

## Our Modern Robotics Laboratory of Educational Experiments

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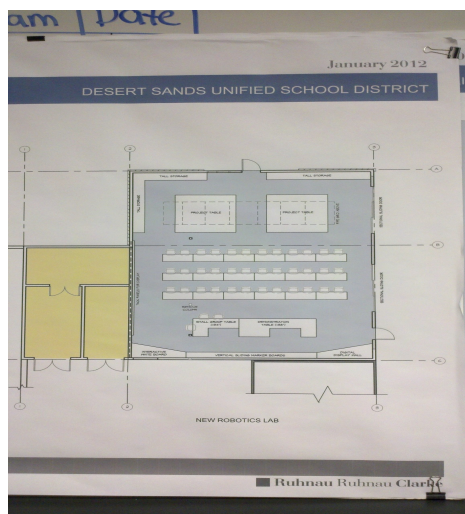
Palm Desert Charter Middle School -

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### Our Modern Robotics Laboratory of Educational Experiments

Overcrowding in our current robotics class is a potential hindrance to our productivity. Therefore, the staff at Palm Desert Charter Middle School proposed a genius plan to rid the robotics class of this unnecessary hindrance. Since we got a new cafeteria, they decided to use the old cafeteria to harbor the building for the new robotics laboratory. This plan has brought forth a great excitement in the classroom on the prospect of getting a new robotics laboratory.

At first, this was not an easy thing to convince the district to sponsor. Lack of support for this laboratory and not enough evidence from us are just two reasons why the district had a hard time deciding to allow us to build the lab. However, the main reason for this uneasiness by the district was the sum of money this project would consume from our already limited funds. On the other hand, the reasons for us (the robotics club) not giving up on this journey was because we had multiple problems with our robotics room and we needed an update. One of these problems was organization. To find just one piece in the classroom (which should just take a few seconds if you were properly organized) would take a few minutes to find. Another problem we faced was with limited computers that are updated. Without updated computers, we lost many hours of focus on our robotic projects. Another problem was the scarcity of students in the robotic program. However, our top problem was the lack of space. The room is packed with so many LEGOs, robot parts, electrical cords, and robotic toys that it takes an exponential effort just to get around the entire classroom. Not giving up on our journey, we kept trying and trying to embrace every possibility way we can get to convince our district to construct this amazing laboratory (which the layout of it is displayed by the picture to the left). After presenting our problems of our current robotics classroom and the ideas of our new robotics lab to the district's council, the wishes of making this robotics laboratory turned into real thoughts. Now we are going to be able to construct our robotics lab!



The layout of our planned robotics laboratory

Now let us address our first problem: space. Just moving around the room takes a long time. There are cords and wires

everywhere, causing many trips in the class everyday (luckily, no injuries have been made... yet). But, with our new lab, space would not be a problem because it is about five times the size of our current classroom. With a lab of that size, we can have anything in it and still get around easily. Also, like mentioned before, with proper organization, there will be more space available.

The second problem is the lack of updated computers. Currently, our computer runs at less than 1.0 GHz. That makes programming and searching things up at school highly time consuming. The simulation is almost impossible to run. If we had better computers, we could be so much more productive by reducing the amount of time just waiting for the computers to load up and process our actions. The new robotics laboratory will most likely force a computer update because, with us already starting all over again, it will save tons of time, stress, and money.

Our third dilemma is adding more kids to the class. With our new robotics lab, we can recruit more kids into our robotics class. Breaking the limit of the class size from 25-30 to say like 35-45. There are so many enthusiastic students in our school that are trying to fight for the position of being in one of the six classes during the day. But, with more kids, we might need more teachers. Currently, our Robotics teacher is the one who is our coach. He provides many creative, out-of-the-box ideas that kids don't usually think about. However, he does allow us kids to come up with most of the ideas, which is a good practice for the real world later on in our lives. Mr. Clark teaches us extremely well how to form an efficient team. He teaches us how we should behave as a team and how to maximize our time and effort to get the most done. However, many of us (including Mr. Clark) have a little tough time with the more advanced programming and building of the robots. So, to make up for the programming and building issue, in the beginning of the year we could spend some time (1-2 weeks) educating every single student in robotics to master programming and building so we would not have any problem with it.

It is not just because of the prospect of kids begging to be in this class. The real reason why we

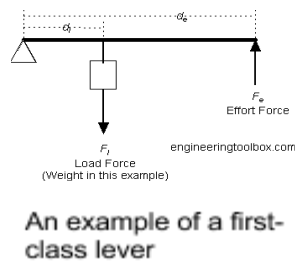


P.W. Singer on TED talking about the technology that we have currently

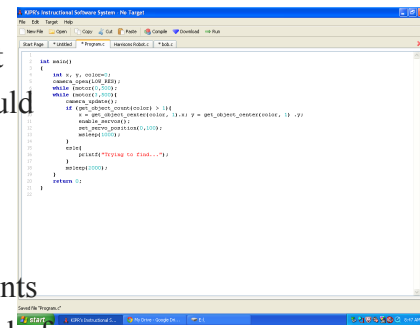
need this robotics lab is because of the need for more kids to become programmers. It is not only because our school needs them. Our nation needs them. According to P.W. Singer, he states in his talk on TED about 21st-century technology with 20th-century policies that we, America, is the STEM and Robotic leaders in the world. But, we might fall behind one day because our hardware is made in China and our software is made in India. As of right now, hardware is a problem that we cannot fix. But, software is a problem that we can solve. And the solution is quite simple, WE NEED MORE TECHNOLOGY CLASSES IN OUR SCHOOLS. And now, with our new lab, we can sow the seed for that possibility. Why is India writing our software? I don't get it. I personally believe that programming

should be a requirement of this nation. Every single citizen in the United States should be able to program in at least one programming language once they reach the age of 21. After software design, we may start our endeavors to fix our hardware creation problems. How? Well, if we all congregate and create a robot that can manufacture as efficiently as humans can, we wouldn't need the Chinese, right? If we can solve the creation of hardware, you might just begin a new technological age of manufacturing with the help of robots. Therefore, our great nation will stand up on its feet and, once more, become the glorious eagle of peace, power, and prosperity.

If we have more students, we can increase the chance of getting highly-educated students who can suggest great building and programming techniques. Techniques that utilize gear power, pulley systems, and levers are things that would be nice to suggest; e.g.



$F_e = F_l \times d_1/d_2$  for the equation of the lever. On the picture of the lever, you can see the first-class lever at work. Also, the same goes for programming. We could really use more great suggestions for programming. Things such as tips on how to make a more stable program and simple things like just how to write a



An example program of the KISS IDE, C-based programming software

program. By increasing the chance of getting very smart and productive students (such as the smarts and productiveness of Amin Atrash, a postdoc at the School of Computer Science at USC), we would get a ton more work done and at a higher level of education.

Now, our most important (and troubling) problem, organization. Our robotics room is not as organized as we want it to be. Yes, we do have boxes that have a tag on them saying what is contained in it. But, it is still not enough. We need our boxes to be more specific. Right now we have a box that says "metal". That is pretty diverse. Now, what if we had a box that says "channels" and then another box that says "chassis." That would make finding materials easier and faster. With the lab, we will have more room for more boxes to organize our materials. The problem for the boxes is not the cost, but the fact that we need more room. Like I mentioned before, the new lab will enable much more space, allowing us to improve our organization with not just our building materials, but also our class materials; such as computers, tables, chairs, etc.

In conclusion, a robotics lab would really help the development of a great robotics team. It would allow us to be more organized, conduct better experiments, get more diversity of competitions in, get more students into our class, get more room for bigger projects, and get more great ideas as a result. I (YuSheng) was the one in the class who figured out how to script a create. Although, I did have help from another benevolent classmate. Us two together figured this out. But, what if we had

more people, we can potentially figure out any problem that arises. These are the reasons why a robotics lab would be a benefit that everybody can reap.

If you want any more information about the lab (such as what is going to be inside of it), feel free to ask us or any of the other team members (including Mr. Clark) about the lab. We will be happy to do so.

### **Works Cited Page**

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Pictures:

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Lab's Layout: Courtesy of Mr. Clark

This paper fits into the "Autonomous Projects" category