



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Leif P. Rudling	Project Number J0810
Project Title iWB APP: Aircraft Weight and Balance Calculator	
Abstract Objectives/Goals My project was to design and create an application for determining weight and balance for general aviation aircraft that would be faster and more accurate than calculating it manually. Methods/Materials I spent 55 hours doing on-line tutorials to learn how to write code, and over 30 hours to write the code. Apple computer, Microsoft Excel, programs Swift2 and Flash, calculator, Pilot's Operating Handbook, Gleim Private Pilot Handbook, and stopwatch. I performed eight different test scenarios which included total weight and location placement on the aircraft, both manually and using the iWB app, and timed them. Results The iWB application proved to be much faster than the manual tests, and just as accurate. The iWB app determines if the aircraft's weight limit and center of mass has been exceeded and will issue instructions to recalculate for safety. The iWB app is effective in solving math problems based on the weight in the aircraft in the positions of fuel, pilot, passenger, and cargo, and for the center of mass. Conclusions/Discussion As a student pilot, my prior knowledge of the vital importance of proper weight and balance in an aircraft was re-emphasized to me while working on this project. Improper weight and balance can cause slower speeds, increased fuel consumption, difficulty in taking off and landing, stress to the engine, stalling, spinning, crashing, and ultimately, loss of life. The practical lesson I learned from this project was how to develop and create code for a convenient computer app that can be applied to my interest in aviation and help in the pursuit of becoming a pilot. This knowledge of writing code can be applied to any field of interest of mine in the future.	
Summary Statement I designed and created a computer application for determining weight and balance, and center of mass, for the general aviation pilot.	
Help Received I learned how to write code by doing on-line tutorials. I then designed and created the app myself after my father purchased a new Apple computer that was compatible with the code writing software.	