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Taste the Fun
2010 SAN DIEGO COUNTY FAIR JUNE 11 - JULY 5
Presented by **Albertsons Savon**

iARoc Contest Details

Objectives: The primary objective of this contest is to build an autonomous, computer-controlled robot that can find its way through a set of fixed obstacles, locate an Infra-Red and visible home station beacon and activate a mechanical push-action switch at the home station. This task simulates real-world robot navigation problems using minimal sensors and sophisticated use of software. Participants will learn about robots, navigation, computer programming, enjoy the thrill of competition and have fun. Prizes will be awarded for speed, cleverness, originality and presentation. There will be junior, senior and open based categories for contestants to compete in. Junior categories will be restricted to team members ages 15 and under, while senior categories have no age restrictions. There are likely to be platform specific categories as well, these will be dependent on sponsors. A team may enter more than one robot entry and in any number of suitable categories.

Divisions: There are three divisions available for teams to compete in. The division is decided upon by the highest grade level of any team member, excluding the Team mentor.

Junior: Grade 5-8

Senior: Grade 9-12

Open: All Grades/Ages

Registration: To register, go to: <http://iaroc.com/forums/login.php> and register yourself as a new user, then: mailto: registration-form@iaroc.com?subject=Registration&20Request with your user id in the body of the email. We will add you to the Registration forum to get further assistance with your registration.

The registration fee is \$250, for which you will receive a free Roomba Create, Sun SPOT control system and other sponsor provided materials. In addition, cash prizes will be awarded for division winners.

Schedule: The competition will be held over two days, with different events occurring on both days. The first day will be for the Teams to setup, get their robots ready, do as many trial runs as they can, and to do a technical presentation in front of the judges. The second day will be the actual competition, where each Team will get the opportunity to compete for 1st, 2nd and 3rd place.

Throughout the competition, there will be a main display board listing the current standing of each Team.

Day 1 09:00-10:00 Registration

10:00-11:00 Welcome to the competition session

11:00-12:00 Team setup time

12:00-19:00 Debug runs

13:00-17:00 Technical Presentations

Day 2 09:00-10:00 Recap from previous day, last minute updates

11:00-14:00 Urban Challenge

15:00-16:00 Gold Rush Challenge

16:00-17:00 Judges do evaluations

17:00-18:00 Prizes Presentation

16:00-20:00 Team tear-down time

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Teams: Team Captain - Each team will be elect a team captain. This is the individual who will be responsible for all coordination with the iARoC organization. Team Mentor - Each team may elect to have a Mentor. This person will be responsible for helping the team out with technical and coordination issues. However, all tasks must be performed by a member of the team.

Scholarships: Scholarships are available and requests for scholarships will be reviewed on a case by case basis, with financial need being the primary focus.

Rules: There are no restrictions as to who can enter a robot. There is no limit on team size. Only one prize will be given to each winning robot entry. Number of Entries - There will be a maximum of 21 entries allowed, as this is the maximum number of entries we can accommodate with the amount of time we have. An entry is defined as a team and robot pair. Entries will be posted on website as they sign up.

Registration: Registration Fee - A non-refundable registration fee of \$250 (s required for each robot entered into the contest. Any individual or group can enter more than one robot, but a registration fee must accompany each entry. The same physical robot cannot be entered twice.

Registration Deadline - Registration must be completed and registration fees paid by April 1st, 2008. Late registrations will be considered on a case-by-case basis and will be charged a late registration fee.

Prizes: There will be prizes awarded to the top 3 entries of each division. The exact value of the prizes will be provided on the contest website and will depend on the level of sponsorship we manage to get prior to the competition. Prizes will also be a prize awarded for the Most Amazing Robot. There will also be additional prizes donated by our contest sponsors and other interested supporters. Each team member of a robot entry, will receive a Certificate of Achievement and an official contest T-shirt.

Points: Winners for each division will be determined based on points earned by the successful completion of the following tasks: Technical Presentation, Urban Challenge, Gold Rush Challenge. The sum of points achieved for each task will be used to determine the overall winner of each division.

Technical Presentation: During day 1 of the competition, each entry will be provided with a work area. Judges will be coming to each entry and expecting a technical presentation explaining the details of the software and hardware engineering details of a particular robot. Presentations can include poster boards and other aids, but will mostly be comprised of the team orally explaining how their robot functions. Order of technical presentation will be based on the reverse ordering achieved on signing up for a test run. That is, the last entry to have a test run time slot, will be the first entry to have to do the Technical Presentation task. The maximum amount of time for the Technical Presentation will be 15 minutes.

Urban Challenge: A maze will be built, through which a robot will need to travel to reach an Infra-Red/Red beacon which will need to be bumped to stop a timer. The maze is intended to simulate an urban setting with streets and buildings. A sample maze layout is provided in Figure 1. The approximate dimensions of the maze will be 25m x 15m. The starting line will be at one end of the maze with the beacon at the other end of the maze. The beacon will be attached to a wall with a mechanical switch that must be activated to successfully finish the task. The beacon will not be visible from the starting line, as the buildings/walls of the maze will obscure it until such point as the robot reaches the correct corridor. The flooring will be smooth commercial grade carpet type of flooring. Traction should not be a problem. There will be no moving obstacles during this task. The intent of this task is to traverse this maze as quickly as possible from start to finish. Each entry will be provided with 15 minutes within which to achieve the best time from start to finish of the maze. The maze will be static during this 15 minutes. We are intent on having robots able to learn what the best path through the maze is. Therefore, we expect a robot to do multiple timed attempts within there 15 minutes. The best time achieved in getting from start to finish will be recorded. Lighting is expected to be consistent and provide visibility of all surfaces. First place will be given to the robot with the best time, 2nd to the second best time and 3rd to the third best. In order to be able to receive the Successful Completion points, an entry will have to have completed the task of going from the starting point to the end point. In keeping with the international flavor of the contest and with standard scientific and technical usage, all dimensions are shown in metric units. Order of Urban Challenge will be in reverse order of standings from Technical Presentation. That is, the entry who comes in 1st place on Technical Presentation will go last. Each entry will have 15 minutes to make as many attempts as possible at traversing the maze. Team captain will be allowed to fetch robot and restart a run as many times as desired during their 15 minute time slot.

Gold Rush Challenge:

An open desert setting with rocks and cactus, through which a robot will need to travel through in order to reach one of 3 Infra-Red/Red beacons. The approximate dimensions of the desert are 25m x 15m. The starting line will be at one end, and the beacons will be located directly across. This task will involve moving obstacles in the form of fellow robot entries. Unlike the Urban Challenge, where each robot is running solo, in this task there will be other robots attempting to achieve the same goal. The robot will be required to work on avoiding the obstacles, rocks, cactus and other moving robots, in order to reach a beacon. The intent of this task is again to achieve the best time in reaching a beacon, however there will be other robots trying to do the same thing within the same arena. The "rocks" will be setup such that they will not obscure the beacons, but keep in mind that other robots are likely to do so. Lighting is expected to be consistent and provide visibility of all surfaces.

1st place will be given to the first robot arriving at a beacon, 2nd place to the 2nd robot, 3rd to the 3rd robot. Successful Completion points will be awarded only if robot is within obstruction vicinity of a beacon. Order of Desert Challenge will be in reverse order of standings from sum of Technical Presentation and Urban challenge. That is, the entry with the most points will go last. There is no theoretical time limit to the Gold Rush Challenge, whatever time it takes for the 3 beacons to be turned off. But for practical reasons, we will cap the time to 30 minutes.

Robot Operation: Once turned on, the robot must be autonomous, self-controlled, battery operated and self-contained without any human intervention or remote computer. That is, the robots are to be computer controlled and not manually controlled devices. The robot cannot leave anything behind as it travels through the arena. It cannot make any marks on the floor of the arena that aid in navigation as it travels.

Size: Robot must be able to fit within a 70 cm circle and be no higher than 90 cm high. If the robot has feelers to sense objects, the feelers will be counted as part of the robot's total dimensions. Contestants may add flags, hats or other purely decorative, non-functional items to the robot.

Weight: There are no restrictions on the weight of the robot.

Construction Materials: There are no restrictions on the types of materials used in the construction of the robot.

Sensors: There is no restriction on the type of sensors that can be used as long as they do not violate any of the other rules or regulations. Robots that use laser-based devices must take measures to prevent eye damage to team members and to observers. Contestants are not allowed to place any markers, beacons or reflectors on the walls or floors to aid in the robot's navigation. The tasks of this competition have been designed such that the sensor requirements are intended to be as simple as possible. This is to allow entries to focus more on the software aspects of controlling a robot, rather than on the mechanical or capabilities of sensors.

Program Downloading: Any program necessary must be downloaded to the robot before it is put into an arena when performing an actual task.

Electrical Power: The maximum electrical requirements for any system needing power prior to contest runs at the arena will be 10 amps at 120 VAC, 60 Hz. Power can be used to power computers being used to work on robot, as well as other requirements such as charging batteries.

Cables: No fixed cables are allowed to be connected to the robots during any contest run.

Wireless: No wireless communications are allowed during any contest run.

Debug Runs: Contestants will be given time on Day 1 to make debug runs for the purpose of working out last minute bugs and handle any possible unexpected surprises. There will be a sign up sheet made available on Day 1. The sign up sheet will work on a first come first serve basis. Each slot will provide for 20 minutes of testing time. The number of debug runs possible will depend on how many times you are able to get into an open time slot. You will only be able to sign up for the next available time slot once you have completed your debug run. First sign up for time slots will only permit one slot.

Beacons: A beacon will be located at the far end of the arena and be marked with a visible red LED and an Infra-Red LRD. The LED will not be visible through the obstacles from the start line in the Urban Challenge, at least not until the robot is in a corridor that provides line of sight visibility. The beacon will be attached to a mechanical bump switch that will activate a blinking light visible to contestants and spectators. This will be utilized to signal successful completion of the task.

Pit Area/Work Area: Each team will be assigned a work area with a table and chairs. Each work area will have a single plug for power. Additional plugs needed will be responsibility of each team. Each table will be 4' x 8' and will be sturdy enough to do work on and support a computer to work with. All trash will be responsibility of each team, there will be trash containers provided within proximity of work areas.

Safety: The contest judges may stop any robot at any time if they feel that it is performing, or is about to perform, any action that is dangerous or hazardous to people or equipment. No robot is allowed to use any flammable, combustible, explosive or potentially dangerous processes.

Banners and Posters: Appropriate team banners and posters are permitted and may be displayed only in your assigned work area.

Disqualification: Any robot deemed to be able to do damage to arena and or obstacles will be disqualified. Any robot placing markings of any kind, whether on floor or obstacles will be disqualified. Any suspicion of remote control of robot by a team will cause that entry to be disqualified.

Challenges of Judge's Rulings: The Chief Judge is the final and absolute authority on the interpretation of all rules and decisions. Any contestant who wishes to challenge any ruling or scoring of the arena judges to the Chief Judge must do so before they leave the arena area. The Chief Judge will then be called in to arbitrate the matter. Once the contestants have left the arena they may not appeal any decision or scoring of the Arena Judges.

Interpreting the Rules: Prior to the competition, there will be an on-line forum established for team members to ask questions and for clarifications on any of the rules setup for this competition. During the competition, any issues not covered by these rules, the decisions of the Contest Judging Committee will be final.

Security: Overnight security will be provided for robot entries and auxiliary equipment.

Become a Sponsor: You can support this program with a donation of any amount to Wintriss Technical Schools. Your donations will go 100% towards making this competition better. Donations can be provided via either cash or equipment, either will be greatly appreciated. Wintriss Technical Schools is a 501(c)3 nonprofit organization, making the donation tax deductible.

Become a Mentor: How would you like to make a lasting impact on a teenager's future and help build the technology workforce of the future by becoming a Team Mentor? This competition uses robots and programming to engage students in learning the practical applications of science, technology, engineering and math. Watch middle and high school students grow ad they design, build, program and document their own autonomous robots to compete in a fast-paced tournament. Teams are advised to purchase a robot kit including microprocessors, sensors, motors and software. Your role as a mentor can have a profound influence on students and teachers in your area! As a mentor you can make a difference in a student's life: Build a student's confidence in his or her own abilities to solve problems, expand their knowledge in science, technology, engineering and math, be a positive role model to middle and high school students of all backgrounds, introduce students to careers in technical fields they may have never considered, serve as a resource, sounding board, coach and cheerleader, challenge students to learn new skills and concepts in an exciting environment and have a great time! Mentors come from a variety of professions - engineering, science, technology, computer programming. While students design, build, program and document the robot themselves, your expertise as a resource and trouble shooter is important to a team's success.