

Introduction to Maslab 2011

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01/03/2011

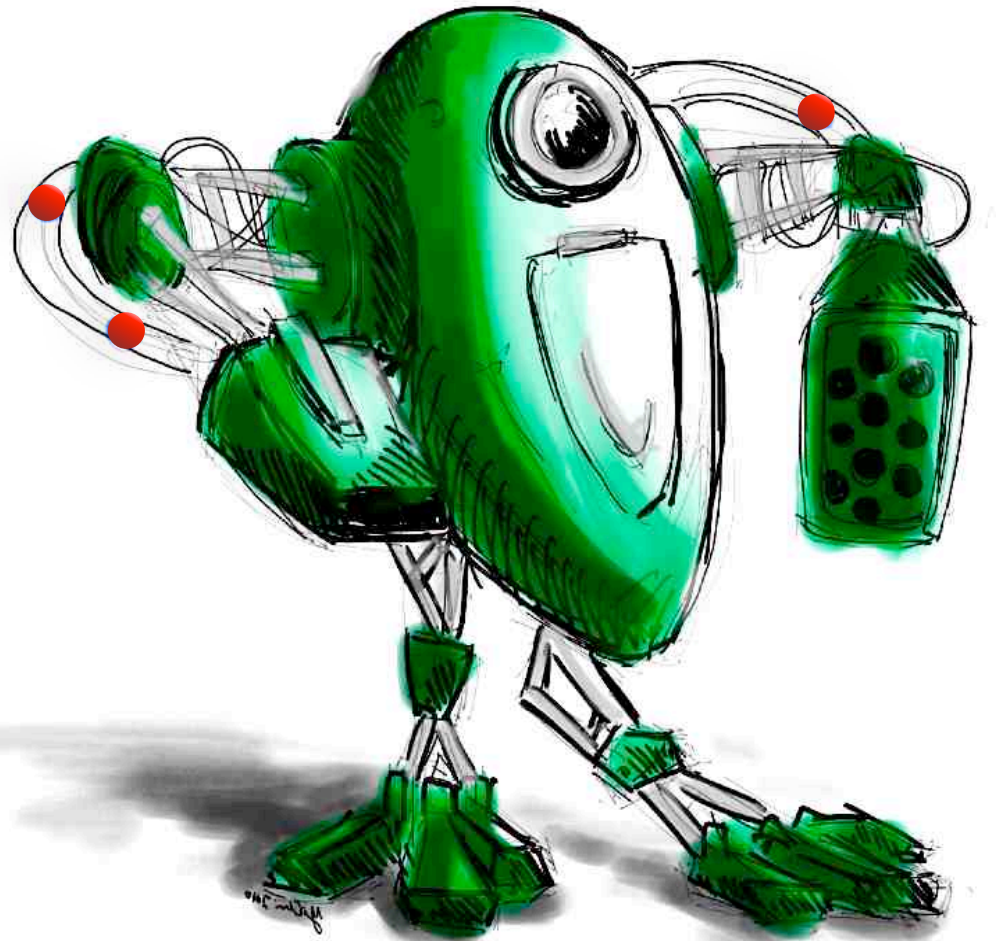
Outline

- Organizational Tasks
 - Sign in sheet
 - Edgerton Shop Signup
- Syllabus and Assignments
- Game Rules
- The Kit
- Software and Hardware Notes
- Checkpoints
- Q&A

Today's Schedule

- Intro Lecture (Ellen)
- Sensors Lecture (Arthur)
- Strategy and Mechanical Lecture (Sam)
- Get your kits
- Build pegbots and complete Checkpoint 1
- Write in journal, start planning your robot (prepare for Checkpoint 2)

Syllabus



Maslab 2011 Schedule

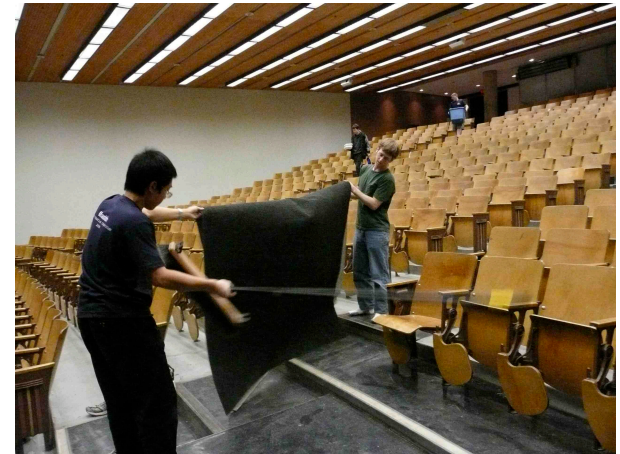
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1 Staff Setup Day
2 Staff Setup Day	3 First Day Lectures 1, 2, 3 (noon-4) Edgerton Shop and Laser Training Checkpoint 1 (due by 10pm)	4 Lecture 4, 5 (noon-3) Checkpoint 2 (due by 10pm) Edgerton Shop and Laser Training Resumes Due	5 Lecture 6,7 (noon-3) Checkpoint 3 (due by 10pm)	6 Checkpoint 4 (due by 10pm)	7 Checkpoint 5 (due by 10pm)	8
9	10 Mock 1 – Checkpoint 6 (noon-5)	11 Guest Lecture TBD	12 Guest Lecture TBD	13 Guest Lecture TBD	14 Mock 2 (noon-2) Checkpoint 7 (2-5)	15
16 MLK	17	18	19 Mock 3 – Checkpoint 8 (noon – 5) Sponsor Dinner (6-8)	20	21	22
23	24	25 Mock 4 - Seeding (noon-4)	26	27 Impounding (5 - 10pm)	28 Pick up Robot (10am) 26-100 open (10am-9pm) Final Competition (3-8)	29 Cleanup Day (noon-4pm) Maslab Staff meeting (4pm)
30 Final Papers and Exit Surveys Due (11:59pm)	31					

Class Requirements

- Attend lectures
- Write in your team journal on the wiki daily
- Complete all 8 checkpoints
- Attend mock competitions
- Attend sponsor dinners
- Write a 5-7 page paper summarizing your team experience
- Complete your team assignments
- Attend Seeding and Final Competition
- Do the majority of your work in lab

Additional Team Assignments

- Cleanup lab (show up 30 min before closing time)
 - Mock Contest Setup
 - Mock Contest Teardown
 - Sponsor Dinner Setup
 - Sponsor Dinner Teardown
 - Contest Teardown
-
- Posted on the calendar on the wiki.
 - Please notify staff of any swaps



Checkpoints

- Checkpoint 1 – Pegbot, Hello World, Simple driving
- Checkpoint 2 – Strategy, Design and Schedule
- Checkpoint 3 – Use a sensor to avoid a wall
- Checkpoint 4 – Publish image, Color identification
- Checkpoint 5 – Find a ball and drive up to it
- Checkpoint 6 – Competition compliance test
- Checkpoint 7 – Progress Report Meeting
- Checkpoint 8 – Collect balls, attempt to score

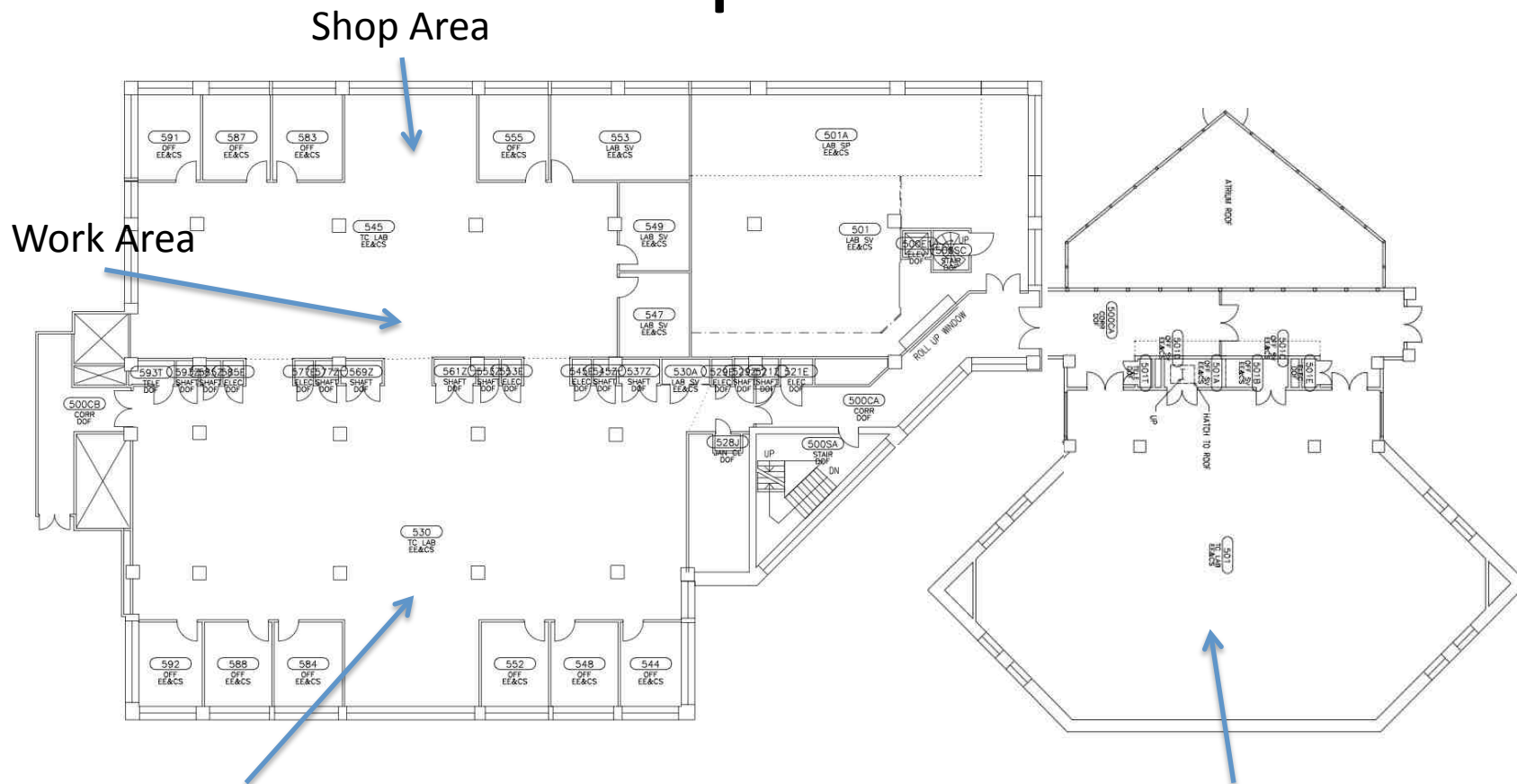
Mock Competitions

- Highest team score (or team that moves the most balls [without double counting]) from each Mock gets free pizza
- Mock 1
 - Checkpoint 6: Compliance tests
 - Two 3-minute runs, no opponent
- Mock 2
 - Checkpoint 7: Progress report
 - Two 3-minute runs, no opponent
- Mock 3
 - Checkpoint 8: Attempt to score
 - Sponsor Dinner
 - Two 3-minute runs, no opponent
 - Additional runs against random opponents
- Mock 4/Seeding
 - Two 3-minute runs, no opponent
 - Additional runs against random opponents

Lectures

- Staff Lecture
 - Intro
 - Sensors
 - Strategy/Mechanical
 - Vision
 - Software Architecture/Threading
 - Controls
 - Behavior
 - Navigation
- Guest Lectures
- Work Sessions
 - Specific topics with hands-on sessions
 - Examples: How to make a motor controller, How to build a roller...
 - Please talk to a lecturer or email maslab-staff@mit.edu to request a topic

Spaces



Shared Work Area

Building 38, 5th floor

Open noon-10pm weekdays
Open some weekends by request

24-hour Work Area

Building 34, 5th floor

Open 24 hours, no machining here!
Test field will be available here, code 19263*

Machining Areas

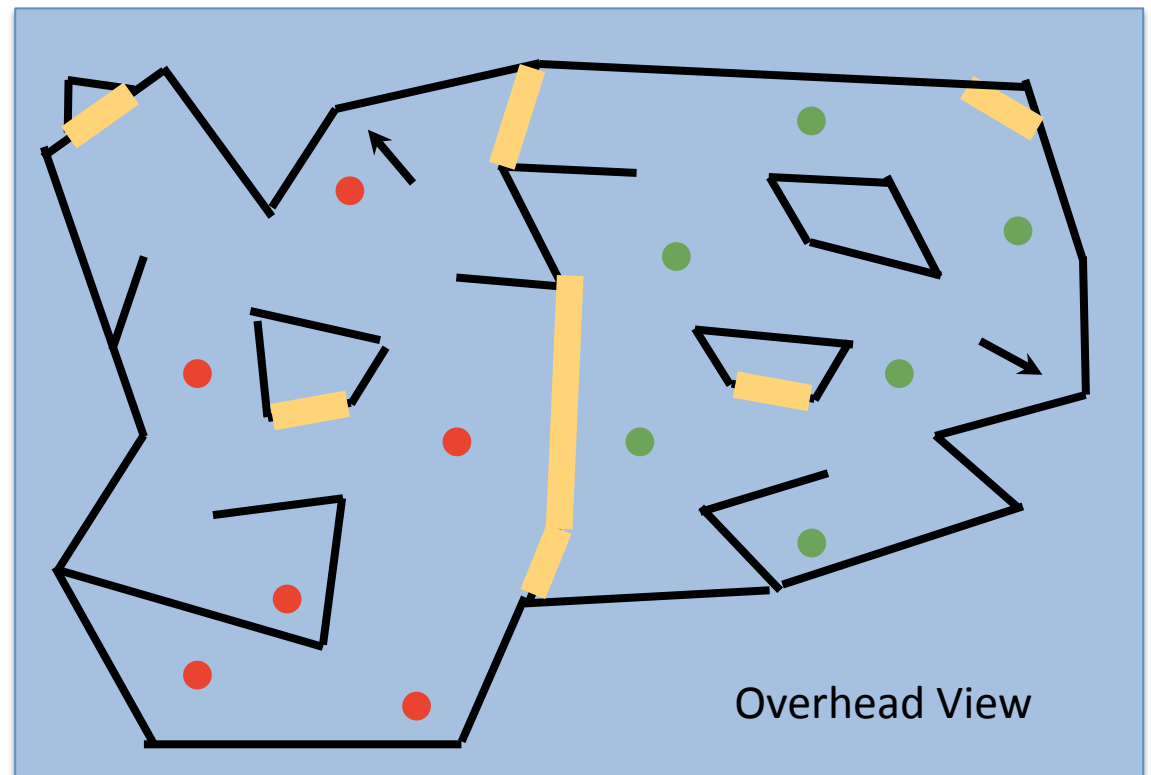
- Maslab Shop
 - Tools, scroll saw, small drill press, hand drills
 - Small shear, small sheet metal bender
- Edgerton Shop
 - One student per team will be trained through Maslab
 - Bandsaw, Mills, Lathes, Drill Press, 3D printer, etc.
- Edgerton Laser Cutter
 - One student per team will be trained through Maslab
- Hobby Shop
 - Requires individual membership
 - Waterjet, woodworking tools, etc.

Game Rules



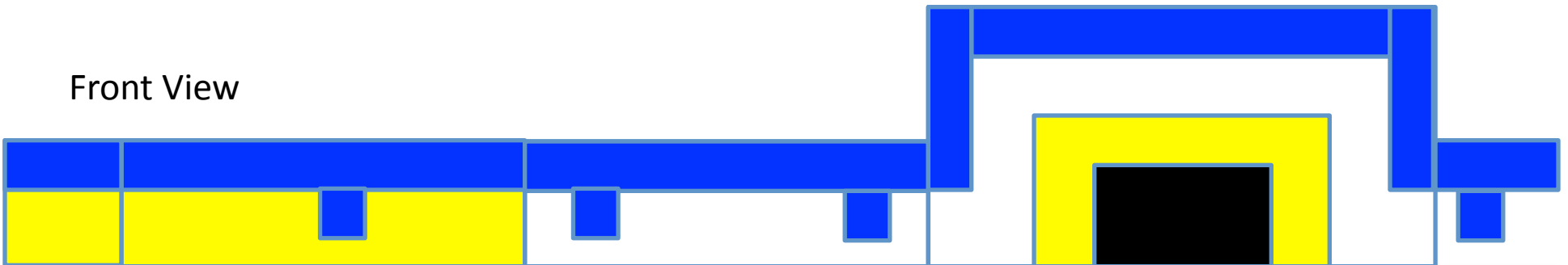
Game Rules

- Two robots on the field at the same time (3min per run, 2 runs)
- Collect colored balls and score
 - Each side will have a different colored ball (red or green)
 - ~8 or more balls each size
- SCORING
 - Over Yellow Walls
 - May not be continuous
 - Into Yellow Goals
 - 1-2 goals on each side



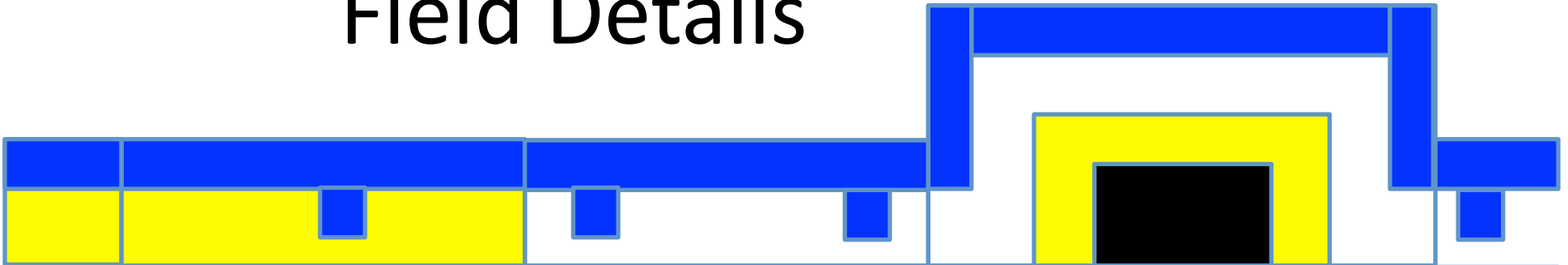
Scoring

Front View



- Possession of your color ball = +1
- Porch of your color ball within 12" of the goal = +2
- Your color ball in your goal = +4
- Possession, porch or scored other color ball = 0
- Your color ball on opponents side = +6
- Balls you put outside the field of play = -1
- Robots that do not stop within 10 seconds after their run = -3
- ALL POINTS ASSESSED AT END OF ROUND
- Team with highest score (sum of 2 runs) advances

Field Details



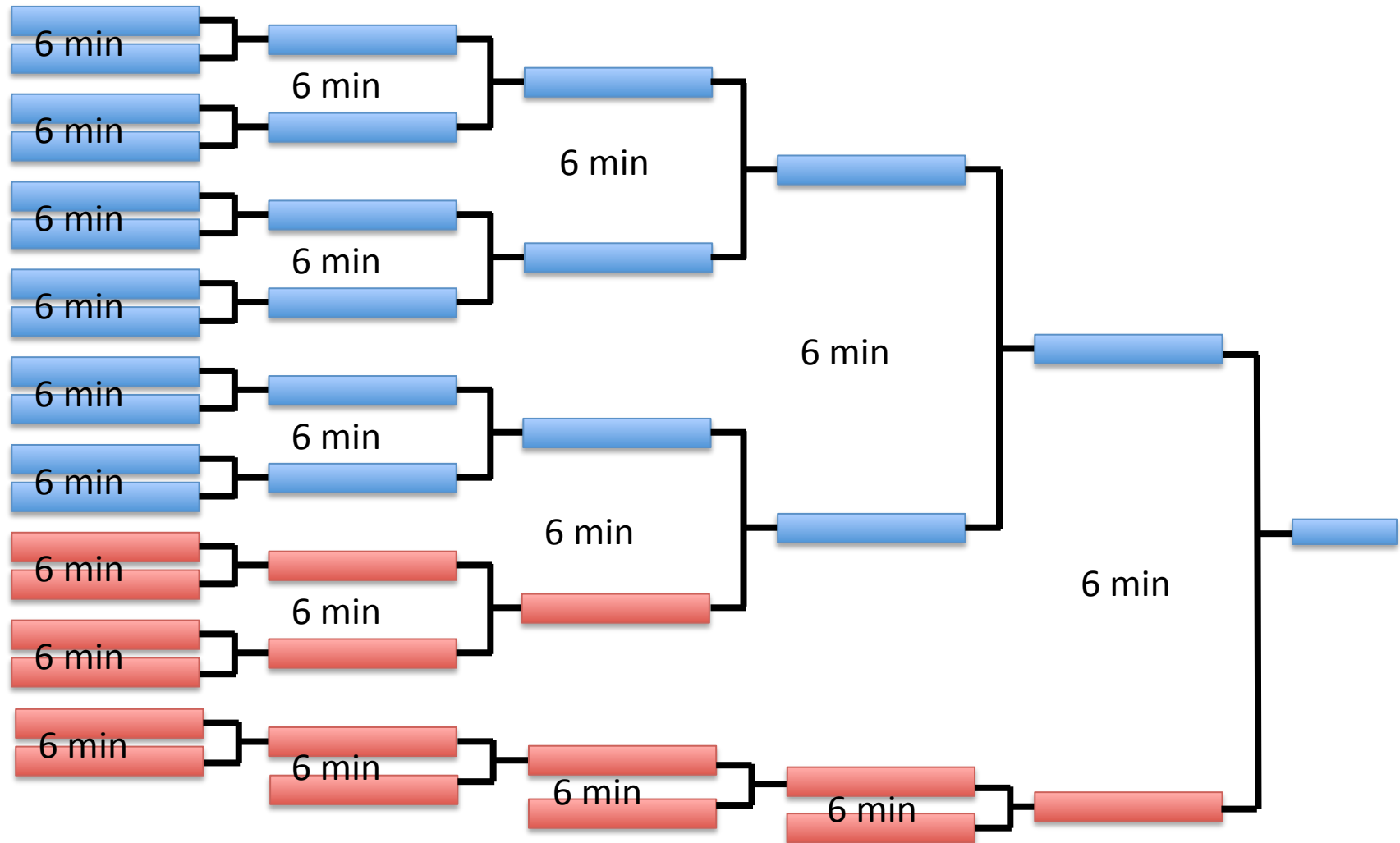
- Goals
 - 12" tall
 - Possible to see field through the entrance of the goal
- Scoring Walls
 - 6" tall, blue line touching yellow
- Towers
 - 12" tall, 2 blue lines
 - Used to stabilize corners
- Tickmarks
 - Blue ticks that reach down from the blue line
 - Can be used to identify location on the field
- All Teams will be notified of any rule changes
- No shoes on the carpet!



Ties

- Ties will be broken as follows:
 - 1. Team that moves the most balls advances
 - 2. Team that seeds highest advances
 - 3. Team with the lightest robot advances.

Bracket Structure




Double Elimination

Total contest time ~ 2 hours

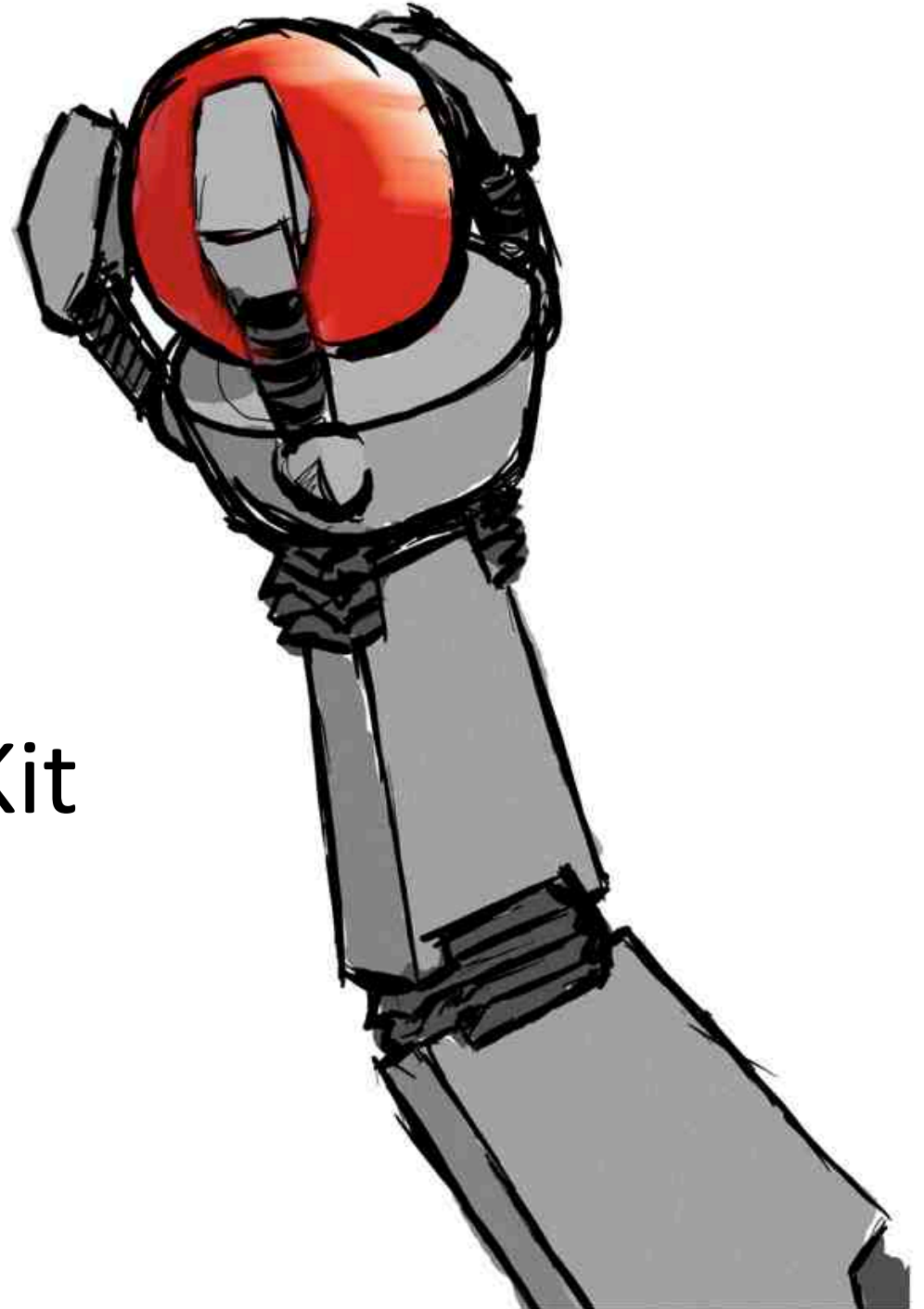
Seeding

- 3 days before the final competition
- Seeded against a stationary robot
- Seeding determines who you will play against: higher ranked robots will play against lower ranked robots.
- May be asked to do additional runs to clear up ties or close calls

Robot Requirements

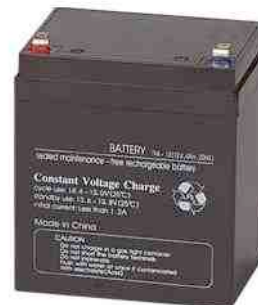
- Footprint restricted to 14"x14"
 - ~30 Sensor Points
 - 1 Camera
 - Limit on additional funds \$100
 - Provided by your team.
 - Additional allowances:
 - \$50 for batteries
 - \$70 for drive motors
 - Totally Autonomous
 - Start with one of two push buttons (color selection)
 - Must stop when time is up automatically
- 
- Exceptions Need
to be Approved
by Staff

Maslab 2011 Kit



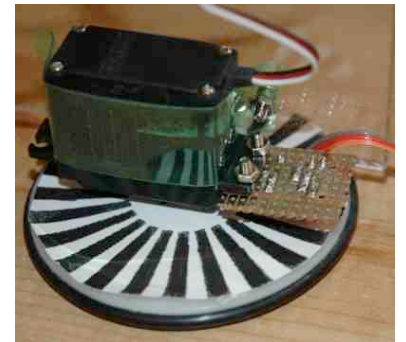
Maslab Hardware Kit

- 10.1" EeePC
 - Ubuntu
 - Hard Drive
- uORC
- 2 motor kits
- Batteries and chargers
- Peg board



Maslab Hardware Continued...

- Camera
- Gyro
- Additional Sensors
 - IR range finders
 - Ultrasound
 - Encoders
 - Bump sensors
 - Etc.



Notes: uORC

- Put electrical tape on the back of your uOrc board (or make an acrylic back plate for it) when you get it.
- uORC only provides 3 motor ports. You will need to obtain a motor driver chip for additional motors

Notes: Batteries

- Will take a while before fully charged
 - Flashing Red/Orange = Charging
 - Alternating Red/Orange and Green = Topping Cycle
 - Green = Charged
- One marked 2011, return at end of IAP
- One is fully charged for you (marked charged)
- The other one is for you to keep.

Notes: Motors

- Careful when soldering leads, do not let motor get too hot!
- Motors will automatically shut down 1 sec after they receive their last command.
- To fix, call `setWatchDog(0);` on any Motor objects. That should disable the timer and tell the motors to just keep going even if they don't receive commands. The javadocs for `orc.Motor` explain it.
- If it doesn't work, you will have to repeatedly send your motors commands.

Notes: Sensors

- None are included in your bin today
- Ask a staff member when you want them

Item	Value
Extra drive motor	7 points
Extra stock motor (see stock bin) or self-obtained motor	5 points
Servo	5 points
Ultrasound	4 points
IR	4 points
Solenoid	2 points
Photodiodes, etc.	1 point
Optical encoders pair	0 points
Whisker switch	0 points
Moment buttons	0 points
Original gyroscope and camera in your kit	0 points

Not Recommended
Short or Long Range

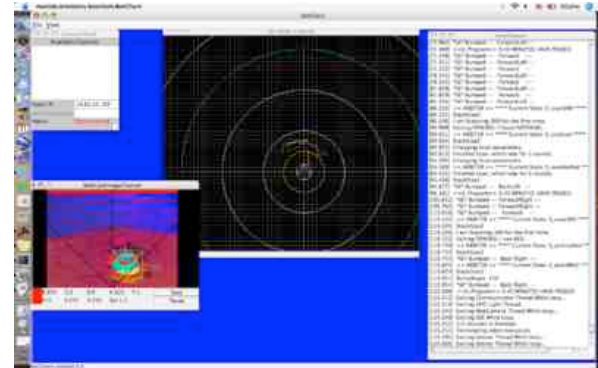
Maslab Software

- Username and Password
 - Find username type “**whoami**” into terminal
 - Find computer name type “**hostname**” into terminal
 - Password: (Info included on slip of paper in your computer box)
 - Change password type “**passwd**” into terminal.
- Comes Installed:
 - Ubuntu 10.10
 - Harddrive (do not shake excessively!)
 - Kerberos and OpenAFS
 - Subversion
 - Java 6
 - Current maslab.jar and orc.jar
 - API for maslab.jar and orc.jar available on wiki
 - Graphical desktop is disabled
- Do NOT code on your Maslab computers!
 - Use SSH and SVN!



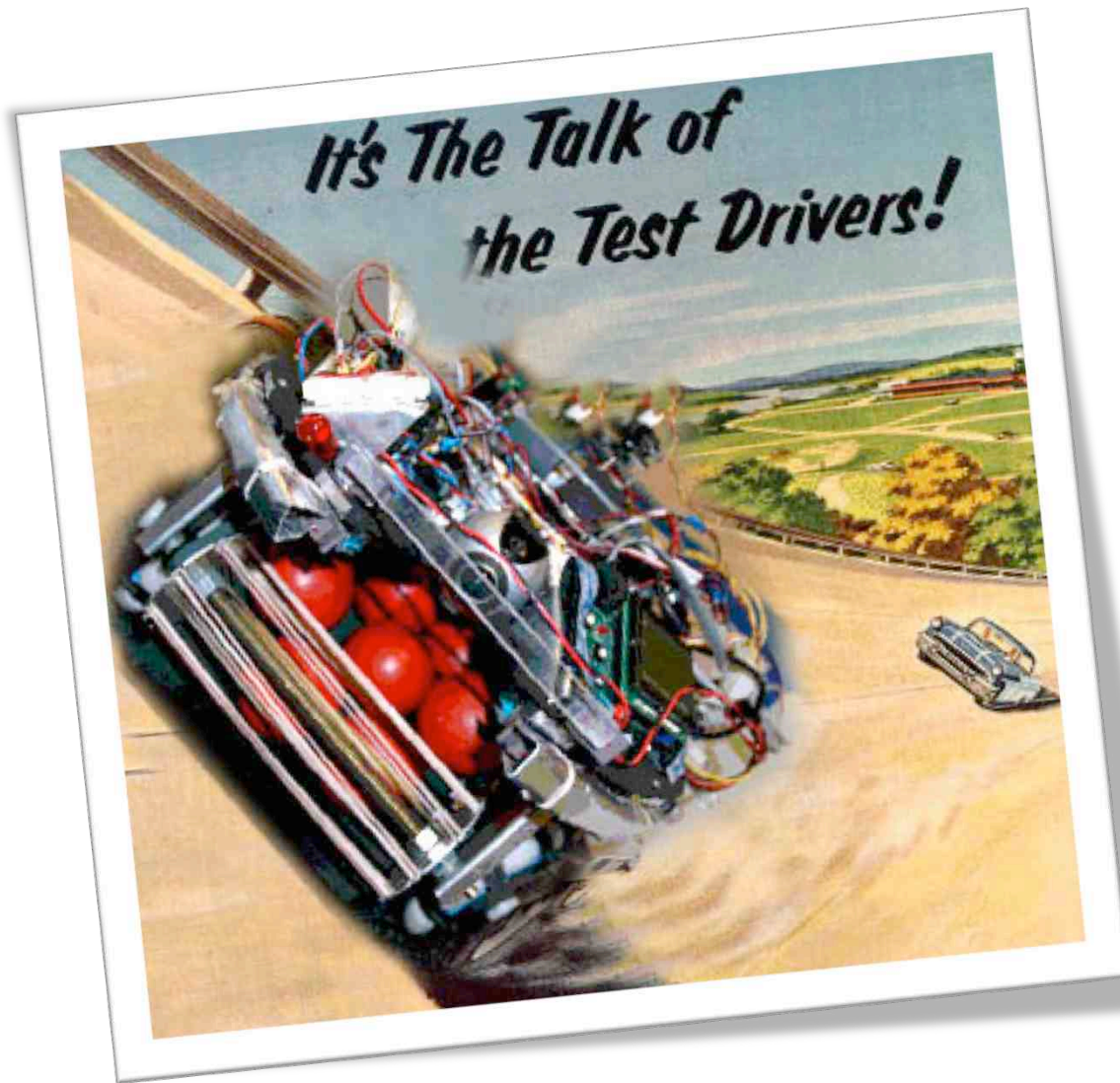
Maslab Software

- Staff can provide support for
 - Eclipse or Emacs
 - SVN or Ant
- BotClient
 - Visualize what your robot is thinking on another computer
 - Camera images, text output, localization information, state machine output
 - Types
 - ImageChannel
 - TextChannel
 - ScopeChannel – Plotting data over time
 - VectorChannel – Plotting vector images or image annotations
 - See details on wiki
 - **Must have some useful output for final competition!**



Software Resources

- Supplied with .jar of uOrc classes:
 - <http://web.mit.edu/6.186/2011/maslab.jar>
 - <http://web.mit.edu/6.186/2011/orc.jar>
- SVN repositories in:
 - <https://svn.csail.mit.edu/maslab/2010/team#>
- Subclipse (SVN integration into Eclipse) can be found at:
 - <http://subclipse.tigris.org/servlets/ProjectProcess?pageID=p4wYuA>



Checkpoints

Checkpoint 1 (due at 10pm)

- Pick up your kit.
 - Pick up your computer and uOrc board.
 - Verify that your kit is complete.
 - Assemble the pegbot: bolt on motors, etc.
- Checkoff
 - Write a "hello world" program. This program should be run on the eeePC and transmit "Hello World" to BotClient running on your personal computer. In other words run BotClient on your computer and send messages to it using the classes in the maslab.telemetry.channel package.
 - Program your pegbot to perform a simple task such as driving forward for three seconds and stopping.
 - Add a file to your subversion repository.
 - Show your finished eeePC hello world and pegbot to a staff member.
- Other
 - Write in your team journal on the wiki
 - Order custom parts for your robot
 - Read past wikis and work on strategy and design
 - Do vision tutorial if you haven't done so already!

Checkpoint 2 (due tomorrow)

- You should prepare information (a document or something posted on your wiki) of the following information.
- Must have a robot strategy
- Must have a schedule for IAP
- Must have a mechanical outline, drawings or SolidWorks
- Must have a software architecture outline
- There will be a 20 minute team interview with staff to discuss your plan

Resumes

- Maslab is funded by corporate and academic sponsors
- They are looking for
 - Interns
 - Employees
 - Grad Students
 - UROPs
- Send Resumes to yichen@mit.edu and jdawn@mit.edu
- In PDF, DOC or DOCX formats
- Due this Friday (1/7)

Maslab Wiki

http://maslab.mit.edu/2011/wiki/Maslab_2011

The screenshot shows the Maslab 2011 Wiki page. The left sidebar contains navigation links (Main page, Community portal, Current events, Recent changes, Random page, Help), a search box, and a toolbox (What links here, Related changes, Upload file, Special pages, Printable version, Permanent link). The main content area is titled "Maslab 2011" and features a "page" tab, a "discussion" tab, and buttons for "edit", "history", "move", and "watch". The "Announcements" section is highlighted with a green circle and contains two entries: "First Day of Class" and "Tuesday, January 4th, 2011". The "General Information" section is highlighted with a green arrow and contains a list of links. The "Technical Information" section is highlighted with a green arrow and contains a list of links. The "Teams" section is highlighted with a green arrow and contains a list of team names and their members.

Maslab 2011 Wiki

page discussion edit history move watch

Maslab 2011

Announcements [edit]

First Day of Class: Monday, January 3rd, 2011, noon-3pm in 32-155
Lecture contents include the Introduction, Sensors, Strategy and Mechanical.
Checkpoint 1 is also due by 10pm.
Team 1 is assigned to cleanup, please arrive at 9:30pm

Tuesday, January 4th, 2011: Lecture noon-2pm in 32-155
Lecture contents include the Behavior and Software Architecture/Threading.
Edgerton Shop training at 3pm for those who have signed up. Checkpoint 2 is also due by 10pm.
Team 2 is assigned to cleanup, please arrive at 9:30pm

General Information [edit]

- Course calendar
- Assignments
- Rules & Sensor Points
- Course policies
- Playing field
- Kit contents
- FAQ forum
- Tools and Stock Request (New!)
- Athena lists
- Old Wikis
- Repositories

Technical Information [edit]

- Software
- Quadphase encoders
- Gyroscope
- BotClient
- Battery Connection
- API Documentation

Teams [edit]

1 - 2 - 4 - 3 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13

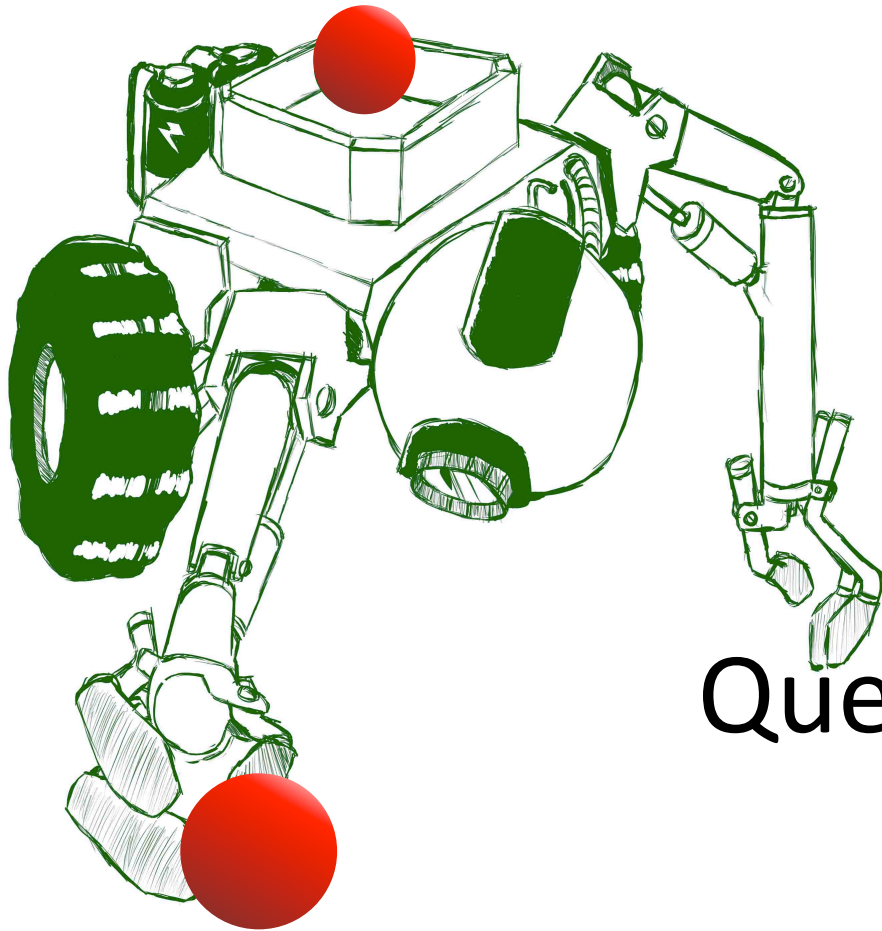
Team One
Erons Ohienmhen, Cory Robinson, Andrea Lincoln, Allan Miramonti, Matthew Redmond
Journal, Assignments, Final Paper

Team Two
Leighton Barnes, Stanislav Nikolov, Cathy Wu, Dan Fourie
Journal, Assignments, Final Paper

Team Three
Faye Wu, James White, Audren Cloitre, Stephanie Lin
Journal, Assignments, Final Paper

Team Four
Sam Sinai, Nazli Deniz Sevinc, Carlo Mannino
Journal, Assignments, Final Paper

Team Five



Questions?