MICROMOUSE: AN INTRODUCTION

“OPS is too ez for me, now what?”

“Natcar looks hard/boring” “I’d rather do MicroMouse”

“I like software and algorithms”
WHAT IS MICROMOUSE?

• An autonomous maze-solving robot
• Can be built with virtually anything (electronic, of course)
• Competitions started in the 70s when embedded electronics started taking a foothold
• Events now held worldwide, with organizations in Asia and North America holding big competitions with big prizes
YOUR MM LEADS

Name: Justin Young
Major: EE, Class of 2015
Pathway: Circuits
Hobbies: eating good food, gaming, biking, and most importantly, electronics!
What I did last summer:
Interned at Walt Disney Imagineering, ate a LOT of food, played lots of dota 2, and spent lots of time on the 405 and 101 freeways.
YOUR MM LEADS

Name: Danny Li
Major: EE, Class of 2014
Pathway: Circuits
Hobbies: Nature, philosophy, biking, travel, and food
What I did last summer:
Worked at a start-up doing embedded circuits stuff
Bike all over Los Angeles
A (SOMewhat) PROFESSIONAL MOUSE

Green Giant v.2, designed by Green (Luzhou) Ye, UCLA IEEE
IMPORTANT CONCEPTS

• Hardware Design
  • Microcontrollers
  • Sensors
  • Motors
  • PCB Layouts (if necessary)

• Feedback Control
  • PID (Proportional-Integral-Derivative) Controller
  • Or not?

• Maze-solving Algorithms
  • Floodfill
  • CS majors can probably think of more than I can
TEAMS AND BUDGETING
TEAMS

• Teams will be established, and can consist of 1 to 4 people
  • Unless you have done MM before, we highly recommend teaming up

• A questionnaire will be sent out by the end of this week (Sunday, Oct. 13)
  • Google Drive/Doc form

• Teams will be announced via e-mail the following week
  • You can list preferred teammates, so if you have friends you want to work with, you will almost certainly get to be teammates
BUDGETING: BASIC BUDGET ($250)

• Initial deposit of $100
  • Provides access to $250 from IEEE to order parts and build your mouse

• Goal: Traverse $10000_2$ cells without touching (or crashing) into the walls

• Best option for those who are beginners to Micromouse
BUDGETING: ADVANCED BUDGET ($500)

• Initial deposit of $200
  • Provides access to $500 from IEEE to order parts and build your mouse

• Goal: Find the center of the maze! (16x16)

• Designed your own PCB before? Great with software? This may be the one for you!
# Budgeting

## Sample Parts List

<table>
<thead>
<tr>
<th>Component</th>
<th>Cost</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microcontroller</td>
<td>$25</td>
<td>Arduino MegaMicroNano 5000+</td>
</tr>
<tr>
<td>IR/Proximity Sensors</td>
<td>$20</td>
<td>IR SuperProxSensor++</td>
</tr>
<tr>
<td>Batteries</td>
<td>$50</td>
<td>Original Voltaic Pile (aged 213 years)</td>
</tr>
<tr>
<td>Motors</td>
<td>$20</td>
<td>Faulhaber “TooExpensiveForYou” Motor</td>
</tr>
<tr>
<td>Encoders</td>
<td>$40</td>
<td>WheelWatcher Wheel Watcher- 5th ed.</td>
</tr>
<tr>
<td>Wheels</td>
<td>$10</td>
<td>Michelin Circular Rotation Apparatus</td>
</tr>
<tr>
<td>PCB/Perfboard</td>
<td>$10-50</td>
<td>Perforated Board</td>
</tr>
<tr>
<td>Gyroscope</td>
<td>$30</td>
<td>STMicro SuperGyro Black Edition Xtreme²</td>
</tr>
<tr>
<td>H-Bridge</td>
<td>$20</td>
<td>TI E-F-G-H-Bridge</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$225-$265</strong></td>
<td></td>
</tr>
</tbody>
</table>
ADDITIONAL FUNDING IDEAS

• We encourage all participants to think outside the box
  • Novel/interesting ideas will be given consideration to receive $500 of funding for the basic deposit of $100
  • Encouraging innovation and inventiveness

• Options for not even putting in a deposit?
  • Justin/Kamal’s mouse from last year
EVERYTHING ELSE
TO (PC)B, OR NOT TO (PC)B?

• Lower tolerance for error
• Extremely Reliable
• Increased precision
• More compact and lightweight
• Knowledge in Eagle CAD required
  • UCLA IEEE holds Eagle workshops a few times throughout the year
• Recommended for those who have created a mouse before or for those more experienced in EE
• Highly Recommended!!!
COMPETITIONS

• There are lots of them
  • All-America MicroMouse at UCLA
  • California MicroMouse (CAMM) at UCSD
  • Region 6 Southern Area MicroMouse
  • More?
Meeting Times?

• Tuesdays, Wednesdays, or Thursdays?
• 5PM or 6PM?
• Bi-weekly or Tri-weekly, depending on needs
RESOURCES

• MicroMouse wiki: [http://micromouse.ieeebruins.org](http://micromouse.ieeebruins.org)
  • Also can be accessed by going to http://ieee.ucla.edu, link located under Projects tab
  • All presentations will be posted on the website as soon as possible
  • Information on parts, hardware, software will also be on the wiki
  • Document your mouse!!

• MicroMouse Lecture Series
  • Short 30 minute – 1 hour lectures given at meetings
  • Includes basic to advanced concepts for building your MicroMouse, given by your leads and inspired by professional mice
  • Will be a useful resource to newcomers and veterans alike
EXPECTATIONS

• Document your processes (for your own help, it’s very useful)
• Attend the lectures, if possible. They will provide valuable information and will help you if you get stuck
• Reach milestones on time
• Have fun! Making a MicroMouse is a lot of fun and SUPER rewarding when you see it run. It’s an enjoyable experience even if you don’t reach the center!
TO-DO LIST

• Fill out the application form to join/form a MicroMouse team for the 2013-2014 year

• Next meeting time will be e-mailed to everybody who signs in. Anybody who didn’t make this meeting, e-mail micromouse@ieee.ucla.edu

• Come with deposit and team name. We have limited creative capacity so team names are not our forte.

• See you next time!