



CSCI 1106 Lecture 2

Introduction to Robotics



Announcements

- Quiz #1 is next Friday, September 21, in class
- Labs begin tomorrow!
- Be sure to have your CS account activated.
 - Go to the CS Help Desk to activate your account.



Today's Topics

- What is Robotics?
- Anatomy of a Robot
- The Sense-Decide-Act Cycle
- Introduction to the NXT-G Environment



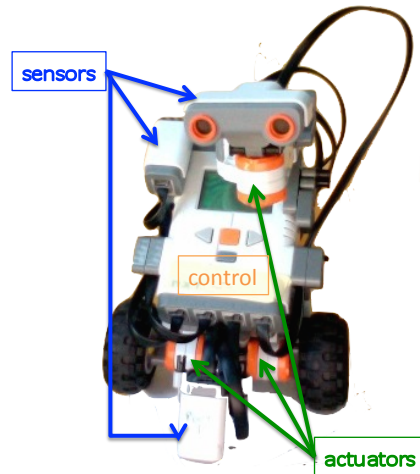
What is Robotics?

- From the OED:
 - “*Robotics*: The area or science of design, construction, operation, and application of robotics and the like; the study of robots.”
 - “*Robot*: A machine capable of automatically carrying out a complex series of movements, *esp.* one which is programmable.”
- A robot is composed of
 - Hardware: the machine
 - Software: the program that controls the machine
- Robotics includes both aspects.
- Question: Can we have one without the other?

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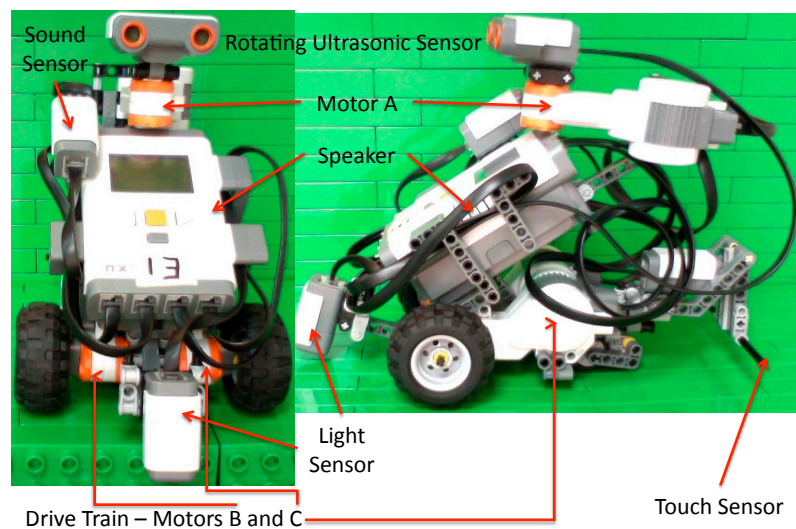
Anatomy of a Robot

- Hardware Components:
 - Sensors
 - Control
 - Actuators
- Software Components:
 - Sensor Input Processing
 - Decision Making
 - Actuator Manipulation and Output



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Tribot Mk II.5

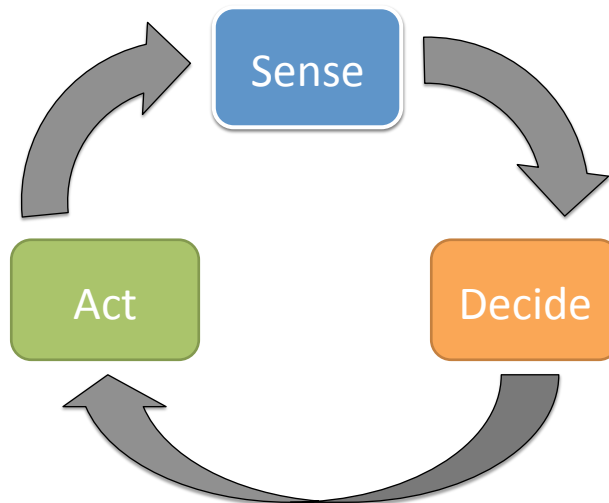


What is this Tribot Doing? AG

- What is the Tribot sensing?
- What decisions is the Tribot making?
- What actions is the Tribot taking?



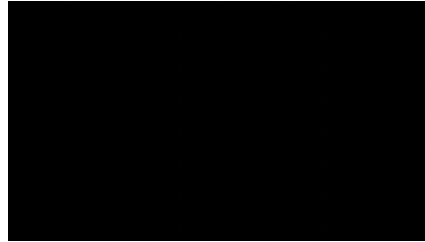
The Sense-Decide-Act Framework AG



What is the Tribot Doing?

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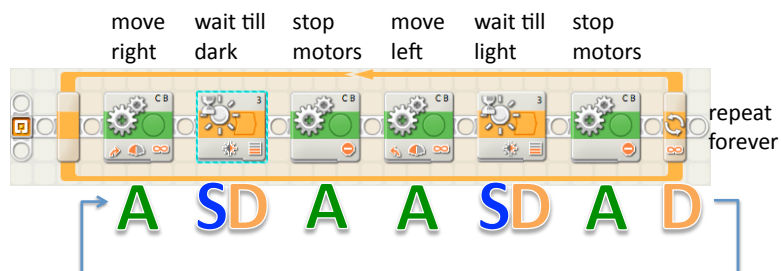
- What is being sensed?
 - What is being decided?
 - What action(s) result?
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- We ask these questions all the time.
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- Once we know the answers, what's next?



Lego Mindstorms NXT-G Environment






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- Programs are composed of *blocks* on a *girder*
- A *girder* of *blocks* represents an execution.
- Each *block* represents an input, decision, or action






Types of Blocks

- Action Blocks
 - Move forward, left, right, back 
 - Output text or sound 
- Decision Blocks
 - Repeat a group of blocks (loop) 
 - Wait until a specific event is sensed 
 - Decide which group of blocks to run (switch or if) 

To Create and Run a Program



- Specify program name and “go to” a new “program”.
- Add blocks to the *girder* representing the program.
- Save the program.
- Ensure robot is turned on.
- Connect robot to computer via USB cable.
- Download the program. 
- Disconnect the robot.
- Use the robot controls to run the run the program.
 - My Files → Software File → “program name” → Run



Robot Controls

