The Loose Gears

Welcome from our Editor of Chief…

Welcome to the first issue of The "Loose Gears"! I, along with Elizabeth, the director of Storming Robots, strive to share with you the discoveries of the robotics world, report the achievements and the events involving people in our Storming Robots roboclub community, etc.

Hopefully this will be the start, the first issue, of a **successful publication. Please don't hesitate to** write or suggest to us your robotics-related stories, thoughts, articles, competitions, jokes, **comics, anything! We'd also heartily welcome any** of your extracurricular achievements, as well. We would like this to be something that draws the Storming Robot community together. Please enjoy our newsletter!

Editor in Chief's bio: I'm a 9th grader from Ridge High School. I was born in Indiana, and moved to Georgia soon after. In 7th grade, I moved to New Jersey and discovered a lot of my interests and hobbies. I like to video edit and write in my free time. I've liked writing since I was a little girl, and I recently discovered my passion for video editing a few summers ago. I love writing seasoned articles and find them very enjoyable. **I've been running** half marathons and training for long distance runs ever since 8th grade. **I've run a few** famous half marathons and have been first in my age group. **Additionally, I play the flute and I'm part of the school's wind ensemble, which is an audition**-only advanced band. I am part of the Forensics (speech and debate) team at school. I do the debate event Public **Forum with a partner. We've been very successful at** many tournaments. One day, I hope to become a medical doctor.

Attention!

- Send us shout-outs, accomplishments, and articles!

- Email us your robotics creation. Email to admin@stormingrobots.com to obtain details in requirements.

- Write us any of your special interests!

Inside This Issue:

Robotics Alert!

The Rat Car
- by Michelle Lu

The RatCar is a revolutionary advance in robotics made by Japan. The RatCar is a brain-machine **interface that uses a rat's** brain signals to control a motorized robot. The rat hangs in the air, and the **robot does what the rat's** limbs would do.

Osamu Fukayama and colleagues developed RatCar to study whether a small vehicle could be controlled by the brain signals **that move rats'** limbs. The system involves implanting tiny neural elec-**trodes in a rat's** brain.
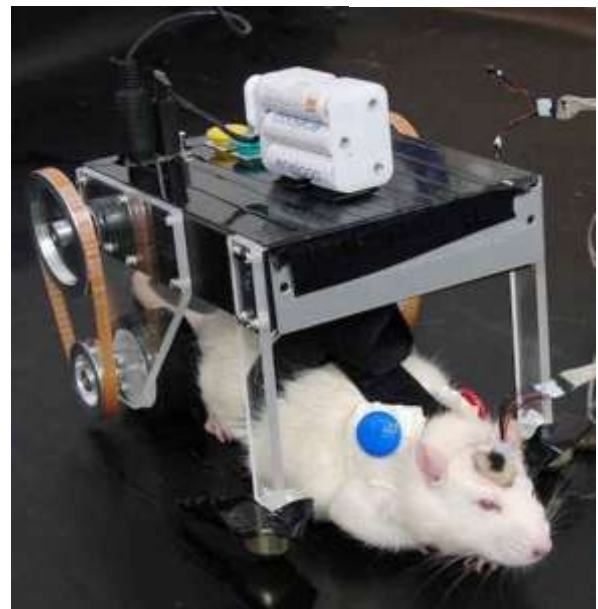
The rat is suspended from a small lightweight **"neuro-robotic platform".** The goal is to make the vehicle and the rat work together to move forward.

Researchers trained the rats by making them tow the car, motors turned off, around an enclosed area. A camera tracked **the rats' movement and** fed data into a modeling program, which pieced together signals from the motor cortex. Then, the rats were hung from the car so their limbs barely touched the floor. The researchers switched the motors on, and as they tried to move, their neural signals were used to drive the car. Six out of eight rats adapted well and were able to get around with the car, according to IEEE Spectrum.

The purpose of this experiment was to see whether people with locked-in syndrome or various other disabilities could control a vehicle with their brain for increased mobility.

"Soon, the streets are going to be filled with people in robot exoskeletons-get ready for the Robot Wars!"

U. of Tokyo's Medical Engineering and Life Science Laboratory

RatCar RatCar involves implanted neural electrodes that allow a rat's brain signals to control a motorized robot, Brain-Computer Interface Development.

The LandWalker

- by Michelle Lu

Image courtesy of myLIFE.com

Remember in Avatar, where soldiers had robots they could sit in and the robots would move for them? Now that technology is reality. A new product released by Sakakibara Kikai in Japan, the Land Walker, allows someone to sit in the cockpit inside a large robot that walks around according to your commands. You can even shoot sponge bullets!

Japanese machinery and robotics manufacturer Sakakibara-Kikai has released the first genuine bi-pedal **exoskeleton. It's the world's** first bipedal, 340 cm exoskeleton. It is designed for adults to use.

Image courtesy of myLIFE.com

Sakakibara-**Kikai's Land Walker** is 10 feet high, weighs 1000kg **and 'walks' along at 1.5kmh.**

"Soon, the streets are going to be filled with people in robot exoskeletons-get ready for the Robot Wars!"

Initially the Land Walker will be used at exhibitions and demonstrations. It has a gun mounted on each side but they currently only shoot squishy rubber balls. Given a bit of development funding, a bigger motor and a bit more speed though, the Land Walker would make a wonderful psychological weapon. It could also be a useful weapon when fighting in wars, and could help in rescue missions in situations too dangerous for humans to go in without robotic help but too tough for a robot to navigate alone.

Right now, the machine is on the market for about 36 million yen - around US$345,000. Sakakibara-Kikai is currently **working on a Kid's Walker,** which is a mini landwalker for children. Children sit in the chair, and they can control the machine which rolls around slowly. Soon, the streets are going to be filled with people in robot exoskeletons-get ready for the Robot Wars!
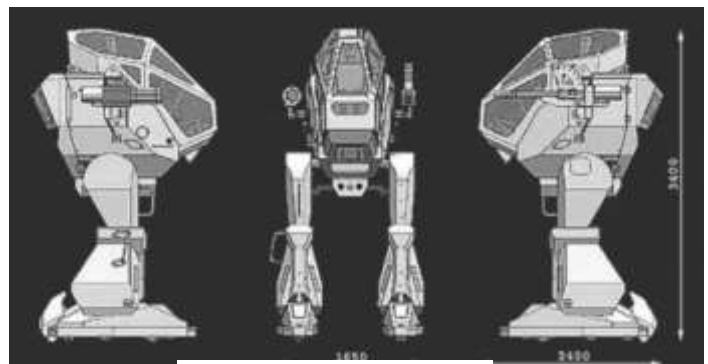

Image courtesy of gizmag.com

The Inside News!

The RoboFest — (NJ Engineering and Science Fair)

- by Michelle Lu

NJ Engineering and Science Fair took place on Oct 23rd and 24th of 2010. Storming Robots was invited to demonstrate a few of our projects, and host a fun Maze robotics challenge.

At the event, a wide array of tables, robots, people, and Lego pieces are squeezed into a high school gym. Loud murmurs and sounds **can be heard. It's the** RoboFest exhibition!

It's the second day of the exhibition. In the middle of the gym stand the Storming Robot booths. One of them hold a large, wide black wooden box. The top is open and inside a an enormous maze, built by small, flat pieces of wood. Yellow tape is placed intermittently along the maze. A large cardboard box filled with STORMING ROBOTS pencils is sitting to one side, and a large yellow box filled with spare parts is next to it.

There is a large roll of red raffle tickets, and next to it three robots and its respective remote controls, resembling large wheels. Tilt left to go left, tilt forward to go forward, etc. Another Storming Robots booth sports a small arena on the ground with two robots playing RoboSoccer with a small plastic ball.

Soon a loud buzz fills the air as children, parents, and exhibitors begin to get busy. Children approach the booths hesitantly, and we offer them a chance to drive the robots through the maze using the remote controls. They eagerly take up the offer, and when they finish, I hand them a pencil, a Robot crossword puzzle, and three raffle tickets. Automated robots passing the maze get 10 raffle tickets. Soon there is a line of kids waiting to try these robots, and my teammates and I are set busy giving them raffle tickets,

Setting Up-The Storming **Robot's booth (on the right)**

connecting the Bluetooth, and teaching each child how to work the remote. Hours pass. There is a quick 15 minute lunch break, **and then I'm back. At** around 5, the exhibition gym begins to pack up and so do we. A few children linger around other booths but soon the gym is relatively empty.

Then, I realize that how much work is involved for running even simple activities. By the end of the day, **we're all tired but** satisfying.

> "*Another booth sports a small arena on the ground with two robots playing Robo Soccer with a small plastic ball.*"

People mill around the other booths as the exhibitions begin

The ZeroRobotic

- Elizabeth Mabrey

Storming Robots team was selected to compete at the 2010 MIT/NASA project, SPHERES-ZERO-Robotics program.

"... **T**he review process **was detailed... concentrating** on finding those teams that will be able to work with us through this major expansion of Zero **Roobtics... We count on** your professionalism and experience to help us out throughout the **process...", from the MIT Sphere Project Director's** acceptance letter.

Storming Robots team is the sole team from NJ in the 2010 ZeroRobotics competition.

The goal was to design software driving small satellites aboard the International Space Station to do tasks relevant to future space missions. SPHERES stands for the Synchronized Position Hold, Engage, Reorient, Experimental Satellites.

The team with the best design will be selected to have the final competition at MIT/ISS Lab to operate the SPHERES satellites on board the ISS.

The competition started with substantial simulation work. This competition was indeed very unique from others. Competitors were selected to perform two major roles. One was to design and develop algorithms to navigate the SPHERE at the competition. The second role was to work as a partner who helped the SPHERE project to improve their Interface Development Environment (IDE).

Students' algorithms were tested to fly a volley ball-sized spherical satellite **inside the space station's** cabin. Each satellite contains its own power, propulsion, computing and navigation equipment. The goal of this competition is more than just an exercise, but for automation of the satellite and advanced maneuvers for the spacecraft, like formation flying and docking. There were graduate students **following the teams' work** and could potentially adopt their solutions into a thesis.

Within a month, they needed to not only learn the entire system from scratch, develop solutions and testings and all, but also figure out workarounds with an IDE which was still under development.

Although they did not win to enter the final, the experience for being part of the future was very satisfying!

The five-members high school team included (from left to right of the images above) Alex Franchuk-17, of Branchburg, Avery Katko - 16, of Long Valley, Catherine Dai— 15, of Belle Mead, Matthew Goldman—16, of Bedminster, and Oliver Katz, 15, of Ringoes. Alex , Avery and Matthew played major development role, while Oliver and Catherine worked in test development role.

They all demonstrated impressive level of self-initiative, motivation, and perseverance. A few of them spent quite a few nights till 12am. These students are truly the role models for our roboclub youngsters.
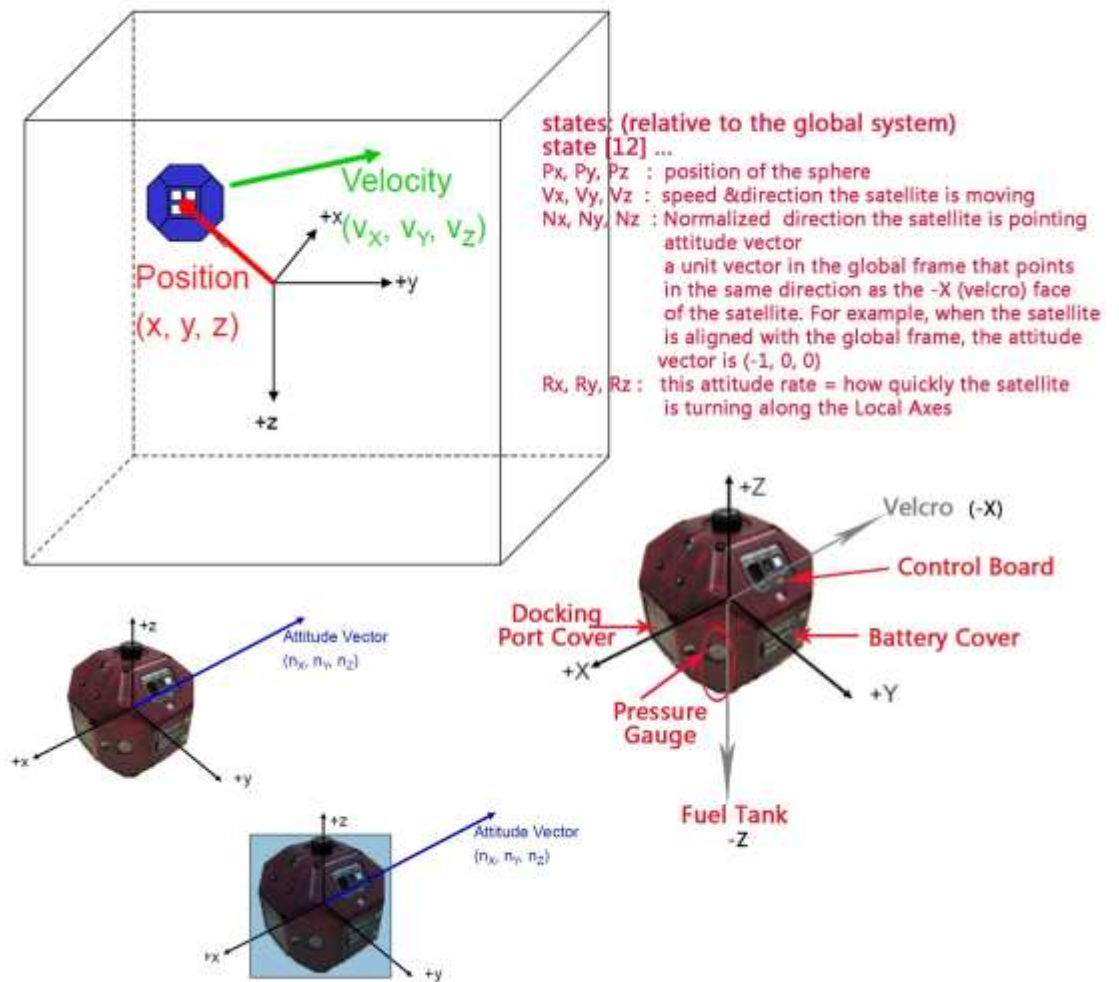
"...*design software driving small satellites aboard the International Space Station to do tasks relevant to future space missions...*"

Ah....! The IDE crashed again!

The ZeroRobotic

- Brief Illustration of The Sphere and Its States

states: (relative to the global system)
state [12] ...

Px, Py, Pz : position of the sphere
Vx, Vy, Vz : speed &direction the satellite is moving
Nx, Ny, Nz : Normalized direction the satellite is pointing
attitude vector
a unit vector in the global frame that points
in the same direction as the -X (velcro) face
of the satellite. For example, when the satellite
is aligned with the global frame, the attitude
vector is (-1, 0, 0)
Rx, Ry, Rz : this attitude rate = how quickly the satellite
is turning along the Local Axes

Velocity

Position
(x, y, z)

$+x (v_x, v_y, v_z)$

+y

+z

Attitude Vector
(n_x, n_y, n_z)

+Z
Velcro (-X)
Control Board
Docking Port Cover
Battery Cover
+X
Pressure Gauge
+Y
Fuel Tank
-Z

The FIRST LEGO League
- by Michelle Lu

The Regional Tournament

This year, the First Lego League (FLL) hosted the Body Forward Challenge.

Teams explored the world of Biomedical Engineering and aimed to find innovative ways to do things such as repairing injuries, overcoming genetic predispositions, and maximizing the body's potential, with the intended purpose of leading happier and healthier lives.

About the FLL:
Each FLL Challenge has two parts: The Robot Game and the Project.

In the Robot Game, teams build and program an autonomous robot using LEGO MINDSTORMS technology to score points in 2.5-minute matches on a themed playing field.

The second part, the Project, is where research work should focus on current isisues, how the technologies applied to resolve the issues, and how you would propose a new invention to help the future development.

At the tournament, you are required to give a thorough and creative 5 minute presentation about your research, and you have shared with the community..

Teams from SR:

In 2010 Regional, our teams were:

Team R2D2: Kelvin C., Benjamin L., Justin W., Dennis W., and Sean T.

Team RoboBrain: Sunny A., Sahaj G., Akash K., and Rohan N.
Team CheezWiz: Matthew S., Derek G., Salil P., and Vadym G.
Team GhostTeam 10.0: Andrew A., Aum C., and Uday S.
Team PI^3: Kushal P., Jonathon H., and Bhavik S.

RoboBrain (most of the team members are rookies) won the 2nd place in team work at the Regional Tournament, and was

"Teams will explore the world of Biomedical Engineering and find innovative ways to do things such as…"

The State Tournament

The State Event was held on Dec 11th at the Mount Olive High School. RoboBrain won the Third Place in the Project Challenge, and gained high score 315 out of 400, just 30 points shy from the First Place won by the Plainsboro Team. RoboBrain ranked the 8th out of 44 participating teams.

(from left to right)
Sunny A., Sahaj G., Matthew G. (back, the technical mentor), Akash K. (front), Rohan N. and Vikas A. (the home coach)

The RobocupJunior Tournament

We shall have almost 10 teams (mostly 2-4 members in each team) participated at the RobocupJunior Tournament in the upcoming April. The location is still pending.

This is a very algorithmic driven competition consisting various categories. In this article, we would like to introduce Robocup and RobocupJunior to our community. More details about our teams will be provided in the next issue.

The Robocup

Have you ever seen a troop of robots playing soccer?

RoboCup^{TM} is an international research and education initiative, truly a landmark project, designed to increase awareness of, and stimulate research in artificial intelligence and robotics. Its first official games was held in 1997 at Japan with about 40 teams from 11 countries . In 2010, the game was held in Singapore with over 500 teams from over 40 countries.

RoboCup is an international research and education initiative. It aims to foster Artificial Intelligence (AI) and intelligent robotics research by providing a standard problem where wide range of technologies can be integrated and examined, as well as being used for integrated project-oriented education.

The Dream
The ultimate goal of the RoboCup Initiative is: By mid-21st century, a team of fully autonomous humanoid robot soccer players shall win the soccer game, comply with the official rule of the FIFA, against the winner of the most recent World Cup.
However, the accomplishment will not be limited to just robots playing soccer, but most importantly, it will be considered as a major achievement of the robotics field as it will also generate significant social and economic impact.

There are many graduate schools teams from prestigious universities throughout the world. From United States, you will find teams from the Carnegie Mellon University, UPenn, Cornell U., Stanford U., MIT, Harvard U, etc.

The RobocupJunior

This sits at the entry-level of the international RoboCup initiative. RoboCupJunior is for age 9 to 17; although most do not start until 12 due to the programming complexity. Even in junior league, games heavily focus in algorithmic programming, and full self-awareness of robots to their environment.

"...fully autonomous humanoid robot soccer players shall win the soccer game..."

RoboClub—Science Track

Our projects-oriented roboclub sessions have always focused on robotics engineering track. In the Winter term of 2010, we started one session taking a slight twist. For lack of a better term, we called it the science track.   In this session, all topics stem from a particular science discipline (in chem or physics). **Each term starts with a specific concept, such as "what is a Nanobot", "what is Stoichiometry" , "Motion in Physics", etc. They may conduct online research, or doing mathematical experiments including setting hypothesis, variables, data collection, and graphing, etc. Then, the students, with the instructor's** guidance, will come up with robotics activities utilizing the vocabularies and simulating the principles they learn.

This may work for some kids more than others as this model works in an atmosphere more like a conventional classroom, and less hands-on robotics work.

The last term, they talked about Stoichiometry. Here are a couple of summaries written by the students themselves.

Stoichiometry... Math for Chemistry!

- By Ananya Balaj
   Fall of 2010
   Age 11, Grade 6

During the Fall Term of 2011 at Storming Robots, my friends and I worked on the project that would incorporate stoichiometry, a branch of chemistry that deals with the quantitative relationships that exist between the reactants and products in chemical reactions, and robotics.

In short, stoichiometry is a mathematics behind the science of chemistry.   Using mathematics, we can decide determine what combination of elements needed to create a certain reaction. A typical reaction, for example, is explosion.

To get a better understanding in Stoichiometry, we studied the periodic table. For Halloween Day, each of us dressed up as an element and did a small presentation about the element being stable or unstable, its uses, its color, etc.

After that, we then create a robotics project to simulate the idea about combining elements to a compound. We built 2 robots and programs them to sort the elements

Ananya demonstrated how to create a balanced equation from combining several elements.

(Lego bricks) into groups that would match the elements in a compound that we were given. Our bot had claws to collect the elements and had light sensors to find them.

We had a very good teacher and were able to understand the significance of stoichiometry. The fun part also includes creating a bot to complete the task we were given.

We own much of our success to our teacher, Sue, who taught us Stoichiometry which even helped my friend Val and I in school. Thank you Sue.

Suhagi Shah, a Doctoral Candidate in Bio-Med.

RoboClub—Science Track - cont'd

Being ARGON on the Halloween Day

By Val Post
Age 11, Grade 6

During the Fall of 2010, we learnt something about elements on the periodic table. Before we started, we learnt that each element listed in the Periodic Table possesses its own State of Matter: liquid, gas or solid. We also learnt that combining elements forms compound, The compound may easily become a different State of Matter than its component elements. For example, hydrogen (H) and oxygen(O) are gases, but when combined two H and one O, they become water (H_2O), a liquid.

We then had to choose an element. Our group, Ananya Baljai, Jimmy Bortree, Sue Shah (our teacher), and myself, decided to each be a Noble Gas. These Noble gasses were Helium, Neon, Argon, Krypton, Xenon, and Radon.

Ananya chose Krypton, and became the Krypton King.

Jimmy chose Neon, and became the Neon Ninja.

Sue picked Helium, and decided upon The Helium Hippie.

I, well, selected Argon and became the ARGON ASSASIN!

The next part of the project was research. First, we had to find out if our element was stable or not. As we all were Noble gases, the most stable group of the periodic table, we were all stable. Next, we had to find out the color. As a gas, Argon is colorless. But, if it becomes liquid, it turns dark purple.

Next, we had to find usages for our element. We learned that major usages can be:
♦ for extinguishing fires without damaging equipment.
♦ used in museums to protect and preserve old documents or materials.
♦ fill light bulbs and incandescent lamps to protect the filament.

Then, here comes the fun part. On the Oct 30th class, we all came in dressed up as the element to greet the Halloween Day. We had cookies and drink too.

I would just like to thank my teacher Suhagi **Shah, for everything she's done for us. Thank** you Sue! (We let us call her Sue.)

Val and his work partner Jimmy explain how their robots work.

Jimmy talked about he learned

The Creation Corner!

Howard's
NXT Bank
by Howard Hua
7 years old, Grade 2
Fall of 2010

Front Side

Side View

Back View

Software features:	NXT-G A touch sensor is programmed to activate the action.
Hardware features:	NXT MIndstorms. One motor for moving the card in and out, as well as dispensing a small technic piece. This piece will act like a coin. One touch sensor as an on/off button to make it sucks in and ejects the card. When the NXT bank reads in a card, it will dispense coins. I used very small lego technic pieces as coins. The coin comes out of a hole when you insert your card into feeding card place. The feeding card place has a roof on top. The banks motor has a pushing lift function. It has a lock on the side of the arm. Its base measured 16x32 studs. THATS BIG!
Inspiration:	I am always curious of how ATM works, so I decided to build my own NXT coin dispense bank.
Time:	I have spent almost 8 hours to build this machine, and about another 4 hours to program and test until I called it a success.
Comment	It took me almost a whole day to get it done. I programmed it with NXT-G. The NXT Bank is programmed to use the touch sensor to start its action. I used an expired card from my mom for testing. One time I accidentally broke the bank but the whole circuit was still working smoothly. If I have more time to improve my bank, I will make a tall tower to feed real coins. Therefore, when I insert the card, I don't have to put the coin back inside the feeder until the machine empties out all the coins inside the tower.

The Awesome Chess Creation!

-by Andre Gou
Age 13, Gr. 8
Started in the summer of 2010

"... It is more fun to create it than play it."

I had started playing chess since I was around seven, taking a four-week long summer chess camp in China. To this day. I consider myself still a mediocre.

Two years later, the first workshop at Storming Robots I took was a spring break workshop in 2006, where robotics first caught my interest. I shifted from complete ignorance to finding good grip on various robotics challenges given to me. Currently I am working on a very interesting and challenging project: the RobocupJunior Rescue B. This is a research robotics project conducted by the world

Those of you attending Storming Robots should have noticed a LEGO chess set always chillin' in the seating area. That was built by one of the first group of students back in January of 2005. He now is attending Cornell University studying in Mechanical Engineering.

During a Summer workshop in 2010 at Storming Robots, an idea sprang up out of the blue. Maybe I could build a set too? I thought, "The Cornell guy and the other guy both have the normal, mirror chess sets and they look great. I couldn't possibly compare. But, what if I take a side route by having unique pieces for each set; and it would be **interesting, at least."** *BOOM!* Humans vs. Robots, a completely unoriginal idea, actually seemed plausible at the time. However, I started to build just following my instinct. Other kids seemed to be impressed, and so as Elizabeth, the **director of Storming Robots.   She advised me to share this with others at this newsletter. I indeed thought, "hey, this** could be fun. It is more fun to create the chess set than play it. Now, it is even more fun to create stories for each **piece!".**

This will be an on-going column. Gradually, stories and pieces will become complete with a story and a neat figure. They will be released one or two at a time in future issues.

At this issue:
My Favorite piece: the Gray pawn - aesthetics, simplicity, and being the "first-born".
Favorite story: How.Sir

How.Sir (Howitzer, Rook)

Story:
How.Sir is a 155 mm self propelled gun-howitzer. Although outdated by nearly 2 centuries, How.Sir is still a devastating presence on the Chess-rena. How.Sir is armed with tungsten alloy shells to create supersonic shrapnel. In the first en-**counters by the ToRAiD, reports show that the troopers "Rolled On the Floor, Laughing at the How.Sirs" then were "instantly blasted into a bloody pulp." Like** Radar.Prism and Grim.Reaper, How.Sir is best deployed in pairs.

Stats:
Moves: See 'Attacks'

Attacks:
Load. Aim down 4 Directions. One Shot. One Kill. Shrapnel! Need I say any more?
If the enemy is inside of the effective firing range, a simple poke with the barrel is more than sufficient to down the enemy.

Points: 5
Special: None

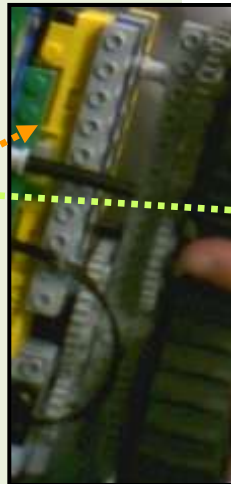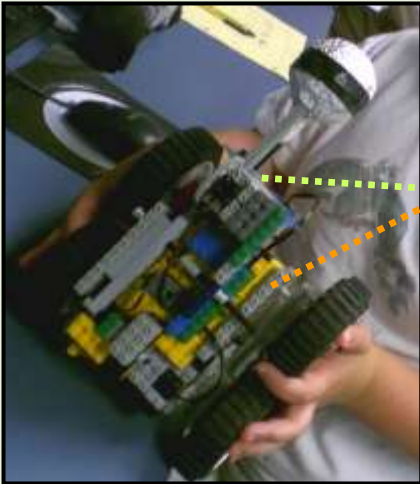# The Creation Corner - Archive

Rachel's Punching Sumo

by Rachel Goldman
9 years old, Grade 4
Spring of 2007

Software features:	I programmed my robot using Inventor 4 in Robolab. I had to have a task split in order for the robot to punch and go forward at the same time. One task was punching and the other was going forward while looking for black, so the robot would stay in the sumo ring.
Hardware features:	To build the puncher, I had to have a third motor attached to the top of the robot, with a 40 tooth gear on it. The 40 tooth gear moved pieces with little ridges on them in order to punch. These pieces are like flat gears. The chassis was the hardest to build as it was very important to brace the sumo bot. It took awhile to find the perfect number of braces that would not make the robot too heavy, but would still keep the robot together. In order to get my gear ratio, which is 25/2, the motor had a 16 tooth gear on it. I had a compound gear train which means that I had more than one layer of gears. My gear pairs were: 40/16 40/8 (40-tooth gear attached to the back output shaft) 40/8 * 8/40 * 40/8 (the last 40-tooth gear attached to the front output shaft) That gives me a final gear ratio: 25/2 for both front & back output shaft Front : 40/16 * 40/8 Back : 40/16 * 40/8 * 8/40 * 40/8
Inspiration:	I built this robot because I thought it would be cool to have a robot that could punch. The **typical sumo robots don't have a puncher. The puncher helped because when another bot** was about to push mine out of the ring, if my robot punched it, my robot could go forward again and it would not leave the ring.
Time:	It took me about 6 hours to design and build the chassis and the sleeve of the punch. The programming took me about 2 hours.
Comment	If I make this robot again, I will make the puncher have more torque. This would allow the robot to punch harder.

The Creation Corner - Archive

Eric's Robodog
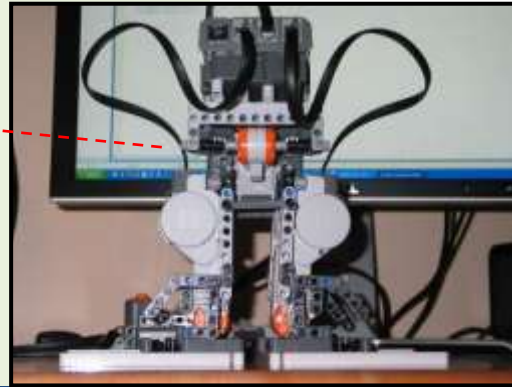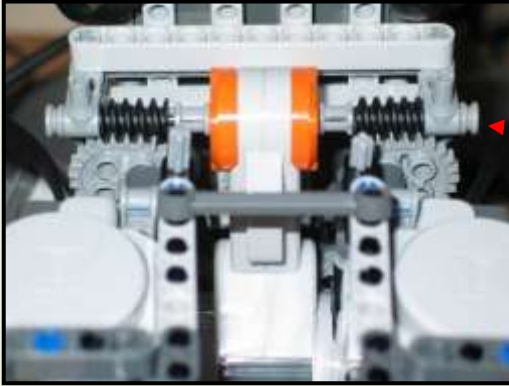
by Eric Ward
10 years old, Grade 5
June of 2008

Software features:	I used the Mindstorms NXT Firmware Version 1.03 (NXT-G) to create the program. To make **sure my robot didn't tip over, I programmed it to check if it was close to a wall after every** two steps it took. I used a switch block to check if the Ultrasonic Sensor was within 8 inches of an obstacle. Future Program Plans: Utilizing RoboLab, I plan on programming synchronization steps which will allow the Robot to turn more than one time.
Hardware features:	I used two Interactive Servo Motors, a 12-tooth driver gear driving a 40-tooth gear; on the other side of the 12-tooth driver gear are two 24-tooth idler gears. The idler gears are driving a 40-tooth gear. The gear ratio 3/10 The Ultrasonic Sensor acts as the eyes of the Robo Dog, and prevents it from running into objects. When the Robo Dog gets close to an obstacle, it stops, backs up 10 steps and turns 90 degrees to the right and continues walking straight. The extreme gearing down of the Robo Dog makes it strong, but slow.
Inspiration:	The directions for the Robo Dog came from Laurens200 (50493) at Brickshelf.com. The inspiration came from wanting a challenge to create a walking robot as opposed to the more common robots on wheels. The programming was designed by me.
Time:	The Robo Dog took approximately 2 hours to build. The programming and testing took about 1 hour. Many hours were spent experimenting with other quad walkers before creating this model.
Comment	It was difficult creating the Robo Dog because you must lift two legs at one time, while keeping it balanced. In addition, I would like to make the Robo Dog turn and synchronize both sides nicely at the same time. This will require more complex programming, and I will switch to use Robolab.

The Creation Corner - Archive

Marc's Walker

by Marc Bruggemann
14 years old, Grade 7
Summer of 2007

Software features:	I programmed my robot with NXC, a text based programming language. I had made several programs for this robot. Some programs were more advanced than others. All approaches to programming were pretty much the same.
Hardware features:	My chassis has an advantage over some bipeds as it only requires three motors. Two of the motors shift the robot to one side and the other as each foot advances. In effect, you get a Frankenstein like walking motion. The gear train in the waist is very special as it allows one motor to move the feet forward instead of two. The gear train pivots one foot around the other while making sure both feet face forwards. Also, the robot is perfectly symmetrical which keeps it from falling over. There is a gear train in the ankles that give the robot enough torque to shift the weight. Overall, this robot is almost perfectly designed to walk.
Inspiration:	The idea of this robot came from a video. It was actually a video of this robot, but with slight differences. I thought this was a pretty cool robot because it actually picked up its feet **instead of shuffling them. This more advanced approach to making a walking robot isn't** always easy to do. The robot was originally built by Joe Nagata, who posted the video online.
Time:	This robot, although copied from a video, took 7-8 hours to build. There were no building instructions and only brief glimpses at some key parts of the robot. I managed to build it with only some slight differences. As far as programming, it took me 3-4 weeks including using different languages (actually including the learning curve involved in both NXT-G and NXC). Although if we lived in a perfect world it could be programmed in 5 minutes. There were some variations and I could not figure out what they were caused by. In the end it could only sometimes walk in a straight line.
Comment	I thought this was a fun project even though it was not original. This is my first biped project. It had some unexpected surprises and I would like to revisit it. There were some mechanical issues that I could not figure out and were illogical to me. When I revisit the project, I would like to incorporate some sensors into the robot to improve its coordination, enable more fluid like movements, and self-align its initial position.

Students' Articles

Baseball

by Hugh Zhang
8 years old, Grade 2
- Jan of 2011

Baseball is a sport where basically the batter hits and the pitcher throws and the fielders field. In order to be a good player you have to run fast, have good eyesight and have good strength and if you do all these things you might get **rewards like the golden glove. That's one** of my dreams.

If you are really good and you hit home runs and you respected your teammates you might be elected to hall of fame of **baseball. That's another one of my** dreams.

There about 45 teams in the major league and there two divisions, American and National. There are playoffs in the end of the season and the best teams in the American League and the National League play the World Series and whoever wins that wins a trophy.

There are some differences between the American League and the National League. For example in American League **the pitcher doesn't have to hit but in the** National League you do. There are nine people on a team. The game plays to nine innings and if it is tied it goes on. Players can switch teams over the years to make new teammates and other stuff. Some players have been playing 14-15 years in major league baseball. Some of the greatest baseball players of all were Babe Ruth and Lou Gehrig.

If you want to know how to score a run here are the two ways how: First, if you hit it into the stands you get one point but if there are people on base you might get 1, 2, 3 or 4 points. Second, drive a run. To do that there has to be a runner

"... I dream to get golden **glove...**"

on base and you hit the ball and they run home and score a point.

Baseball started in the **1800's and some of the** greatest teams were the Pittsburg Pirates, New York Yankees and the Los Angeles Dodgers.

Some parts of baseball might be boring **because when you're fielding the ball** has to be exactly at you and then you catch the ball. Most people like batting than pitching and fielding because in batting you get to score and do other stuff to make your team win.

There are special games like the home run derby when judges see how many home runs a player can get in a period of time. Another one is the all star game where players from different teams form up two teams and play against each other. Baseball teams play from early April to late October (including playoffs). I cannot wait to play my next season!

About me:
I am 8 year old, and a 2nd Grade student at Riker Hill Elementary school in Livingston. I love sports, especially enjoy playing baseball, tennis and Soccer. I also love reading and drawing. Since I am very interested in LEGO Mindstorms, I have been attending Storming Robots for two more years.

My Christmas Gift

by Howard Hua
8 years old, Grade 2
- December of 2010

Christmas is around the corner. My birthday is getting closer! I can't wait for my presents to be here. But last year, I didn't even get a present, instead I got a note from Santa. On the bottom of the note, it read: "Use this note to help you to get a present next year."

One year later, it's almost my birthday again! This year I'm dreaming about the sound sensor. The sound sensor can detect sound like when you say something. One day after Thanksgiving, I saw my mom was ordering a Lego set online, but not for me. So I asked my mom, "Can I get my sound sensor this year?" "Sure." My mom replied. "Yay!" I shouted and sped downstairs to place the order. My mom was so generous that she allowed me to get one EXTRA sensor. I looked at all the sensors again and found the right one. It is called the accelerometer sensor. The accelerometer sensor can know which way is up, down, left and right. Soon my order's going to be there!

Every day I would go onto Fededx.com to see where my sensors were. They moved so

"slooooooooow". I checked the mail about twice a day, once in the afternoon, and once in the night. No luck at all!

On December 6, 2010 before school, grandma told me, "I'll check if your Lego is here today. Don't think about them at school!"

Eight hours later, after my grandma picked me up, I asked her if she saw my Lego. She said "No." I felt sad again. I thought I had to wait another day. When I went on the computer to Fedex.com, it said "Out for Delivery." "Yay!" I cried.

A few minutes later, I went to the mail box with Dad one more time. Dad took out the mail and handed them to me. I dug and dug. There was a yellow envelop coming from South Haven, Mississippi. That's my Lego home town.

"... "Hooray!" There is my sensor that I have been waiting for such a long time..."

Which Smartphone is right for you?

by Salil Pathare
12 years old, Grade 7
December of 2010

Old flip phones are fading out and Smartphones are coming in. These are my top 3 picks.

iPhone. **Apple's new model of their** legendary product, the iPhone 4 includes music, an HD screen and a ton of apps. It is the most functional iPhone yet. Despite its small antenna flaw, AT&T gives the iPhone blazing speed - great for watching videos, playing online games and surfing the web. The App store has been a huge

success over the years. Iphone users around the world buy apps (short for applications). New apps are being added every day; some are really fun and addictive. Of all the new features **of iPhone 4, the most exciting is "Face Time". "Face Time" allows two iPhone** users to have a video chat with each other. This feature allows the user to **"Visit"** each other. Not only does the iPhone have Face Time, it also has a new HD screen. Its a bright stunning screen that tops any other phone. Along with all new features, the iPhone includes a web browser, iTunes and can multitask. If you want a cool new and sleek phone, the iPhone is

yours. The only drawback is that – it is only available on AT&T for the time being. However, iPhone was supposed to be available for another network like Verizon in the early 2011. We shall see how this works out.

Droid Incredible**. If you're on Verizon and can't wait for the iPhone** to come out, then Droid Incredible is your phone. The Droid Incredible is truly an incredible phone. The Droid Incredible is the third phone in the Droid line. With Android OS 2.1 nothing falls in its way. It has a 5 megapixel camera, zoom and dual flash. This is perfect for any photographer. With Amazon mp3, the music store application is perfect. Another great addition to this phone **is the "app store" application. Even though it's far behind Apple's, it's still** fun. This phone deserves the name Droid incredible.

HTC EVO. The next best phone is the HTC EVO; it is the fastest phone in the market. No other phone speed can compare with this monster. Like the Droid Incredible, this phone also runs Android OS 2.1, but the reason for **speed is 4G. HTC EVO is on America's** first 4G network (Faster than 3G). The phone features are quite similar to the Droid incredible.

For Apps and Music the iPhone is your man. **If you want a sleek new Verizon phone, I'd** go with the Droid Incredible. For extremely fast speed, the only winner is the HTC Evo. One of these phones is right for you, which one is it?

"... "The next best phone is the HTC EVO; it is the fastest phone in the market. ..."

War of Three Worlds

by Seriozha Zakharkin
13 years old, Grade 7
January of 2011

Hey you! Yeah you! Ever heard of **Starcraft II? Do you know what is? Well I'll tell you what it is. It's a RTS (Real**-Time Strategy) game designed by the entertainment company Blizzard. In my opinion, it features a great multiplayer **matchup system. Basically, it's a game** designed for hardcore gamers or any beginner who just or wants to start gaming.

Before we begin, I'll introduce you to the teams or factions of the game. As perfectly **stated by one website, "The Terrans are a** balanced group, the Zerg are an overwhelming swarm, and the Protoss the **most technologically advanced" (Digital** Trends 2). The Terrans are the humans, the Zerg are just alien bugs that want to destroy civilization, and the Protoss are super intelligent beings seeking to destroy **the Zerg. Let's revisit the fact that** Starcraft II is a strategy game. This game **is a "classic style of real**-time strategy play, one old-school RTS gamers should be very **familiar with" (IGN 1). So, if you don't like** playing video games or even playing **computer games, then this isn't for you.** But if you are a person who could understand how much effort Blizzard put **into the game; you'll definitely appreciate** every single element.

A sample screenshot of a replay in Starcraft II Beta. It allows to change the speed of the replay and view what is being constructed and other important things.

Speaking of little details, the game has incorporated lots of little features into the multiplayer part of the game. Most beginners or any other people are afraid to venture to the multiplayer part of the game. But there really

is no fear of getting placed against a pro gamer. The trick is that Blizzard has created a new system that matches up someone roughly the same skill as you. Playing against someone as good as you can sometimes turn into a very tiring multiplayer match.

A sample screenshot of a replay in Starcraft II Beta. It allows to change the speed of the replay and view

one of the best RTS games that Blizzard has ever made.

Sometimes if you don't feel like going onto the multiplayer portion, you can go and hunt down some accomplisments. Achievements can help any gamer to improve their skills. Beginners may not feel like grabbing achievements but might want to see how well they did in a certain match. They just go to their profile and click on the replay button, and then they can watch events unfold from one, two, **three, or even everyone's point of view.** The replay button also helps professionals create new tactics that they can use for a next time.

On The Lighter Side!

Robot Trivia

1. What year was the first industrial robotic company founded?

a. 1937
b. 1956
c. 1973
d. 1981

2. What application was the first industrial robot designed for?

a. Arc Wielding
b. Spot Wielding
a. Pick and Place
b. Die Casting

3. Which of today's popular manufacturers was the first in the robotics business?

a. Motoman
b. Panasonic
c. Nachi
d. OTC

4. Who is the parent company of Motoman?

a. Yasawaka Electric Company
b. Unimation
c. Osaka Transformer Company
d. ASEA

5. Which robot manufacturer produces the FlexPicker, a dedicated pick and place robot?

a. Motoman
b. Nachi
c. Fanuc
d. ABB

Answers Key
1. B 2. D 3. C 4. A 5. D

Crossword puzzle
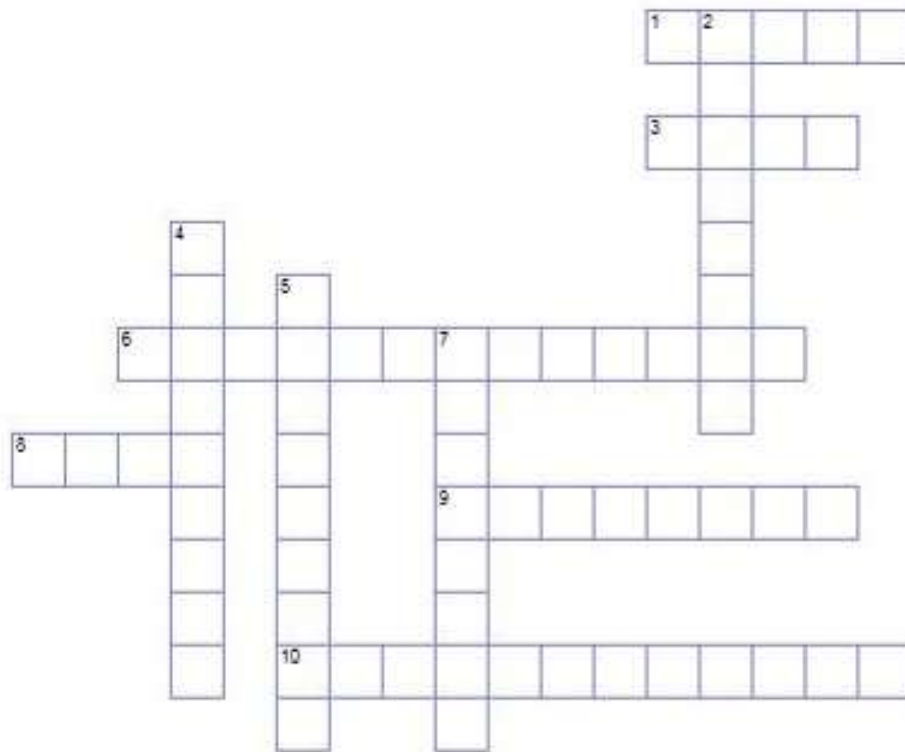
Across

1. 1000 in binary (base-2) = _____ in decimal (base-10).
3. 1111 1111 1111 1111 in binary (base-2) = _____ in hexidecimal (base-16)
6. _____ is a device that used in Wii Controller to allow motion sensing control.
8. _____ sensors meaures the angular rate change.
9. An _____ is a mechanism that puts something into automatic actions.
10. Robots with two independent motors most likely do not run straight, becasue of the _____ output.

Down

2. You use _____ sensor to view UV light.
4. "Dead _____" is a process of estimating a robot's current position based upon a previously determined position.
5. Usually, you calculate the distance traveled for the robot based on the size of its tire, encoder reading, and _____.
7. Robots may use _____ sensors to calculate the distance travelled.

Words Bank

gyro   infrared   accelerometer   eight   inconsistent   reckoning   FFFF   rotation   gearratio   actuator

Robot Comics

Reference: http://xkcd.com/356/
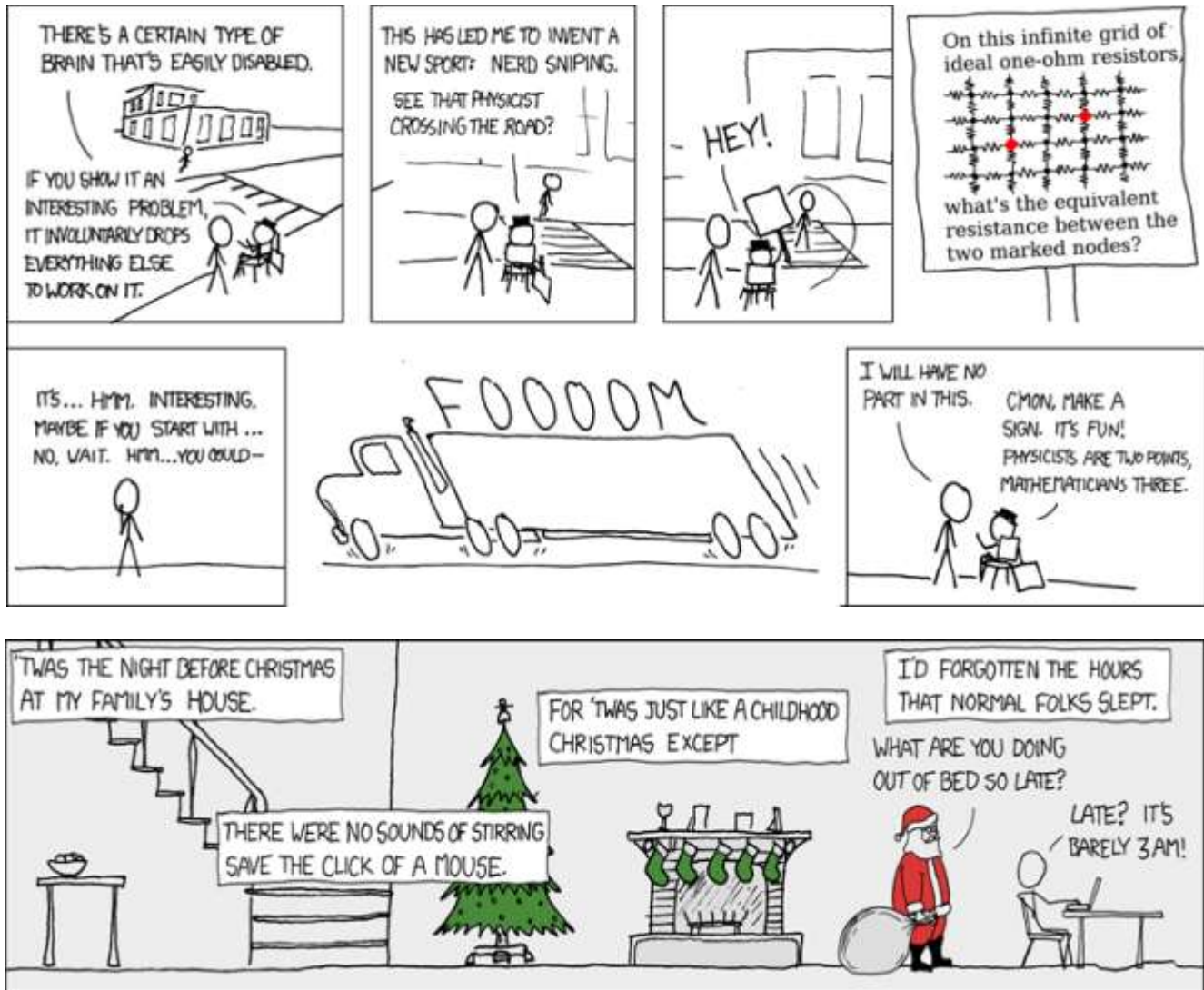
Joke: (Val Post suggested this one)

What did the robot-athlete say to his teammate?

Storming Robots

Special notes

If classes need to be cancelled due to inclement weather, notification will be posted right on the main page of our website:
http://www.stormingrobots.com

Center Calendar: http://cal.stormingrobots.com

Summer site: summer.stormingrobots.com

Twitter: www.twitter.com/stormingrobots

Feb 1st :   Summer RoboCamp/Workshops Open Registration.

Feb 21st : Demo for EWeek at the Liberty Science Center
                 (tentative)

Feb 24th: Introductory Workshop at Rutgers University
                 (tentative)

March 27th: Last day of Winter term for Roboclub

March 30th: First day of Spring term for Roboclub

March 30th: Articles due for the next newsletter

April 1st: Grade 2-4 roboclub starts in Edison Auxiliary Site
                    (Tentative depending registration)

April 10th: RobocupJunior Tournament—Tentative

April 18th-22nd : Spring Break Workshop (Gr.4-9)

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