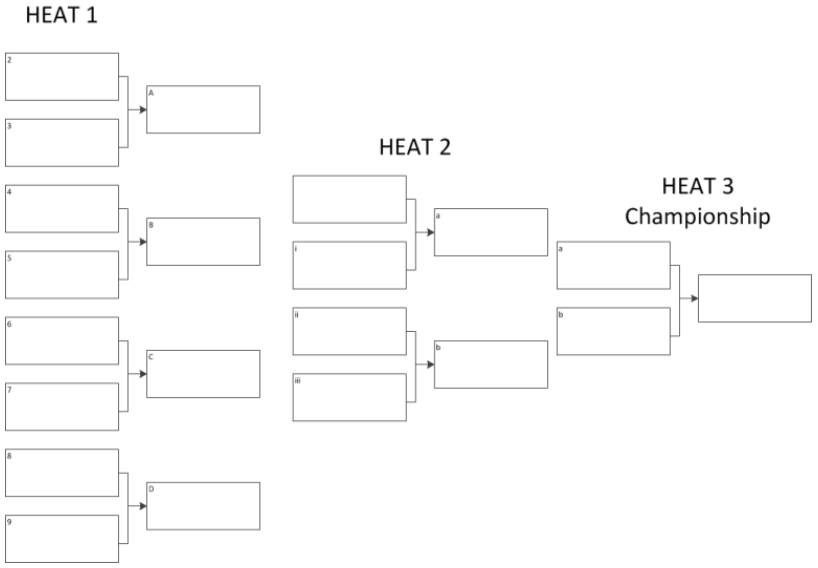
JUDGES

 Berry, Carlotta	 Voltmer, Dave	 Block, Jason
Head Judge/Master Scorekeeper Records time, distance, obstacle hits, calculates score and resolves scoring discrepancies	**Timing/Distance/Obstacle Judge** Use the stop watch to time path execution, count the number of obstacle hits, measure the distance from the goal cell center.	

TECHNICIANS

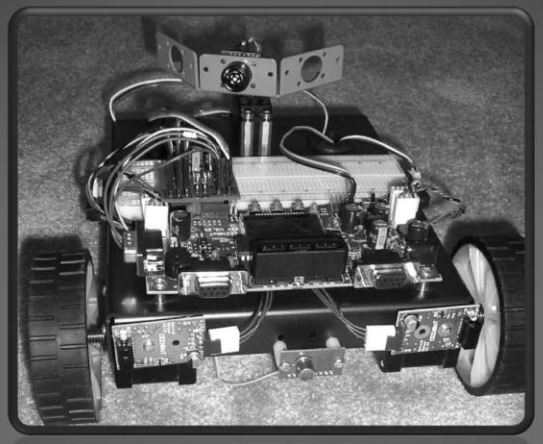
 Gary Meyer	 Benjamin Webster
Arena setup, maintenance, break down and judge support	

Thank you all for your support!



ROBOT MISSION: IMPOSSIBLE

The Final Countdown



ECE 425 Mobile Robotics

Final Project Competition

Thursday, 2/16/12

2:30 - 4:15 p.m.

HMU PA Room

Refreshments will be served

Overview

The goal of the mobile robotics final project competition is for each team to use localization, path planning and execution to rescue a lost (or kidnapped) robot and drive it home. The kidnapped robot will be placed in the world at an unknown position. The robot should then use a localization algorithm such as Partially Observable Markov Decision Planning with an a priori map to identify its place in the world. Once the position is identified, the robot should use a path planning algorithm such as wavefront propagation to move the robot to the given home position. All home positions will be a gateway in the world such as a dead end, corner, hallway or T-junction. The team's score will be based upon the robot's ability to localize, plan a path and then efficiently and accurately execute the path.

The Race

Two robots will be placed in the world at symmetrically opposite positions. When the round starts, both robots localize and head to similar goal positions. They will be scored on the path execution time, number of obstacle hits and accuracy.

World Map and Arena

The competition maps *(.txt format)*, topological and occupancy grid, will be uploaded onto Moodle and accessible no earlier than **12 am on Monday, 2/13/12**. The map will be an 8 x 8 array of integers encoded to represent the presence or absence of walls and obstacles. This map will represent a 12' x 12' arena with 18" x 18" cells. The physical world will not be accessible until the seeding on Tuesday, 2/14/12. The robot's start position will be marked with a "Δ" and the goal location will be marked with an 'X', both provided at run time. The robot's center of rotation will be placed in the starting cell at run time. The team has the option of selecting the robot's orientation within the cell.

Seeding

The time trials for the competition seeding will be on Tuesday, 2/15/12 in the PA room in the Union. All teams will be ranked from 1 to 9 based upon their performance. The top seed will get a bye in round 1.

Heats

Each heat will be a maximum of 3 minutes. If neither robot has reached the goal at the end of 3 minutes, then the robot closest to the goal will win. Each team is allowed one mulligan during the heat. A mulligan is one small adjustment to the robot's position to correct for odometry error. This may include a small nudge to the left or right or forward or back. The validity of the mulligan adjustment will be at the discretion of the judges.

In round 1 of the competition, the heats will be in order: 2-3, 4-5, 6-7, 8-9. The top 3 teams from round 1 will go on to round 2. In round 2, the heats will be round 1 bye versus winner of round 1, 2 - 3. The winners of round 2 will go on to the final round, heat 3 for championship rights. Each subsequent heat will have an increasing level of difficulty based upon the robot's start and stop goal positions. The same world map will be used for all heats. The top 3 teams will receive bonus points on their final project grade (10 pts for first place, 7 pts for second place, 5 points for third place).

Set Up Time

Once a heat has concluded, the next 2 teams have exactly 2 minutes to get their robots in the arena and set up their laptop. Teams that are not ready in the ring at the bell forfeit that round.

Scoring

The team score for each round will be based upon the number of obstacle, wall or robot hits, distance the robot stops from the goal and the localization and path execution time. The team will start the heat with a score of **1000** once the robot starts moving. Each wall or obstacle hit will be a **5 pt** deduction. After the robot stops moving, there will be a **10 pt** deduction for every full inch between the robot and the center of the goal. For example if the robot is 4.5 inches from the goal that will be a 40 point deduction. The distance will be measured from the center of the goal cell to the robot's center of rotation. The sum of the time, hits and distance deductions values will be deducted from an overall score of **1000**. Therefore the formula for the score is

1000 – execution time (seconds) – 5 x number of hits – 10 x distance (inches)

The team with the most points at the end of the heat wins. Based upon this scoring system, there is an advantage in being fast, safe and accurate. If there is a tie at the end of the heat, the two teams will start the round again with a new start position and goal location and continue this process until the tie is broken.

TEAMS

Name	Role
Arbib	Stephan Lemmer, Han Yang
Arkin	Tom Hazelrigg, Chris Ohslund
Asimov	Erik Hoeg, Nick Reed
Braitenberg	Austin Ryan, Andrew Wagner
Brooks	Justin Han, Phil Scherer
Edison	Kyle Spiegel, Luke Woolley
Franklin	Tim Hollingshead, Jordan Maurer
Minsky	Jeremiah Cole, Kevin Risden
Moravec	Luke Mehringer, Sam Newman