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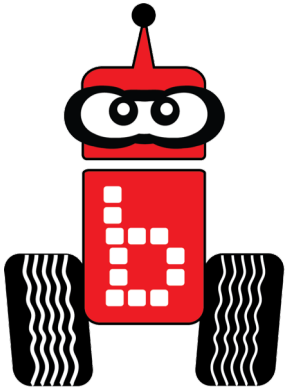

Robotics Introduction

KIPR Module 1

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What is a Robot?

Goals:

- To help students understand what a robot is
- To understand the basic components needed for a robot
  - Mechanical Structure, Effectors, Power, Computer, Sensors, Computer Program
- To understand the types of tasks and jobs robots perform
- To learn terms and vocabulary related to robots

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What Robots do we use Everyday?

1. Have elbow partners discuss why these are robots.
2. Name other robots that we encounter everyday.

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What Makes a Robot a Robot?

Activity 1.1

Materials: Interactive board,
paper, writing utensil.

What makes a robot a robot?

(Good activity for the snowball strategy)

Whole class share

As a group, create a list of robots found in your home and community

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Robot Components

Activity 1.2

Materials: Printed component sheets

1. Break down the topics on the following slides by distributing these components either to individuals or groups
   - Structure
   - Effectors
   - Sensors
   - Power
   - Computation
   - Information
2. Each group is responsible for researching one of the above components and sharing their definition with the class. Everyone can write definitions in their notebooks.

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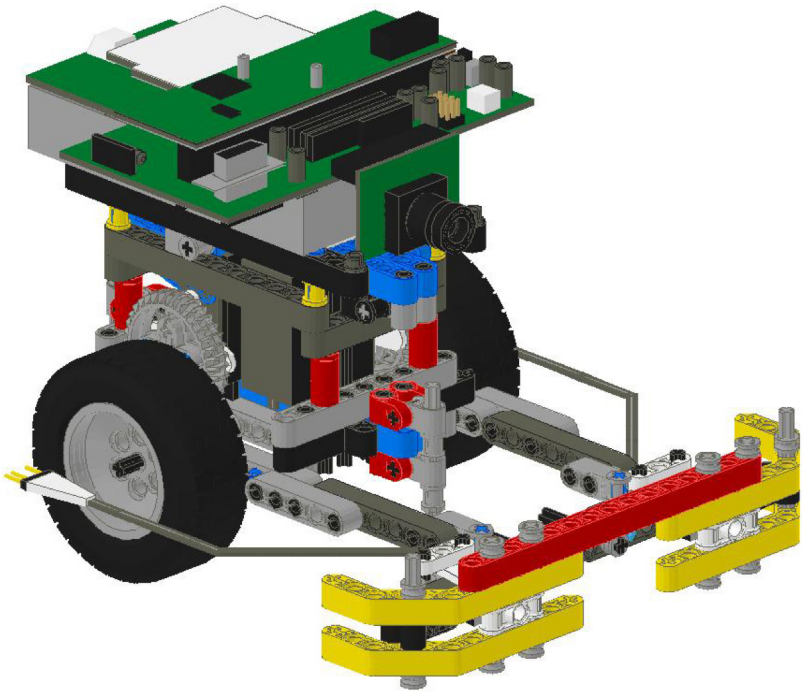
Structure

Robot Structure

- Provides support to the robot, like your skeleton
- Joints in structure normally have actuators, like your muscles, attached
- Holds sensors in position



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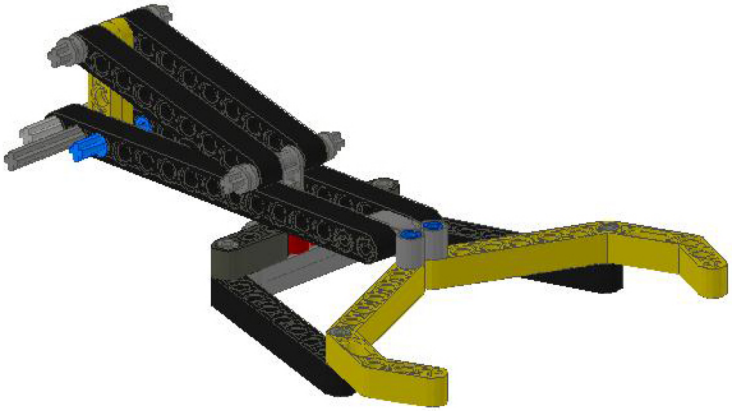
Effectors

- Used to change the state of the robot itself
- Used to change the state of the world
- *Examples:*
  - Motors, thrusters, arms, or legs
  - Voice synthesizers, buzzers, and lights



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Sensors

Proprioceptive Sensors

- Report on the current state of the robot- you know you are sitting down even with your eyes closed

External Sensors

- Report on the current state of the environment the robot is in
  - Light sensors, range sensors, touch sensors, etc.

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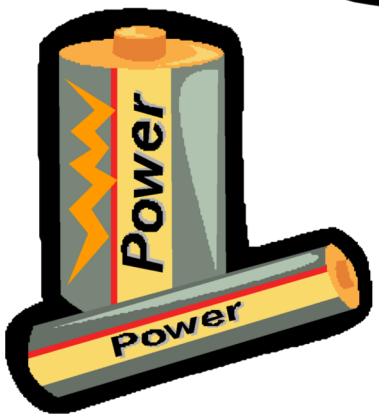
Power

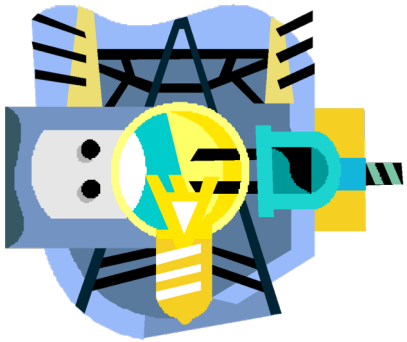
Power Source

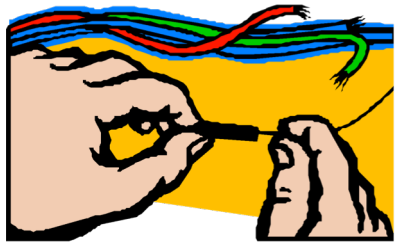
- Batteries, solar panels
- Springs, hydraulics, pneumatics
- Nuclear reactor



Power Distribution

- Wires





Power Management

- Regulators
- Converters

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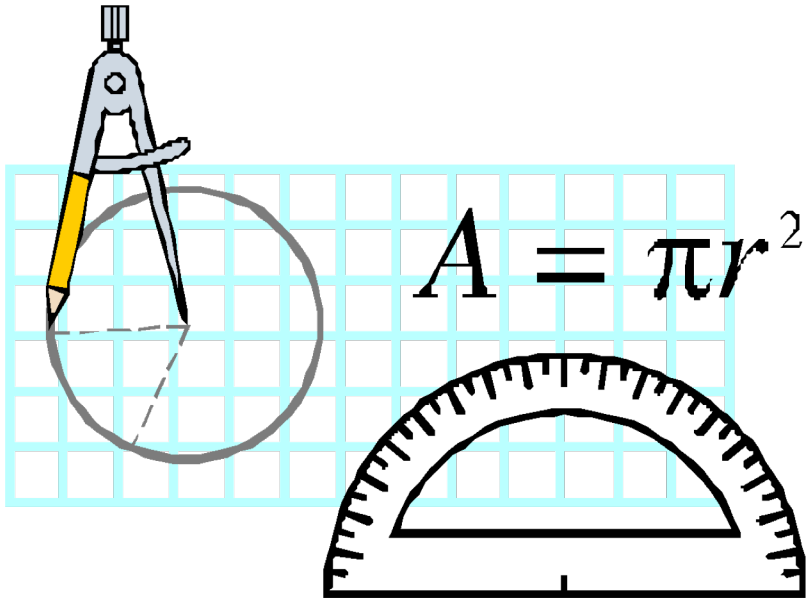
Computation

- Used to interpret sensor values
- Develop perception
- Used to generate proper effector commands
- Used to project effects and plan actions



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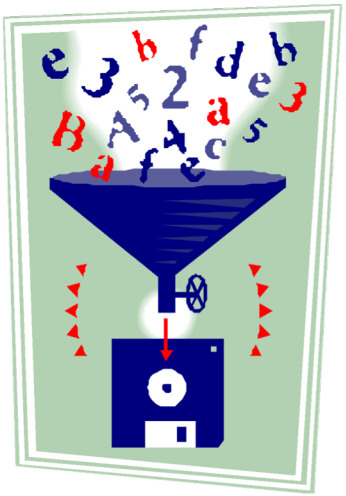
Information

Internal Information

- How to interpret sensor values
- How to generate effector commands
- Internal state & history

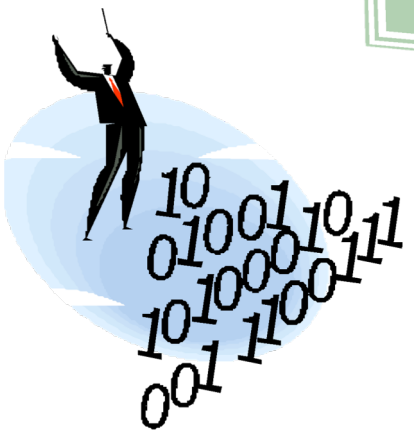


External Information

- World, user & predictive models

Program

- Determines robot actions
- Forms robot plans
- Debugging - introspection



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Match it Up!

Activity 1.3

Material: Printed “Match it Up” activity sheet for each student

1. After students have definitions from Activity 1.2 give them “Match it Up” pieces from next slide.

Can you match them up and justify why?

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Humans vs. Robot Subsystems
Match it Up!

People	Robots
• Bones	• Computer
• Muscles	• Power
• Senses	• Computer program
• Brain	• Sensors
• Digestion/Respiration	• Effectors
• Knowledge	• Mechanical Structures

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Assessments and Rubrics

Suggestions: *Understanding* or *Group Collaboration* rubrics

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