



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) David K. Legg	Project Number S1415
Project Title Learning to Walk: Building and Programming a Virtual Robot	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objectives are to: 1) create a virtual bipedal robot consisting of two manipulators and a two-jointed connecting bar. 2) write a control program to investigate the viability of such a design in a virtual environment.</p> <p>Methods/Materials A Windows desktop computer with anyKode Marilou Physics Editor (Home Edition) was used to build the virtual robot and the test environment, and Microsoft Visual C# 2010 Express Studio, installed on the same computer, was used to write the control program, including the logical functions and servo commands for the robot. The library Marilou.Mods from anyKode was used to interface between C# and Marilou Exec (the robot simulator).</p> <p>I began with a very basic robot consisting of two boxes joined by a motorized hinge. I continually refined and enhanced my design, building up to my current design.</p> <p>Results I was able to create a virtual robot consistent with my first objective. I also wrote a control program that enabled the robot to move around in its environment per user requests. In addition, I added multiple cameras to give users a robot's-eye view of the environment.</p> <p>Conclusions/Discussion The robot design described above is viable. It has the ability to accurately move around, and to reach out with a manipulator to interact with the environment. As a prototype, it is a promising design with possible applications as a general-purpose working robot, a search-and-rescue tool, and as a spacewalking unit to perform tasks outside a spacecraft.</p>	
Summary Statement This project is the building and programming of a bipedal, virtual robot as a proof of concept to investigate the design's capabilities.	
Help Received Father helped teach me C#	