INVITE YOUR FRIENDS!
REGISTER AT http://mit.edu/6.270 BY DEC 14
CONTACT US AT 6.270-organizers@mit.edu
Meet the Organizers

- Isaac
- Ronald
- Daniel
- Ryan
- Jessie
- Christina
- Andrew

6.270-organizers@mit.edu
Two hundred and seventy years into the sixth millennium . . .

The human race exceeded the original Earth’s capacity long ago, and was forced to transform into galactic hunter-gatherers. Constantly on the move, they must gather up an entire solar system’s resources to power their next stellar jump. Though their tools and spacecraft are powerful, the clans’ numbers are too small, so most of the gathering is done by robot.

It’s been a long time since the planet-harvests were good enough to build new ships. You, the captain of one of these roving colonies, own an aging fleet, and some of the ships are breaking down. You must design a robot that can handle the uncertainties of an old ship. The robot must also harvest resources from the surrounding solar systems to power your colony.

But Lo! On the holoscreen, appears an unknown ship! It hails from a foreign colony, and is trying to steal your resources! Well, there’s only one way this can play out....
The Game

Explore the galaxy
Capture territories
Gather resources
Deposit at your colony
City of Miasmador Deposit Resources

Blue Team Start

Red Team Start

Gearbox – spin to capture/reclaim territory

Lever – pull to mine resources

Not to scale
Details

- 2 minute round – first 10 seconds Exploration only
- Capture territory by spinning gearbox
- Must capture territory to mine resources
- Mine resources (ping pong balls) by pulling lever
- Max 5 resources per minute in each territory
- Deposit resources in center

Rules subject to change
Scoring

Explore  10 points per new territory
(30 points per territory in first 10 seconds)

Capture  100 points per territory

Gather  40 points per resource

Deposit  40 points per resource

Rules subject to change
General Rules

Robot starts in 1x1x1 ft cube
All structure = Lego
No detachable parts
Rubber bands for stored energy
Tape/glue ONLY for attaching motors/sensors to Lego
No Lego modifications except large dark-gray baseplate
Sportsmanship (don't attack opponent)
Drop Test

Robot must survive 3ft drop test – must have motors installed and be able to drive

Why? To encourage robust designs

Must pass drop test before final competition

[ videos ]
Sensor Points

Only parts provided in kit are allowed

Can “buy” more electronics/sensors with 20 free sensor points – see website for sensor prices

Spend up to $30 of your own money on extra sensors not in the kit
Final Competition

Wednesday, January 30th
7pm
26-100

Open to the public – invite your friends to cheer you on!

Streamed live online – show your parents!
Administrivia

- If you haven't gotten emails, talk to Isaac or email 6.270-organizers@mit.edu
- Lab hours: 9am – 11pm
  - (staffed from noon to close)
- Grading P/D/F – 6 units – to pass:
  - Qualifying robot
  - Team attendance
  - Robot web page and source code due at end of course
Lab Guidelines

• No food!
• We are guests – there is expensive equipment – leave it alone or 6.270 will be kicked out
• Only solder or hot-glue over ceramic tiles
• NO FOAM TAPE ON ANYTHING!
Happyboard Introduction

- Programmable microcontroller
- Lots of I/O:
  - USB
  - 8 digital IO
  - 16 analog inputs
  - 4 high-speed encoder
  - 6 DC Motors
  - 6 Servos
  - Wireless
  - I2C
  - LCD
Power Switch
USB port
GO and STOP buttons – user configurable
Microcontroller (tiny computer)
ATMega128
FROB Knob – for adjusting parameters
Analog Inputs

Encoder Inputs

Analog Inputs

Digital Inputs
Green: Signal (input)
Red: +5V
Black: Ground
6 Motor Ports

Motor Drivers
6 Servo Ports
Wireless Module
nRF24L01
FPGA (high speed I/O: servo control, PWM, encoders)
Batteries

- 2 Lithium-polymer Batteries
  - 500 mAh for logic
  - 2200 mAh for motors
    - 20 amps continuous!

- LiPoly Chemistry:
  - 7.4V (2-cell batteries)
  - Nice discharge curve
  - High energy density
  - Beware: under voltage
  - Beware: over-charge
More Batteries

- Very high energy density means catastrophic failure if abused!
  
  http://www.youtube.com/watch?v=d4INx2Wn6Oc&feature=player_detailpage#t=8s

- Don't leave charging unattended!
- Don't leave charging overnight!

- Seek TA immediately if battery wires come loose or if battery swells up