

# Solar System Simulator

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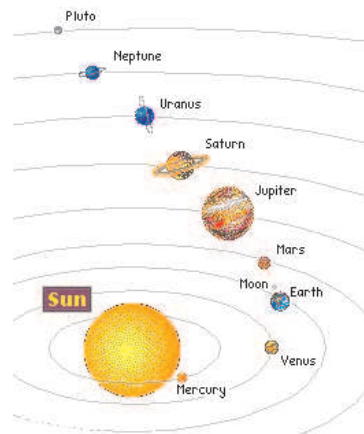
## Introduction

In the late 1600s Isaac Newton, building on earlier work by Johannes Kepler, formulated the Law of Universal Gravitation which allows for the calculation of the attractive force due to gravity between any two objects. When combined with Newton's laws of motion, scientists were for the first time able to accurately predict and explain the motions of planets, comets and all kinds of heavenly bodies.

The aim of this project is to develop a program that allows the creation of an arbitrary solar system. The interactions between objects in the solar system will then be simulated and displayed in 3d so that the user can see how the system develops (or collapses) over time.

## Background

Our own solar system consists of one star and nine planets. Because of the relative distribution of mass between the planets, the Sun and Jupiter, and perhaps Saturn and Uranus account for the stability of the system.



The program will allow for the investigation of more interesting/unstable planetary systems, such as a planet orbiting in tandem with a binary star, or a moon orbiting a moon, orbiting a planet orbiting a star.

Alternatively, the parameters that define a solar system could be tweaked, so that we can discover the effects that changes to the planets would have, thousands of simulated years in the future. Newcomers could be added to a system--what would happen if a rogue planet were to pass by the Earth?

Finally, the user will be able to create and export animations of their simulation runs.

## PHILOSOPHIÆ NATURALIS PRINCIPIA MATHEMATICÆ.

Autore JS. NEWTON, Trin. Coll. Cantab. Soc. Matheseos  
Professore Lucasiano, & Societatis Regalis Sodali.

IMPRIMATUR.  
S. P E P Y S, Reg. Soc. P R Æ S E S.  
Julii 5, 1686.

L O N D I N I,

Jussu Societatis Regiæ ac Typis Josephi Streater. Prostat apud  
plures Bibliopolas. Anno MDCLXXXVII.