Autonomous Robotics
COGS Q360 / CSCI B355

http://mypage.iu.edu/~rdbeer/COGS-Q360/
Course Design

- **Laboratory** Course
- Groups
  - 3 Students each
  - Programming experience + Hands-on experience
- Group Dynamics
  - Need to work together courteously and efficiently
  - Assign responsibilities fairly
  - Make sure everyone is well-versed on all aspects of each project
- Stations
  - Robot kits
  - Windows, RobotC, Office
  - Account
  - Desktop shortcuts
The Course

Course Goal: To teach you the basics of autonomous robotics

Mechanics

Electronics

Control
The Robot Kit
Course Design

- Course Web Page
  - Policies, Assignments, Syllabus, Documentation, Resources
- All grading will be done on Canvas
- A Word About Documentation
  - Instructor
  - Assignment
  - Library Reference
  - Robot C Documentation
  - Vex Documentation
- Lab Access
  - Class times: T/Th 9:30-10:45, F 9:05-9:55
  - Extended class times
  - Generally around during the day (Email first)
  - After hours by arrangement
Assessment

- 15% Class Participation
  - Attendance
  - Contribution
- 5% Design Notebooks
  - A written record of your work in class
  - Graded at Spring Break and end of semester
- 30% Assignment Demonstrations
- 50% Written Reports
- Although work is done in groups,
  Design notebooks and written reports are prepared individually
Class Participation

- Actively participate in all group activities at all times
- You are expected to be in the lab on time for every class
- Absences may be excused with permission
  - For interviews, contact me for prior approval
  - For illness, contact me as soon as possible
- Unexcused absences will be penalized
- Unexcused late arrivals will be penalized
Design Notebooks

- A dated written entry for each day you are in the lab
- Each entry is a substantive summary of work done
  - Design alternatives
  - Design discussions
  - Design decisions
  - Include sketches as appropriate
  - Include data collected as appropriate
- Each entry is legible
- Turn in on time
Assignment Demonstrations

• Follow specific directions for each assignment
Written Reports

• Typewritten and submitted via Canvas
• Explicit labeled sections (format may vary across assignments)
  ➢ Introduction
  ➢ Mechanical Design (discussion and labeled sketches/photos)
  ➢ Algorithmic Design (discussion and visual overview)
  ➢ Performance Evaluation
  ➢ Conclusion
  ➢ Appendices containing commented code, data, etc.
• Detailed enough that someone else who has taken the class should be able to understand what you did, why you did it that way, and how well it worked
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<th>Date</th>
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<th>Notes</th>
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<td>An Introduction to Manipulation</td>
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Karakuri ningyō
Jacques de Vaucanson’s Duck
Maillardet’s Draughtsman-Writer
Karel Capek’s “Rossum’s Universal Robots”
W. Grey Walter’s Turtles
Shakey
The Traditional AI View

Quasilinguistic symbolic expressions formally manipulated

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\begin{align*}
\text{at(block1, [3,20, -10])} \\
\text{at(ramp, [10, -10])} \\
\text{at(G, P1)} \land \text{at(ramp, P2)} & \Rightarrow \text{go(ramp, P2)} \\
\therefore \text{go(ramp, [10, -10])}
\end{align*}
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Robot = AI + sensors/actuators
Braitenburg Vehicles
Rodney Brooks
Robots Everywhere
Behavior and Cognition are properties of the entire brain-body-environment system, not of any individual component.

They can only be understood properly in this broader context.
Robot Movies!
Robot Movies!

ROBO-ONE 11
YOKOZUNA GREAT
VS
CHROME KID
MARCH 25, 2007 - TOKYO, JAPAN