo-bay
 - Includes interfacing hardware and additional ports to interface with a computer
- iRobot implements a serial protocol called OPEN INTERFACE (OI)
 - Can be commanded to perform some actions, or read its sensor values
 - OI commands look like assembly language. Opcode followed by arguments
 - For our assignments we will use C++ library that encapsulates the OI commands

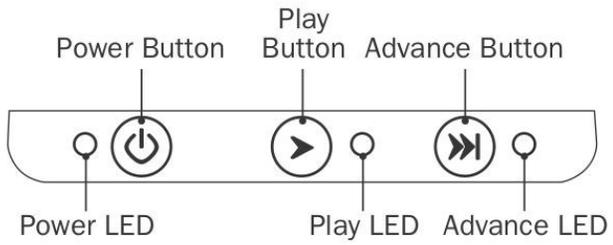
CS 424 Lab Setup

- Raspberry Pi
 - 4 cores - ARM 1.2 GHz, 1 GB RAM, 4 USB ports, HDMI output
 - Built in WiFi, Bluetooth, Ethernet
 - Runs Raspbian - fork of Debian Linux
 - Basically a computer around \$20
- Raspberry Pi Camera
 - Will be used along with RaspiCam and OpenCV to do object detection
- iRobot interfacing through C++
 - Can be commanded through pyserial library
 - We use C++ finer granularity of control over threading, scheduling and memory

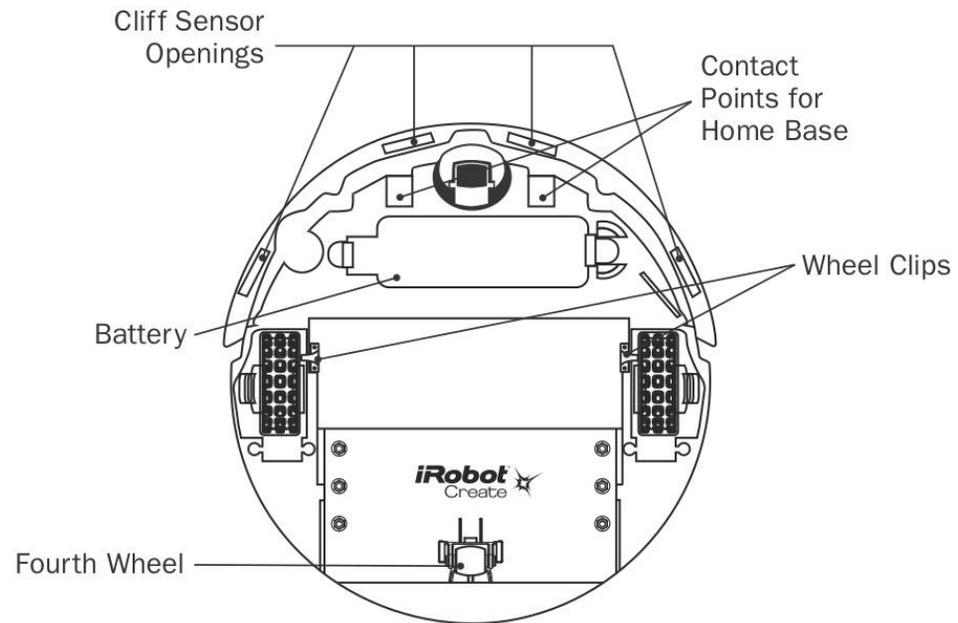
Top View



Buttons and Lights



Bottom View



CS 424: Demonstrating Your Lab Assignment

- Lab submission is through gitlab (https://gitlab.engr.illinois.edu/users/sign_in)
- On demonstration day, you will checkout the code that you submitted on the due date and run on the robot.
- Do not copy each others code.
- Siebel Center 2325/2327
- Office Hours: Tuesday and Thursday 1pm-2pm.

CS 424: Getting Started with Robot and MP 1

- There are three steps involved. They include:
 1. Setting up the Raspberry Pi (involves installing OpenCV, Libraries to Communicate with robot and setting up WiFi for ssh)
 2. Trying the test code
 3. Using the starter code implement

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Questions?