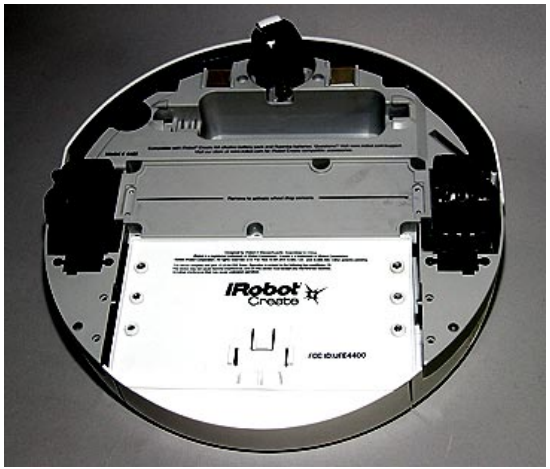
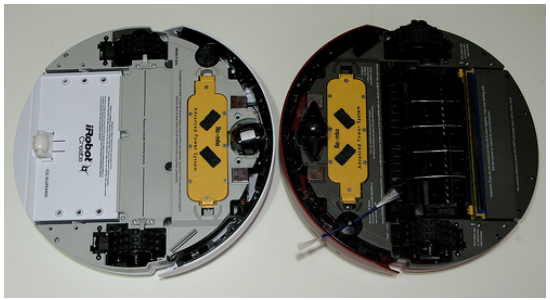
The *Create* robot, by iRobot

- Same as the 4000 series of the Roomba vacuum cleaner, but:
  - Without the vacuum
  - With a port that gives easy access to the robot's "brain"





Students: These slides present important background information, but are NOT something to memorize

Robot hardware

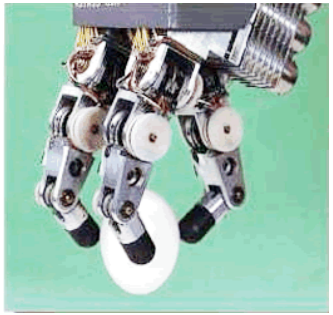
Robots generally have:

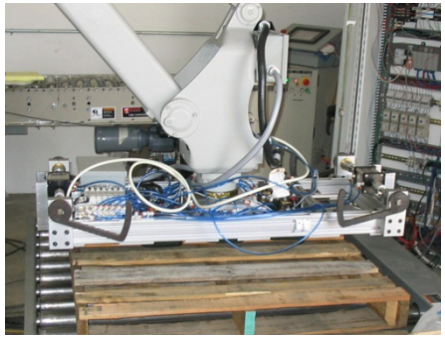
- ***Effectors*** – allow the robot to take an action, e.g.:

- ***Move***

- ***Grasp***

- ***Touch***



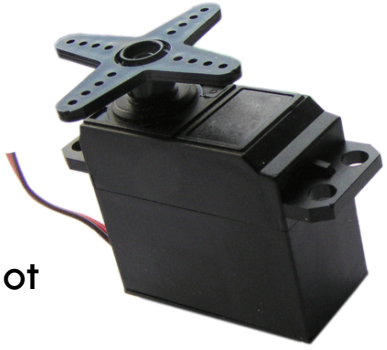


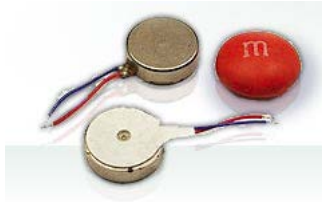
- ***Talk***

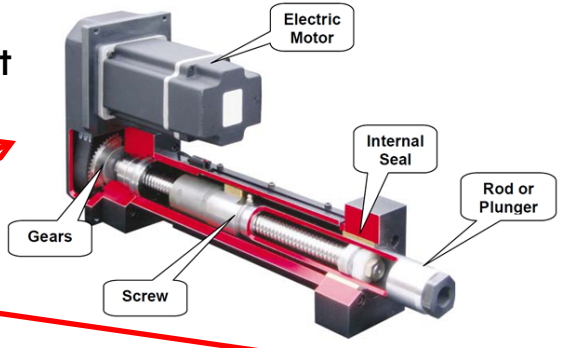
Robot hardware

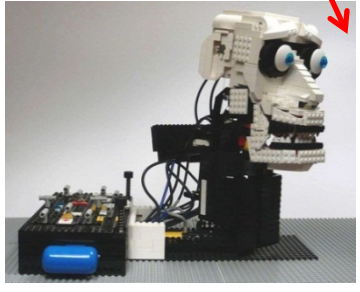
Robots generally have:

- ***Effectors*** – allow the robot to take an action
- ***Actuators*** – mechanisms that drive the effectors, e.g.:
  - Motors / servos
  - Hydraulics
  - Pneumatics





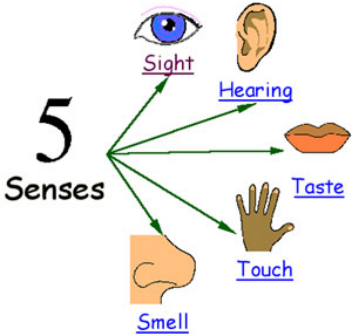




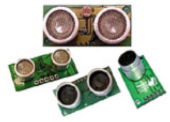
Robot hardware

Robots generally have:

- ***Effectors*** – allow the robot to take an action
- ***Actuators*** – mechanisms that drive the effectors
- ***Sensors*** – allow the robot to know (sense) things about the world



Sensors



Ultrasonic Range Finders

Infrared and Light Sensors

Stretch and Bend Sensors

Force Sensors

Accelerometers

Gyroscopes

Inertia Measurement Units

Inclination & Tilt Sensors

RFID

Localization

Cameras and Vision Sensors

Contact and Proximity Sensors

Encoders and Disks

Linear and Rotary Resistors

Magnetic Sensors / Compass

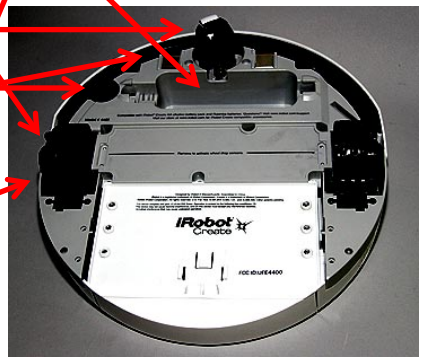
Current and Voltage Sensors

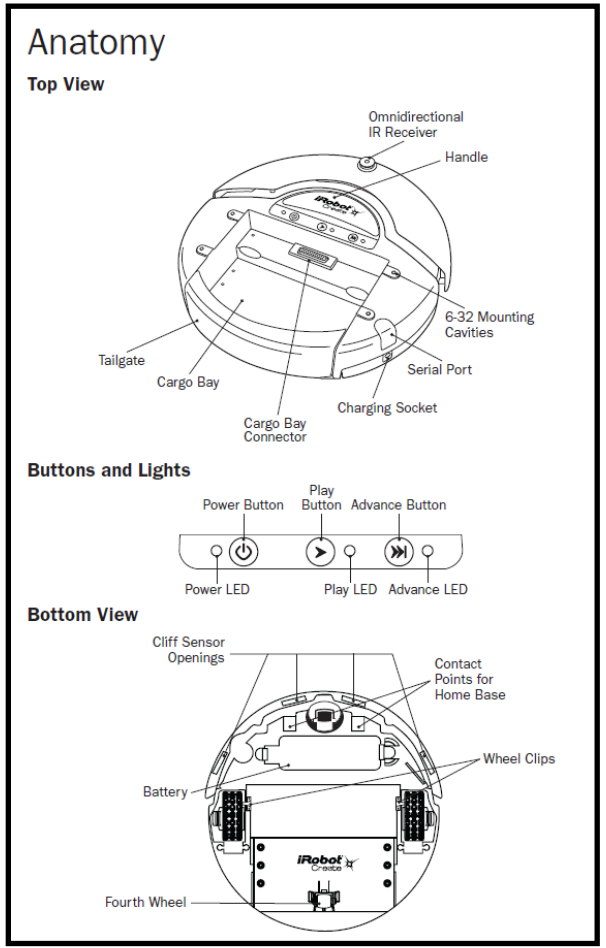
Temperature and Humidity Sensors

Thermal Array Sensors

iRobot *Create* hardware

- ***Effectors*** – 3 wheels, 1 speaker, 3 lights, output ports that send signals
- ***Actuators*:**
  - 2 independent motors
  - Battery power
- ***Sensors*:**
  - 2 touch (bump)
  - 3 buttons
  - 3 wheel-drop sensors
  - 4 active IR cliff sensors
  - 1 passive IR receiver
  - 2 wheel encoders
  - And more!





Your Python program uses the create library.
It supplies functions that send commands:

- to your laptop's Bluetooth radio,
- then to the BAM on the Create,
- then to the Create's controller.

Ditto for the reverse path.

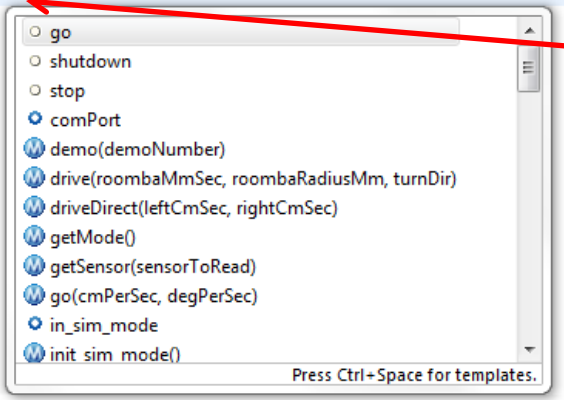

```
import create
import time

def main():
    """ Constructs a robot and makes it move, then shut down. """
    port = 13 # Port your Bluetooth connected to (more in class on this)
    robot = create.Create(port) # Construct and connect

    robot.go(10, 90) # Go forwards 10 cm/sec, spin 90 deg/sec counterclockwise
    time.sleep(4.0)  # for 4 seconds
    robot.stop()     # then stop

    robot.shutdown() # always end with this
```

```
robot = create.Create(port) # Construct and connect
robot.
```



As usual, ***use the dot trick*** to learn the methods in the Create class. This slide highlights a few particularly useful methods.