THE LOOSE GEARS

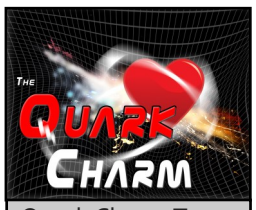
Storming Robots

COMPUTATIONAL THINKING AND ENGINEERING FOR KIDS!

Issue VII | Storming Robots' Student Publication | February, 2015

Scored Highest at 2014 MIT/NAS International ISS Final Simulation

From: Storming Robots Office



Quark Charm Team Logo

Congratulations on our Quark Charm high school team at the ZR ISS finals! Along with our alliance teams, Proxima Centuria from Italy and Herder from Germany, our alliance team's code achieved the highest score at Round Robin Simulation among all other twelve ISS Finalist. The ISS Final was held in Space on January 16th of 2015.

SR Team received two Awards:

1) Simulation Round Highest Scorer (called Mission Completeness Award) at the ISS Final.

Continued on page 3 ►

My Time at the 2014 International Robocup Junior Competition

By: Ashley Yang

The SR-chitects Team Logo

Brazil is home of the Amazon Rainforest, Copacabana beach, and the Statue of Jesus Christ the Redeemer. In 2014, it was also home to the 2014 International Robocup Competition.

Storming Robots sent a convoy of Rescue teams to the competition. Two Rescue A teams: a primary team, BEing, consisting of Ethan Wu and Joseph; and Chen and a secondary team, Tempest, consisting of Alex Saff, Dhruv Patal, and Seriozha Zakharkin.

They also sent a Resuce Maze team, SR-chitects, which I was a member of. Sr-chitects consisted of three international

Continued on page 4 ►

Roboclub Alumni Continues to mentor young Robotics Teams

From: the office of Storming Robots

One of our Roboclub Alumni, Gawain Lau, volunteered his valuable time to mentor multiple teams to participate in the 2015 First LEGO League held in Billings, Montana. There were over 15+ teams competing at the event.

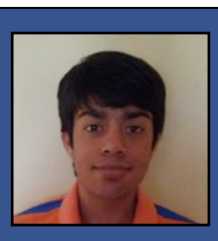

Gawain Lau with his mentor Lord Business Hat

"The event was buttressed by ExxonMobil through event coordination, team coaching and volunteer support.", quote from the Billing Gazette from Montana. Gawain, currently works as an Engineering at ExxonMobil in Billings, Montana. He spent many hours at night and weekends throughout the Fall of 2014 to mentor several teams. He advised the parents of the groups in helping the team to do research and presentation, while offered technical assistance to the 4th to 6th grades team members.

Since Gawain managed several teams, the parents and team members asked him to wear the title "the Lord Business" — one of the favorite main characters from the LEGO Movie. Gawain said, "I made it myself with scrap cardboard and paper. It wasn't the most comfortable hat in the world; but we had fun!" That's SO Great!!! Technical mentor who does not mind to look a bit silly and has fun while working — one of the common practice followed by our roboclub teams.

Another highlight of the event is that there was a Native American Team from the Wyola Tribe, the Crow reservation area in Montana.

Just great to see our alumni continues to make the difference no matter how small or big.


Bhavik Shah
Editor-in-Chief
Grade 10


Ashley Yang
Co-Editor-in-Chief
Grade 10

Attention!

- **Send us shout-outs, accomplishments, and articles!**
- Send us your own comic strip.
- Write us an article about your interest, with topics like science, technology, your favorite school events , or anything in your interests.
- Email to admin@stormingrobots.com to obtain details in requirements.

Storming Robots

Engineering For Kids!

3322 Route 22 West, Suite 402

Branchburg, NJ 08876

Telephone: 908-595-1010

Fax: 855-595-1010

www.stormingrobots.com

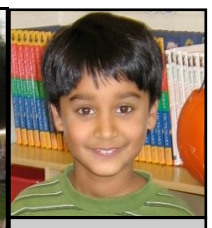
How Programming Skills Helped me in College

By: Nikhil Shah

I have been a student at Storming Robots from 5th grade up until my high school graduation. Throughout the years, I have worked in RoboLab, RobotC, C, and the Arduino IDE. Of course, the skills I developed at Storming Robots throughout my grade school years would have helped me pursue a traditional computer science degree, but they helped me in a slightly different way. When entering college, I decided that I did not want to study as a computer science major; although I enjoy programming and working on programming challenges, I am not as passionate about it as I am in other fields. Fortunately, all my coding skills did not go to waste. Aside from making me feel really cool, programming projects have reinforced many soft skills, such as logic, concentration, teamwork, and perseverance. The actual coding skills I obtained over the years proved to be very useful as well. Since programming has become involved with a wide variety of professions, skills in programming have become applicable to a wide variety of majors. This is the primary reason why I feel experience in computer programming can be invaluable to many people.

Soon after entering college, I decided I wanted to participate in an engineering design team, which focuses on medical devices. I felt that acquiring hands on experience would help me grow as an engineer and give me better insight as to what the field is like. Before joining the team I had to undergo an application process. When interviewing for the group, I was asked primarily about relevant prior experiences. These questions evoked memories of competitions, programming projects, algorithms and classes I engaged in over the years. Interestingly, what did not come up in our conversation was my grades or test scores. Although these things are very important to joining the university and being active within it, the design team members were primarily focused on the skills I had developed within engineering, and I believe my programming experience was critical to my admittance into the group. Later in the semester I decided to join a research laboratory, which focuses on determining protein structures. Again, I was surprised to see how relevant computer programming was to my lab. One of the major criteria for being accepted into the research team was experience in computer programming. Thankfully I was able to provide such experience and joined the team.

Nikhil Graduating from Ridge High School—2014



Nikhil at Elementary School

Throughout my entire first semester at college, my time at Storming Robots helped me become a more involved engineer on campus. Between the actual programming experiences that allowed me to join the design team and research lab, and the soft skills that helped me in the classroom, computer programming shaped my first semester at college for the better. Even my time at *The Loose Gears* helped me become a more effective communicator, as well as a more concise writer, which helps me as a member of the design team. Although I may not directly be pursuing a degree in computer science, the skills I have developed at Storming Robots over my teenage years have proved to be an invaluable resource to me.

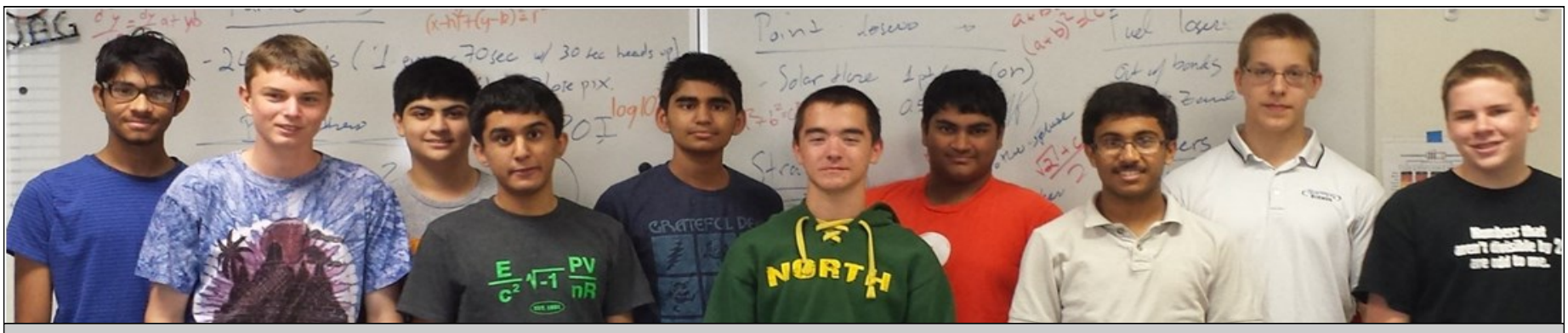
Nikhil at Johns Hopkins University

Roboclub Alumni List since 2008

Student Name:	School of Matriculation:	Major:
NIKHIL SHAH – 2014 AP SCHOLAR WITH DISTINCTION	JOHN HOPKINS UNIVERSITY	CHEMICAL & BIOMOLECULAR ENG.
TANYA GLUSHOVA - 2014 AP SCHOLAR WITH HONOR ACCOMPLISHED PIANIST	RENSSELAER POLYTECHNIC INSTITUTION	COGNITIVE SCIENCE (W/ INTEREST IN NEUROSCIENCE & ARTIFICIAL INTELLIGENCE)
MORGAN VAN BLACRUM – 2013 AP SCHOLAR WITH DISTINCTION	WORCESTER POLYTECHNIC INSTITUTION	MECHANICAL ENGINEERING WITH FOCUS IN ROBOTICS
AVERY KATKO - 2012 AP SCHOLAR WITH DISTINCTION	RUTGERS UNIVERSITY (with Presidential Scholarship)	COMPUTER SCIENCE WITH A.I./ LINGUISTICS FOCUS
MATTHEW GOLDMAN – 2012 AP SCHOLAR WITH DISTINCTION	RUTGERS UNIVERSITY (with Presidential Scholarship)	COMPUTER SCIENCE WITH AI FOCUS
ALEXANDER FRANCHUK - 2011 AP SCHOLAR WITH DISTINCTION	CARNEGIE MELLON UNIVERSITY	COMPUTER SCIENCE WITH ROBOTICS FOCUS
GARRICK LAU – 2010 NATIONAL AP SCHOLAR	CORNELL UNIVERSITY (with John McMullen Scholarship)	MECHANICAL & AEROSPACE ENGINEERING
DAVID DEKIME – 2010 AP SCHOLAR WITH DISTINCTION	GEORGIA INSTITUTE OF TECHNOLOGY	MECHANICAL ENGINEERING
KEVIN FRITZ – 2010 AP SCHOLAR WITH DISTINCTION	UNIVERSITY OF PENNSYLVANIA	MATERIAL SCIENCE ENGINEERING
GAWAIN LAU – 2009 NATIONAL AP SCHOLAR	UNIVERSITY OF PENNSYLVANIA	CHEMICAL ENGINEERING
JOHNNY WANG - 2008 AP SCHOLAR WITH HONOR	LEHIGH UNIVERSITY	COMPUTER SCIENCE
Many of them have joined us since their Elementary School Years. Besides being our roboclub members, most of these individuals also worked at Storming Robots as a technical instructors, mentors, assistants during their high school years.		

Scored Highest at 2014 MIT/NAS International ISS Final Simulation

Continued from Page 1



Dhruv Patel	Danny Kolano	Pranav Darbha	Siddarth Kurella	Salil Pathare	Brady Bean	Sankalp Aggarwal	Pradyumna Rao	Vadym Glushkov	, Sean Doran
Gr. 11	Gr. 10	Gr. 10	Gr. 11	Gr. 11	Gr. 11	Gr. 12	Gr. 11	Gr. 11	Gr. 9

2) ISS Finalist Competition Award - for winning through all the elimination rounds among 150+ teams across the United States in order to advance to the Final which was executed up in the International space Station.

About the Simulation Competition:

Just as how being done up on ISS in Space, the Round Robin Simulation used the identical parameters as the on-orbit competition, e.g. using fixed solar flare periods and fixed POI locations.

Code from our Team got the highest score

ISS Final Simulation Winner Award

competing against all the Finalists.

While the team agrees that the name of the Award is somewhat of a mystery, it reflects the high Mission Success over all other 11 ISS Finalists using the same parameters as the on-orbit competition.

The ISS Finalist Award

Despite of scoring highest based on the same on-orbit parameters, but short of the same level of performance up in Space, it indicates some crucial factors (common ones or anomaly) when running in Space.

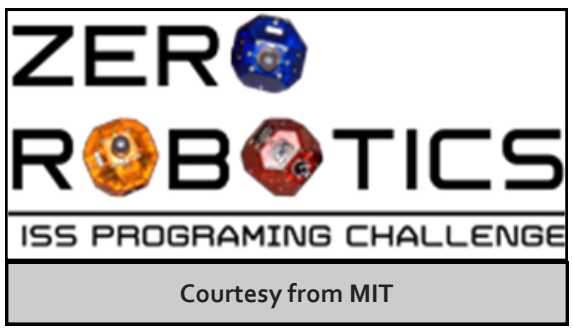
About Advancing to Final Competition:

The competition started online where teams compete to solve an annually modified challenge. Finalists were then selected to compete in a live championship aboard the ISS after an intensive schedule of elimination rounds. Astronauts were the referees the championship competition in microgravity with a live broadcast!

After three intensive elimination rounds involving over 150 International teams from September to November, Team Quark Charm continued to advance to the ISS Semi-Finalists list. In early December, they formed their alliance with teams from Italy and Germany. The alliance team again submitted code for another elimination round. Finally, along with other top 11 teams, Quark Charm alliance team advanced to the ISS Finalist.

About the Game:

This is an annual worldwide space robotics 3D-competition hosted by Massachusetts Institute



Courtesy from MIT

of Technology and NASA. It is called the ZeroRobotics SPHERES Challenge.

"Zero Robotics" is the world's first robotics competition in space where the participants compete to win a technically challenging game by programming their strategies into the SPHERES satellites (the robots)!

The game is motivated by a current problem of interest to DARPA, NASA and MIT. Student software controls satellite speed, rotation, direction of travel, etc. Depending on the game premise, the students must program their satellites to complete game objectives. The programs are fully "autonomous". Programs no only need to perform, but also just as importantly, conserve resources (fuel, charge, etc.) and stay within code-size limits.

The robots are miniature satellites called SPHERES, which contains its own power, propulsion, computing, and navigation equipment. This competition is an intensive engineering/physics/programming centric program where the teams design software to automate small satellites to operate in microgravity environment aboard the International Space Station.

Game this year:

"This year's challenge called CORONASPHERES is inspired by current research missions to asteroids. To achieve

Courtesy from MIT

game objectives students programmed their satellites to take pictures of points of interest on an asteroid. Team's goals were to take and upload the most pictures of Points of Interests on an asteroid while best protecting against the damaging solar flares. The solar flares erase the pictures in memory and even damage the satellite. Satellites are completely safe only in the shadow zone, which is behind the asteroid.

Hope for improvement:

In order to make this Space navigation learning more wholesome, Director from Storming Robots has submitted a request for some features to increase the trajectories for learning in the realm of astrophysics. For example, since testing in Space is not possible (Astronauts have far more important tasks to do in Space than running tests for us), perhaps a feature allows future participants to collect data while the code is running up on the ISS Final for further studies.

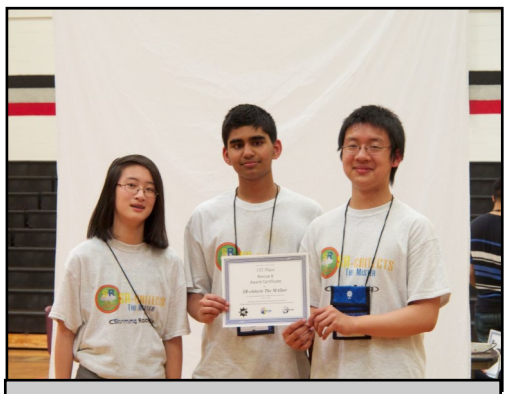
To learn about the Zero Robotics program, visit zerorobotics.mit.edu.

My Time at the 2014 International Robocup Junior Competition

Continued from page 1

competition veterans. Sal, Michael and I have each participated in several previous international competitions

I joined Michael and Sal in Resuce Maze two years ago. We started to develop our robot in September of 2013 from scratch. Instead of using a NXT as the controller, we planned to center our new robot around Arduino. By the end of several months of hard work, we were



From left to right: Ashley Yang, Salil Pathare, Michael Xie

proudly able to present an exceptional robot. We won the Robocup Junior New York and New Jersey Competition, and set our sights for the International Stage. Here's a journal log from our time there.

Day 1 - July 20th

Practice Day. We arrived to Joan Pessoa earlier this morning. We woke up to nice weather, and grabbed our stuff to head out. A bus took us to the venue, a modern looking building in the

Day 2 - July 21th

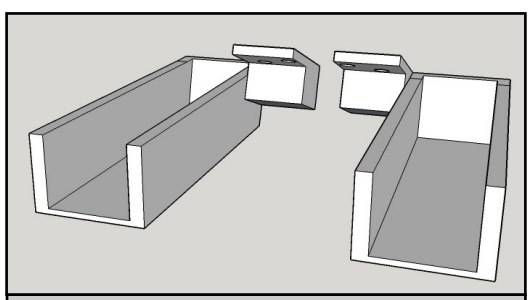
Long first day. Currently we're ranked in the top 10. Our first run was on the easiest field and we scored the maximum amount of points, 320. Our second run…30 points. We changed the logic of the code because we had an issue were the dropper would drop two rescue packs per victim. Luckily we're allowed to drop the lowest score, so hopefully this won't factor into our overall score. For the third run we reverted back to the old code and scored 270. We missed one victim and that cost us 65 points.

Day 3 - July 22

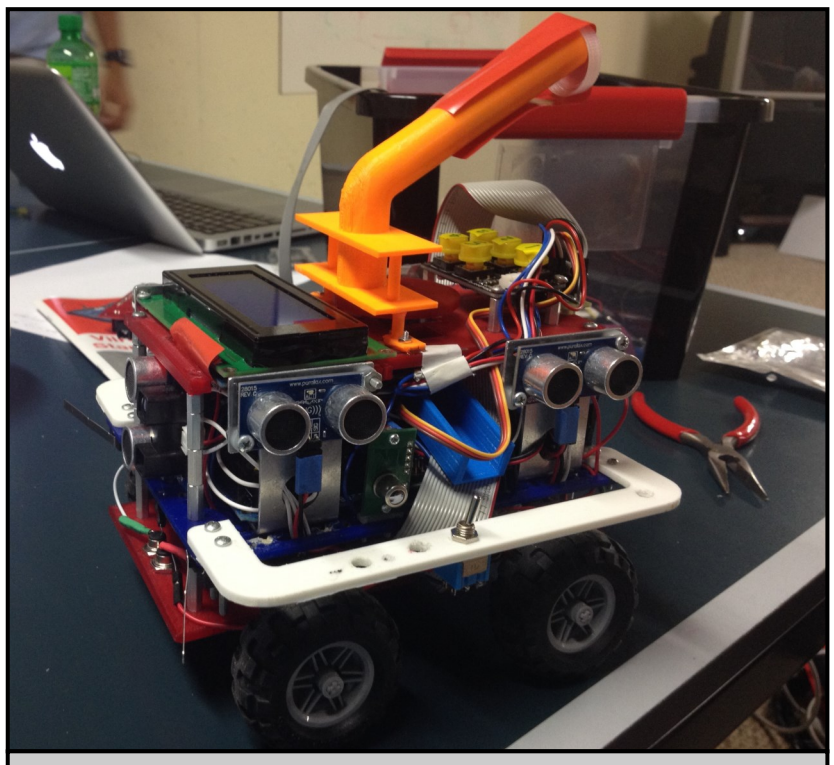
We've finished our second day, tomorrow we have only one more run left, and that'll decide everything. Our first two runs of day went fine, 410 and 400 points scored respectively. For both we missed around 40 points. In the last run, a problem resurfaced. The sensor we used for turning, a MPU 6050, went into "La La Land" (Dennis Mabrey). It gave us values way off from what it was supposed to get. Nonetheless we still scored 250 points. We are currently 5th place. We're trying to fix the MPU problem. We'll see how it goes.

Day 4 - July 23

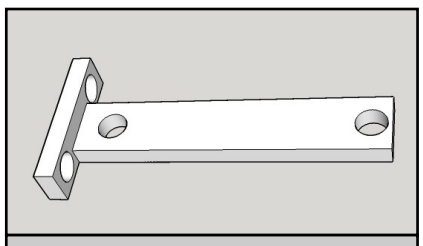
They threw quite a course at us today for our 7th and final run. It had a maximum points of 530. The MPU problem persisted, and we were only able to score 85 points. HOWEVER, **WE'RE SIXTH IN THE WORLD**!!!!!



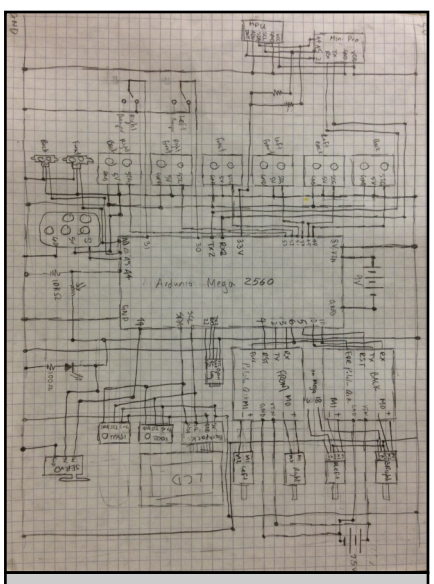
Our Rescue Kits Slider Design



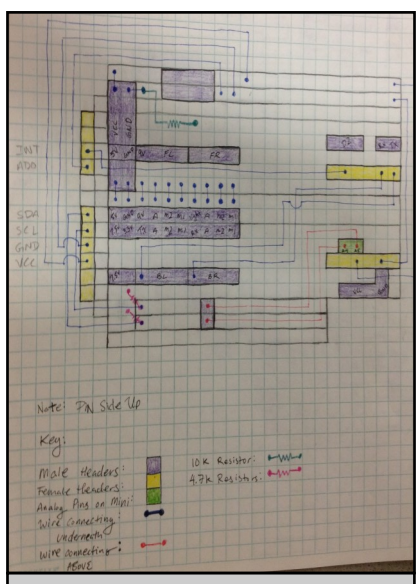
Above is the robot used in the competition



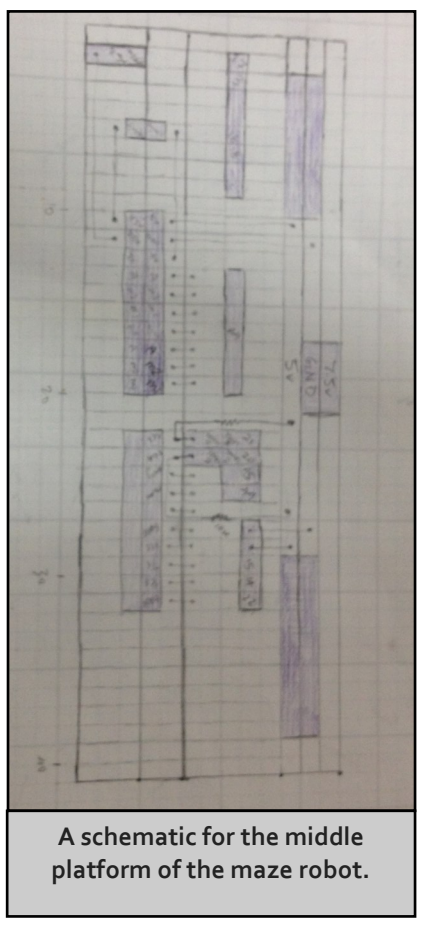
The Thermal Sensor mount for our the team's TPA81—Thermopile Array)



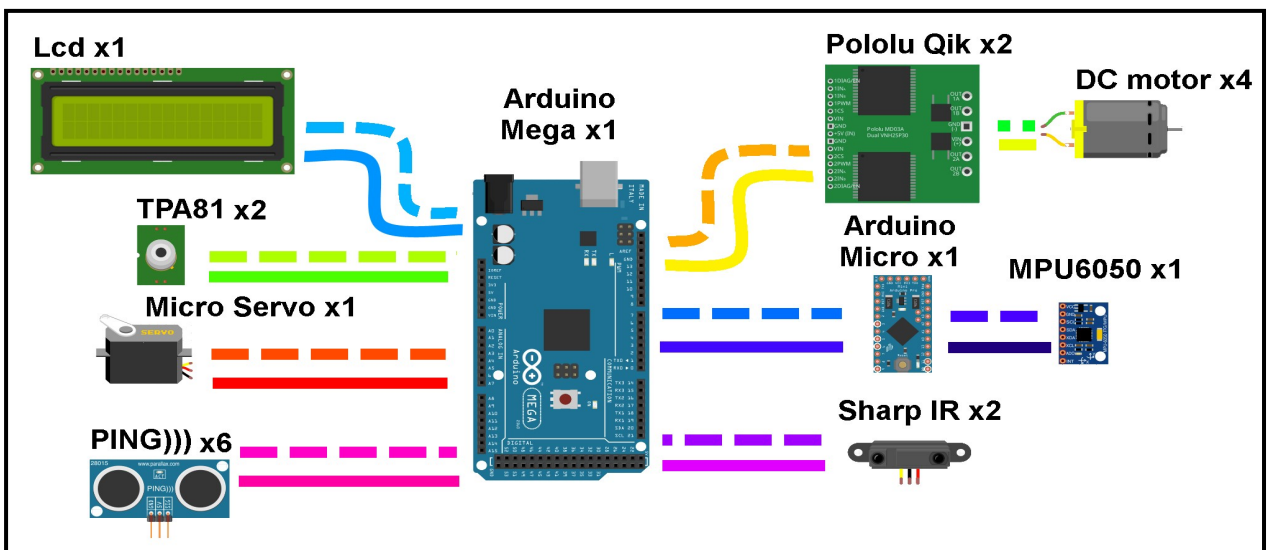
A schematic for the top platform of the maze robot.



A schematic for the bottom platform of the maze robot.



A schematic for the middle platform of the maze robot.



A diagram showing the components of the robot above

Won First Place of Super Team at 2014 International Championship

From Storming Robots Office

Storming Robots students once again represented the United States and won First Place Title in the recent 2014 Artificial Intelligence Oriented RoboCupJunior International Championship Competition in João Pessoa, Brazil from July 19 through July 25.

These NJ techno-wizards performed brilliantly against an intensely competitive field of teams from countries around the globe including China, Japan, and Germany.

The World Championship competition is divided into Major and Junior Leagues. The Storming Robots of New Jersey competed in the Junior League which is composed of teams of primary and secondary school students.

In the Rescue/ Primary League competition, the Storming Robots' Team B.E.ing won the First Place in the Super Team World Championship, along with Team Uraguay. Team B.E.ing is composed of Joseph Chen (gr. 9) and Ethan Wu (gr. 6), both of them are from the Somerset County. This team created their own Arduino-based sensors modules from scratch, and NXT-based chassis. Complexity is so remarkable, and it is truly uncommon even in high school level.

Ethan Wu explained, "The RCJ competition was all about coping with problems and creating effective solutions under pressure. It was also a good teamwork experience because during the Super Team competition, we had to work with another team we didn't even know."

The B.E.ing team—Joseph Chen (Left) and Ethan Wu (Right) after the Rescue Line Super Team Championship Award Ceremony.

Rescue Line Super Team Championship Award

For the Rescue-Maze/ Secondary competition, the Storming Robots' Team SR -chitects won 6th place in Super Team World Championship! Members are Salil Pathare (Gr. 10), Michael Xie (Gr. 10), and Ashley Yang (Gr. 9), all from Somerset county. Salil said, "This competition seemed to be particularly intense. Most upper teams score close!" This team created their 100% Arduino-based robot from scratch, and deployed college level Artificial Intelligence algorithm as core for the robot's intelligence.

Congratulations Team Being and Team SR-chitects!

One team called Tempest – Rescue/ Secondary, a rookie team, has had very challenging runs and returned with bountiful technical experience.

Congratulations to Team Tempest for great sportsmanship and perseverance for excellence!

All of the challenges at the RoboCupJunior require students to delve deeply in robotics programming, their algorithmic thinking skills, and their devotion to exploring the future of artificial intelligence. "For these young folks to possess the capacity in accomplishing this is truly impressive.

This particular competition stands apart from other robotics events held in the United States. Besides all challenges require 100% full automation, this game is artificial intelligence oriented. Another aspect is very different from others is the freedom of using platforms at participants' choice. That means you do not need to purchase proprietary robots platforms such as Mindstorms, VEX, etc.

All robots designs are unique. Some used LEGO Mindstorms devices. Some used Arduino and electronic devices from various vendors. Some even designed their own parts and created them with 3D printer. Most unique and effective designs will be put online at the Storming center's website for future learning purpose.

One outstanding element in this game is that the World Tournament takes place in conjunction with world renowned RoboCup.

The event is attended by hundreds of research scientists and engineers from around the world. The opportunity to interface with researchers and to watch their amazing robotics apparatuses in action truly sparks inspiration and interest in engineering among these children.

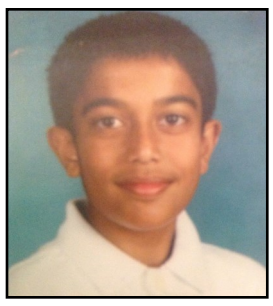
Students will have the opportunity to interface with hundreds of research scientists and engineers from around the world, and watch their amazing robotics apparatuses in action.

These impressive youngsters have learned to be effective problem solvers, and possess technical skills in order to automate robots are uncommon among such young ages. Winning or not, 'Hats Off' to all teams who have demonstrated self-initiative and perseverance in challenging themselves. Last but not least, they had a great time doing it.

Cyberbullying

By: Darshan Patel

Editors: Bhavik Shah and Ashley Yang



Approximately half of US student' are impacted by traditional bullying each school day, Cyberbullying is the most affective. Kids often go on social media and get cyber bullied. Schools should get involved in cyberbullying so kids can be safer online. They should get involved because they could teach kids about cyberbullying, and most times another school student is the bully. Plus, the bully can attack the school and its interests. Schools should be involved in cyberbullying so that kids can stay safe.

62% of cyberbullying is done from another student. Schools are fully responsible of the kids when they are in school. So schools should help a student getting cyberbullied. They can easily tell the bullies at school to stop. Approximately half of US student's are impacted by traditional bullying each school day. Someone can argue that what if the bullies at the school don't stop. However school's can talk to the bully's parents and work it out with them or suspend the bully. Schools can do many other things to help stop cyberbullying.

Kids learn many subjects in school and sometimes that is the only place they get to learn. Since the school's teach the kids mandatorily then they should teach kids about cyberbullying. They can teach them about how bullying is bad. 71% of students go to their school for cyberbullying help. Plus, only 45% get the help. If the schools don't help then the victim might get deeply depressed. "Wouldn't adding classes decrease other class times?" However it would benefit them in the long run. The last reason why is that they can get attacked.

60% of the time cyber bullies are older than 22. School's should help with cyberbullying or else the school might get attacked. 35% of kids have been threatened and the threat happened. This shows that bullies aren't afraid to be violent. School's should have a daily check on students social network to locate any bullying. One can argue that not always is the bully older than 22, people younger than 22 can hack into the school, and so many other things. Schools have the power and knowledge to take down bullies.

More than 1:3 young people have experienced cyberthreats online. Schools should get involved because they have the power to teach kids about cyberbullying, plus, most of the bullies are other school student's. Also, the bully can get the information of the school and threaten the school. Cyberbullying can lead to many problems. Schools should be involved in cyberbullying so they can assure that kids are growing up well.

Football Challenge Project Design Winner

By: Shikhar Ahuja

Introduction:

This challenge has a football field with a Runner robot running towards the goal while avoiding defenders, and a Defender robot trying to stop him.

I got my idea while thinking about activities a robot can do which a real person can do in real life and I wanted to do something about one of my favorite sports, football. I have always been curious about the robot's capacity to impersonate real life actions. I decided to create an impersonation with something different from the regular robotics challenges. I thought it to be unique to add a few features such as two robots instead of just one and also have static defenders while playing football.

The football challenge that I build works really well and is so much fun to watch. It shows the tasks that a Runner and Defender need to perform in a football game. There are many decisions that players need to make. They have to avoid other players, stay within bounds of the field, attack and run to the goal line. The robots also have to be strong and fast to be effective. They have to bear a collision and keep going.

Bill of Materials:

- Black Electrical tape
- Silver Metal tape
- Lego parts from NXT kit
- White window blind screen to use as field
- NXT base set (9797)
- NXT individual brick
- NXT connector cables
- Robolab 2.9 software
- NXT sensors for light, ultrasonic, touch
- 5 Interactive servo motors
- Batteries for robot

Estimated cost - Total about $600-NXT base set was $300, extra brick was $100, and NXT individual parts, pieces, Robolab 2.9 software tape and screen were all about $200 dollars.

Tasks:

Runner:

1. The runner robot has to go as fast as it can to the silver tape goal line for a touchdown.
2. If it sees a moving defender rushing, it must turn to dodge it and continue running.
3. If it sees the defenders standing still it must turn to one side and try to make it past them.
4. If it reaches one of the black lines on the border of the field, it should turn back into the field. This is done by turning left and right with increasing amount of encoders, until it sees white.
5. Once it reaches the silver touchdown line it must shake in a victory dance play, music and then stop.

Defender:

1. When it does not sense an object nearby then it must spin around in circles until it senses an object.
2. When it senses an object nearby, it should go straight towards the object.
3. It has a touch sensor in front the robot. When it touches the runner, the third motor of the defender should activate the hand and it is supposed to pry out the ball from the runner.
4. When the touch sensor is released, it should stop moving the arm up and down, and continue looking for the Runner, or rush towards him if sensed
5. If it touches the black line, it should turn back into the field by going left and right in increasing amounts.

Setup:

Design field layout and number of colored tapes needed

Set up field. Attach white screen with black borders, silver goal line.

Hardware and Design Process:

It is a five minute bot system with many extra parts to make it withstand collisions.

The sensors used are light sensor and ultrasonic sensor for both robots and touch sensor for the defender.

Runner

The Runner needs to be able to hold the ball. There is a system of axles and Lego pieces which I used to block the ball from escaping. If the runner gets hit, sensors will not fall off and

Continued to Page 7

Student Articles ...

Football Challenge Project Design Winner

Continued from Page 6

should get back on track.

Defender

The Defender has an extra arm in front to attack the Runner, which can move up and down. The touch sensor for the defender is low in height. Also the touch sensor will not come in front of the ultrasonic sensor.

After a collision, defender's touch sensor and third motor do not fall off.

System Design and Development

First I designed with flowcharts for the individual pieces of the program. I used Robolab 2.9 software because I have been learning it for longer and I am not as knowledgeable in RobotC. Then I coded each task for Runner and Defender. I started with the code to stay within the black lines of the field as this code was used by both robots.

I tested each task separately for each of the two robots. Then I tested both Runner and Defender together in different positions. I also tested with any object as a still defender. I tested a collision to see that the parts do not fall off.

Time spent on Flowchart Design - 2 hours
Time spent on Coding - 2 days
Time spent on Testing/Troubleshooting individual tasks 2-days

Team:

I did this project alone. My father bought the materials for me and he made the field in my room, and helped me to stick the tapes.

Problems Faced During Project:

1. I had only 1 light sensor on each robot. When hitting a black line, I did not know whether to turn the robot left of right. I made a way to go left and right in a loop with increasing encoding values, till the sensor sensed white. Then it would turn back into the field.

2. This worked on the left side, but when trying on the right side, it was not taking too long. I figured out another check for white was needed in the middle of the loop and I used a fork to do that.

3. The thickness of black tape had to be increased.

4. On the defender the third arm was not working like it was supposed to and kept turning after one up and down move. It turned out that threshold was a positive number not a negative number and I changed it to the right thing.

5. Once the defender went after the runner, it was not sensing black. This was because a fork was not working in a wait for signal. I solved that problem by changing a wait for into a loop, and it started working.

6. The touch sensor was in a position which was blocking the ultrasonic sensor on the defender. I fixed that problem by relocating the touch sensor.

7. The touch sensor was very unstable. I attached pieces to a fixed rod and it worked.

8. On the defender the third motor was high up and made the robot lean forward. I moved it back and attached another beam to make it stronger.

9. Whenever I switched robots, the laptop would not recognize my robot. I fixed that by shutting down Robolab and then starting it again.

Advice to Others:

1. While doing this project you have to do it step by step and test each task separately, or it will never get done. There is too much to do all at once.

2. When faced with a problem, copy that part of the program and test it. Add music beeps to see whether the program is going where it should.

3. Keep the code clean and keep cleaning up the connections.

4. Use beams to make parts stable

If I Had More Time:

If I had more time I would have added one more color outside the black line, so if the runner senses this color it will know that it is out of bounds, play a sad song and display the word failed, because it could not make a touchdown.

Should Gambling be made Illegal?

By: Aditya Jain

Should gambling be made illegal? This controversial topic has been on the forefront of discussions and debates for numerous years. While many will argue that gambling ruins lives and should therefore be immediately abolished, these people are oblivious to the real numbers and statistics. It is easy for someone who has not studied the topic to make an uninformed choice based on emotion. Various researches have proved that the pros of gambling outweigh the cons. Gambling should not be made illegal because it creates jobs, makes revenue and provides entertainment.

To begin, gambling should stay because it creates numerous job opportunities. Someone looking for a job at a casino has many options. He/she can be a dealer, technician, supervisor or more. "Well over 400,000 persons work in the casino properties of the United States" (Thompson 44). So many lives depend on the existence of gambling and if it were to be taken away, there would be a surge of unemployment. Saving gambling is saving the lives of all these men and women!

Furthermore, gambling generates a lot of revenue for the government. Cities where there are a lot of casinos, like Las Vegas, account for a big part of the country's overall income. For example, in February of 2013, in the state of Nevada, gaming revenue was over $1 billion (Stutz 1). It is common knowledge that the government uses this profit to create essential public services like schools, roads, libraries, etc. All these factors together support the economy of the entire region and improve the overall quality of life for everyone.

Finally, gambling provides a source of entertainment from the busy lives of people who just need a break. In fact, 55.4% of people that gamble do it for entertainment, excitement or as a hobby (Thompson 127). Contrary to the belief that most gamblers are addicted to the activity, it is proven that less than one percent of Americans were subject to problem gambling (Thompson 137). Gamblers' motivations, for the most part, are justified.

Although several anti-gambling organizations and individuals may disagree, the given facts are irrefutable. The prohibition of gambling will cause problems on a large scale. Unemployment rates will soar and states like Nevada will lose a lot of revenue. Why go through the trouble of abolishing gambling if it helps the common welfare? Ensuring that gambling is not banned will save individuals and the government alike.

The Importance of Journaling — featuring: Bob the Alien, The Curiosity Rover, The Queen of England, and YOU!!!

By: Ashely Yang

Every kid hates to hear "Time to do journals" at the end of class. I was one of those kids (and don't tell my teachers, I still sort of am). However, my time spent documenting my team's work in Resuce Maze taught me a lot. Journals, despite being tedious, are an important and helpful tool. We can explore it this through a myriad of funny (made up) situations.

You're on Mars, fixing the Curiosity Rover. Midway through your work, you're swept away by a Martian tornado. Your partner Bob the Alien decides to pick up the work from where you left off. Fortunately you wrote a journal. Bob the Alien has an idea what to do, but we have no idea where you are.

Journals are an useful communication tool. They inform and update others. A shared journal between you and your team members helps communicate your progress without having to calling each other up.

You're on a cloud. Somehow you slip, and hit your head on another cloud. You now have a concussion (don't ask me how, I thought clouds were soft too) and you have lost your memory of the previous week. By reading your journal you remember you're going to meet up with Bob the Alien to fix the Curiosity Rover. Thank goodness you have a journal.

Sometimes after a busy long week, you forget what you did the previous week. By keeping a well maintained journal, you can remind yourself of the previous work you've done.

You're back on Mars!!! And it looks like there is a tornado storm right outside your complex. Obviously now is the best time to pick Martian mushrooms. However, you decide to read your journal before heading out, because you remember writing something about tornado a week or two ago. Looking back at your journal you're reminded of your mistake. You went out to fix the Curiosity rover while a tornado storm was occurring, and got swept away onto very poofy, hard clouds. Using the knowledge of this previous mistake you made, you decide to gather mushrooms after the storm.

Journals are a great way to log problems that have occurred, and your solutions if you have them. By keeping a list of both software and hardware problems and solutions, you have a wonderful 'database' of knowledge to look back on. If you come across a problem that seems familiar, but don't remember the solution, FLIP BACK THE PAGES ON YOUR JOURNAL!!! If you have the problem and solution documented, you won't have to go through trying to figure out the solution again.

You and Bob the Alien have done a lot of work on the Curiosity Rover. It's now fixed and acting all curious again. The Queen of England wants to knight both of you for your amazing work. However at the ceremony impostors show up. Before the impostors are knighted, you and Bob pull out your journals, (your selfies) and all the other proof of your work with the Curiosity Rover. The impostors are thrown in jail, and you're knighted.

Journals are a proof of work. Pictures, selfies, but most importantly journals show the outside world that you have been working hard (or hardly working). A maintained journal can't be whipped up in a day, it takes months of work, entry by entry, to get to the final result of a well kept journal.

The 'pain' of journaling comes with rewards. The dedication spent journaling is rewarding when you look back and realized that all those words on all those pieces papers are yours. It's also a priceless proof of the effort that you've put into a project, robot, anything. In my case, my team SR-chitects won the Best Technical Journal Award at the 2014 International Robocup Junior Competition. Awards or not, journals are priceless and important.

Should Universities Provide Free Education?

By: Umar Ahmed Badami

The USA already has free public schools, but why not free college as well? We have been having lots of success with our school system already, so why not take it an extra step forward?

Programs like this have already been started in Finland, Sweden and Germany. This program seems to have benefited Germany in many ways, such that 86% of adults ages 25-64 have something like a high school degree (1). In Finland, 84% of the previous range of adults have a degree like that of a high school diploma. Finland also seems to have amazing education (2). Sweden has 87% of adults ages 25-64 earning the equivalent of a high-school degree, slightly higher than that of Germany (3).

If free college opportunities were offered, students would be flocking to those universities. Then, everyone would be getting a higher standard of education, which means that more people would be able to master higher level professions. Then, they would take the knowledge that they had gathered from the university and go to their home countries and use it to help improve them in a way. Then, that country would build free universities so that more students could learn and improve their countries, then those countries would make free universities, et cetera. Those countries with free universities, or at least graduates from them, would have better economies, health and school systems, as well as government. That would then increase the per capita of that country, which then would make available more public services, such as museums, roads, schools, transportation, recreation, and hotels. With all of these attractions, tourism would be boosted, which could lead to more people coming to that country's free universities. The process would go on forever.

Since these programs have benefited countries so much, this house believes that colleges should have free education. As Neil Armstrong once said: "One small step for man, one giant step for mankind."

Robots installed at Amazon Fulfillment Centers

By: Bhavik Shah

Ever since their conception, Amazon has been known to rarely turn a profit due to their putting money back into their company. They have also prided themselves with having a very organized system for delivering packages efficiently without sacrificing speed. In order to further this idea, Amazon invested in a new technology -- robots.

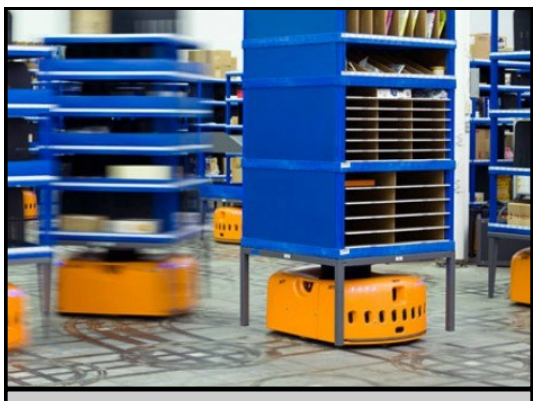
Pictured above is the interior of an Amazon Fulfillment Center

In 2012, Amazon purchased Kiva Systems Inc. for $775 million. What makes Kiva Systems so special to warrant such a purchase is their robot "pods" that they make. These pods are a mere one foot tall and seven feet wide, weighing roughly 350 pounds. However, they are able to lift up to ~750 pounds. Their function in the fulfillment center is to cut the time it takes for the pickers, employees who find the merchandise, to walk around and search for the correct item. Employees used to walk throughout the facility, find the correct item, and carry it back to the station to be taken to the next stand in the process, but the robots will instead lift the shelves and carry them to employees at their stations. They are even equipped with sensors that allow them to move quickly throughout the facility avoiding collisions with other robots. With this menial task done, the employees are able to easily pick the correct item from the shelf, check for quality, and package it for sending to the recipient. However, the task of walking throughout the facility, which could take hours, is finished within minutes by the robots. The robots don't serve to replace the employees, but merely increase the speed with which the employees can do their jobs. In fact, over the past few years, Amazon has actually doubled its employee count.

One of Amazon's massive fulfillment centers. Thanks to centers such as these, Amazon has become one of the biggest retailers in the United States.

Amazon started installing Kiva Robots in their facilities last June. As of Black Friday 10 out of Amazon's 50 facilities throughout the country. Amazon received roughly 426 orders per second on Cyber Monday, and these robots help meet the demand.

There can be up to about 3000 Kiva robots in a facility, and Amazon is already beginning to replace them with better models that operate up to 50% faster than previous robots. Within a few years, Amazon plans to outfit all of its centers with the Kiva Robots.



Kiva Robots hurry around the center

New Ultra-Thin Mirror Developed to Reflect Heat

By: Bhavik Shah

There are many costs associated with large buildings, but a team led by electrical engineering professor Shanhui Fan has found a way to cut one of them--air conditioning.

One of the primary sources from which things receive heat is the infrared radiation that all objects and living things emit. In order to deal with this light, the researchers created a multilayer material. The material is amazingly thin (thinner than aluminum foil), and is meant to be installed onto building rooftops in order to reflect infrared radiation. Some, however, may argue that the reflection of infrared radiation would contribute to climate change, as it would be trapped within the atmosphere. Scientists have refuted this argument by saying that the radiation is actually reflected *through* the atmosphere into space. Thus, as the sunlight does not actually get caught in the atmosphere, it would not impact global climate change.

Of course, another one of the main sources of heat is the sunlight that we see. That is where the second function of the material comes in handy; its functionality as a mirror. The team calls this dual resistance against heat photonic radiative cooling. The material itself is made of seven layers of silicon dioxide and hafnium oxide on top of a thin layer of silver. The internals of the material allows it to deflect infrared rays in such a way that it decreases the interior's temperature by nine degrees, relative to the surrounding air, without increasing the temperature of the air surrounding the building.

However, the team says that there are two main technical problems they are currently facing. One of which is how to conduct heat directly into the mirror. Although the mirror can reflect sunlight directly, in still needs to be able to expunge heat already inside the building. Therefore, scientists are working on a way to efficiently direct the heat to the mirrors so it can be deflected into space. The final problem is production, for the only prototype is a circular disk with a radius less than a few feet.

Despite these blockades, the mirror opens up a range of possibilities involving using space as a resource. Just like how the sun is harnessed as a renewable energy source, space can be used as a vast dumping ground for excess energy.

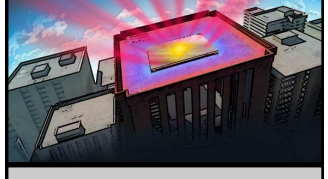


Diagram of Thin Mirror in Action

Stanford University, one of the most prestigious universities for engineering

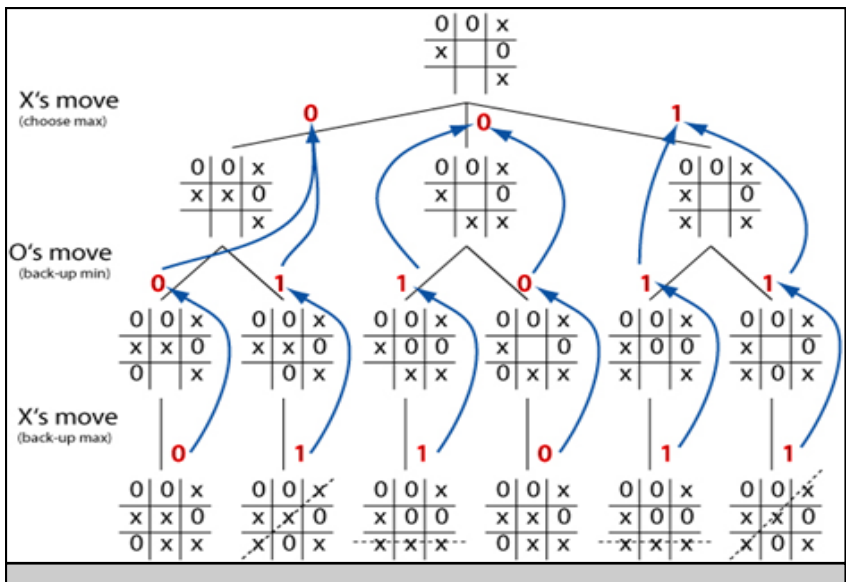
MiniMax Search Algorithm

By: Bhavik Shah

Board games are very popular in today's society; however, in order to play against a computer, certain algorithms in searching or the “best move” must be employed in order to create the computer's AI. One of the popular search techniques to do so is the MiniMax Algorithm. The MiniMax algorithm is a method that utilizes recursion (calling the itself) in order to simulate all possible states the current game could result in. It will then make its decision based on some returned or calculated weight points or scores.

This algorithm is particularly used for two players game. To optimize its chance to win, the algorithm will compute the turn between the Computer vs Human. While Human’s turn will also maximize it’s chance, the Computer turn will minimize whatever Human is trying to maximize. Therefore, the score returned by the human turn is in negative, while the computer turn is in positive.

Diagram below shows Tic-Tac-Toe specifically, one can see the result in the diagram pictured on the left below. In order for player "X" to make the most beneficial move, he/she goes through the all the possible end game states that could result, and because one of the moves resulted in no possible loss, takes that move. Because

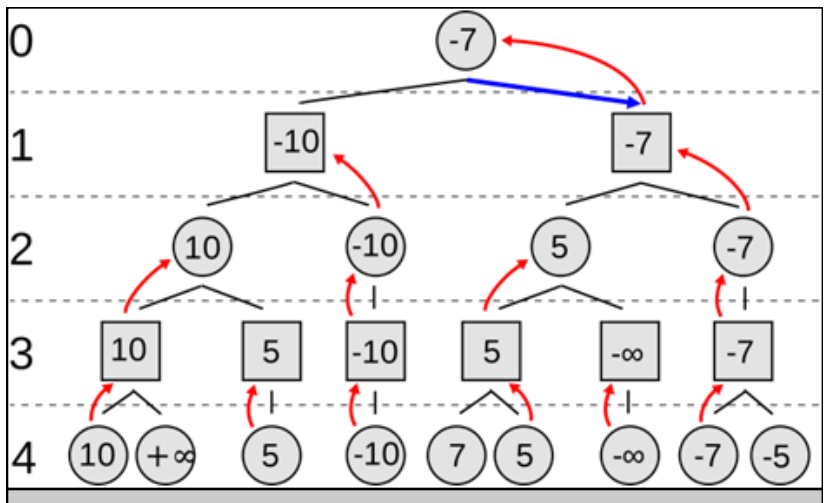


Above is a diagram depicting Minimax applied to Tic-Tac-Toe.

From http://snipd.net

Do note that may be (N-1)! (i.e. factorial of N-1) possible nodes (moves) at Nth level. If each turn returns a constant of 1, 0, -1 only, player cannot determine which move is better than the other. Therefore, it will be good to allow variant in the returned score.

In the diagram below shows a bit of optimization. Instead of just retaining value of 1, 0, or –1, each turn will accumulate the scores. The following diagram shows the effect. Note that it is easier to understand when one starts from the bottom, where all the final scores start to return. In each turn, the function returns whatever score is most beneficial for the player (-1) /computer (+1). Note that , on turns 3 and 1, the maximum number is



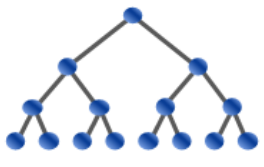
Above is a diagram depicting Minimax applied to Tic-Tac-Toe with accumulated or weighted scores.

http://users.softlab.ntua.gr/~ttsiod/score4.html

returned, as the computer wants to make the move that results in the highest score for itself. On turns 2 and 4, the minimum is returned as the computer must assume the human will make the move most beneficial to him/herself.

The algorithm accounts for *every single* game end, the result when implemented properly will always end with either a Win’s and very few Tie’s.

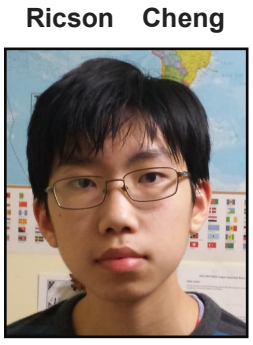
United States of America Computing Olympiad (USACO)



From: Storming Robots Office

To align with the goal in strengthening the indispensable computational thinking skill, Storming Robots encourages our select roboclub students to participate in USA Computing Olympiad. USACO is the one of the most prestigious pre-college Computer Science competition in the states. This serves as a good indicator of one's ability in problem solving, algorithmic thinking and analysis. It is part of the IOI (International Olympiad in Informatics) program.

Here lists SR Roboclub students scoring high at the event.



Ricson Cheng (12th Grade) has been accepted to the Carnegie Mellon University (CMU) to start on the Fall of 2015! We congratulate Ricson.

He advanced to the Gold Division of USACO in January of 2015. In early 2014, Ricson advanced to the Silver Division.

During his free time, he enjoys Astronomy.

Riscon is also the first SR student who establishes his own profile web page in scholastic style to capture the solid evidence of his strength in both academic and attributes. His profile webpage includes some of his cool projects, such as:

- The Sieve of Eratosthenes with his own Binary Segmentation Algorithm
- QuickSort with Tri-Partite-Partitioning and OpenMP
- Robotics GPS Navigation.

Visit his online profile page here: http://ricsoncheng.net78.net/ . Although this is yet complete, we would like to have this noted here at our Loose Gears and hope to inspire others to start their own as well.

Luke Dai (10th Grade) advanced to the Silver Division in January of 2015. He, along with his soccer team Dimensions, has won Third Place in the 2010 International Robocup Junior Soccer Championship!

During his free time, he enjoys Robotic Soccer and Math.

Ethan Wu (7th Grade) has advanced to the Silver Division of USACO in Dec of 2014. He

scored the maximum points in that the December competition. He, along with his B.E.ing team, won the First Place at the 2014 International Robocup Junior Rescue SuperTeam Championship!

Currently, he is working on development of an Android middleware application as his Roboclub Advanced Project.

During his free time, he enjoys figure skating and playing the viola.

Students Articles ...

How Storming Robots has impacted my life

By: Umar Ahmed Badami

I've been attending at Storming Robots for over three years, and it's made a lot of impacts on my life. Working out tough challenges in three different languages over the years really forces you to think outside of the box, and think critically about problems. Storming also encourages a lot of creativity. You will learn how to work out the kinks and bugs in the program by yourself. It teaches you how to cooperate with other members in a group, and also to be punctual about homework submissions. It builds your foundations with drag-and-drop environments to program more basic tasks, then takes you into programming in code to do more complicated things with the same robot. It finally plunges you into a real programming language, which has many real life applications. It also gives children a chance to build their confidence in themselves and their communication skills. Storming Robots has truly shaped my character over these past five years, and it will continue to make me a better person.

Call attention — Future Engineers, Developers, Scientists !!!

From the Director of Storming Robots

Not investing the time and effort to develop good communication skills can be a self-limiting decision no matter how good you are in technical aspect. Missing writing skill will have you entered the workforce at an disadvantage. A lot of good ideas never see the light of day because the inventors/developers/engineers/scientists/explorers who you may become one day are unable to communicate their ideas effectively, or even at all.

So, why not take advantage of it now by putting in small fraction of your time and effort to do so. Meanwhile, you get a chance to voice your opinions, interests, or anything that are worth to discuss and talk about. Being an engineer with writing skill truly makes you one of the coolest person around the block!

Join us the Loose Gears Newspaper group.

Word Search...

Electronics

N E P N F R E S I S T O R T F N Z L G O
B L G E K V F I E Y G L I K T L A E B L
A E K Y R D B D N J M U I Z Z B Y T A E
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TRANSISTORS
CURRENT
BATTERY
CPU
DIRECT
ELECTROMAGNET
GROUND
INSULATOR
OHM
RELAY
WATT
AMPERE
CAPACITOR
CURRENT
CURRENT
ENCODERS
GAUSS
MEMORY
OSCILLOSCOPE
RESISTOR

The Happening ...

Summer Schedule:

Full description Also available online : http://summer.stormingrobots.com , then click on "Weekly Schedule"

July

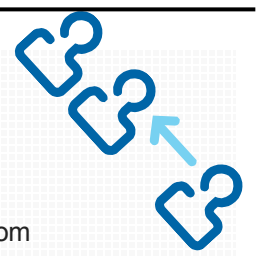
Wk1 - July 6th to 10th	
Robotics Programming and Algebra	Gr. 7+
Robotics Technology Projects	Gr. 4-8
Robotics Learning with Nano Missions (FLL Theme)	Gr. 4-6
LEGO RoboDog (Take Home) & Amusement Park Exploration	Gr. 4-6
Wk2 - July 13th to 17th	
Robot Parade - Coding Party	Gr. 3-4
Physics with Robotics	Gr. 8+
Robot-to-Robot Automation and Remote Control	Gr. 7+
Robo500 Grand Challenge & Drag Racing	Gr. 4-6
Wk3 - July 20th to 24th	
Robotics Programming and Algebra	Gr. 7+
Robotics Fun with Mathematics	Gr. 4-6
Robo Rescue Mission Training (RobotC)	Gr. 5-8
Wk4 - July 27th to 31st	
Robotics with Electronics - Arduino	Gr. 8+
Super Robotics Sumo Contest Training	Gr. 4-7
Robotics Zoo	Gr. 4-6

August

Wk5 - August 3rd to 7th	
Robotics with Electronics - Hybrid	Gr. 8+
Physics with Robotics	Gr. 8+
Robotics Technology Projects	Gr. 4-8
Robo500 Grand Challenge & Drag Racing	Gr. 4-6
Wk6 - August 10th to 14th	
Physics of Engineering	Gr. 8+
Robot-to-Robot Automation and Remote Control	Gr. 7+
LEGO Mechanics (Take Home) & Missions to Mars Exploration	Gr. 4-6
Wk7 - August 17th to 21st	
Introduction to Computer Science and Engineering	Gr. 8+
Robotic Quadruped with VEX-IQ	Gr. 6-8
Super Robotics Sumo Contest Training	Gr. 4-7
Wk8 - August 24th to 28th	
Learning to write an AI algorithm to play against human - 9am to 12pm	Gr. 8+
Analytical Fun Day with Math and Robots	Gr. 4-6

Happening...

September to June:	**Roboclub Terms** **About : http://roboclub.stormingrobots.com**
July to August	**Summer Workshops Weeks** No Roboclub meeting during Summer except for some Advanced or Algorithms group. **Details / Schedule / Policy:** http://summer.stormingrobots.com **Registration:** http://campreg.stormingrobots.com
Mar. 24th — Jun-14th	Spring Term Period
Apr. 19th	Pending RobocupJunior Tournament. Date.
Mar. 31 — Apr. 5th	Spring Break. No classes for Roboclub.
May 19th — 24th	Memorial Day Week. No classes for Roboclub.
Jul. 6th— Aug. 28th	Summer Workshops . No Robotclub meeting until Fall Term.
Sept 8th— Dec. 13th	Pending Fall Term Period..
Nov 23rd— 29th	Thanksgiving Break. Center closes.
Dec 21st— 27th	Christmas Break. Center Closes.
Dec 28-30:	Administration office remains available during this holiday.
Dec 31st — Jan 2nd	New Year Break. Center Closes.



Contacts

Home Site:	http://www.stormingrobots.com
Calendar	*http://cal.stormingrobots.com*
Center Policy:	*http://policy.stormingrobots.com*
Phone:	(908) 595-1010
Fax:	(855) 595-1010
Editor-in-chief:	Bhavik Shah
Co-Editor-in-chief	Ashley Yang
Director:	Elizabeth Mabrey
Office	office@stormingrobots.com
Emails:	*<firstname>.<lastname>*@stormingrobots.com

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