



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Kowsigan Majuran	Project Number S1509
Project Title Simulation and Animation of the n-Body Problem in Two-Bodies	
Abstract Objectives/Goals As the failure rates of satellites are increasing and becoming "space junk," the study of the gravitational 2-body problem is crucial. Trying to understand the n-body problem in a simpler form, such as the two-body problem, is a possible intermediate step in tracking the movements of satellites in space. Therefore, the goal is to create a computer program that simulates a special case of the n-body problem. Methods/Materials The program was manually written, tested, compiled, and debugged using C++ and Matlab, and included animation and user interface enabling control over simulation variables through Microsoft's OpenGL. Results Solving the 2-body problem numerically presented the most computationally efficient way to model the free bodies in real time. The software has a built in kinetic and potential energy indicator which displays the conservation of energy and ensured the accuracy of the program. Conclusions/Discussion Modeling and enabling a better understanding of special cases of the n-body problem could have applications in solving the general problem, which would not only be a monumental mathematical achievement, but would offer huge dividends in space-related industries.	
Summary Statement My project is to simulate and animate the n-body problem with the special case of the two-body problem.	
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