

EGP 425 - Solar System Simulation (Homework)

Due Feb 17 by 5:30pm **Points** 100 **Submitting** a file upload

For this assignment you will implement a planetary motion simulation using your physics engine. You will highlight the aspects of physics simulation that we have addressed so far in the course: Particle kinematics, Newtonian dynamics, and physics engine software architecture.

This will be your first graded assignment in the course.

Requirements/Grading:

- Implementation of Force Generator/Registry (20)
- Use of real planetary data
 - Easy to access format - import from a human readable format (JSON, XML, etc.) (5)
 - 8 planets + earth's moon (5)
 - Extra Credit: Ability to add planetary bodies at runtime (+5)
- Good UI
 - Planet names, mass, velocity and other relevant data (10)
 - Extra Credit: Particle trails (+5)
- Good Debug System
 - Reset Everything (5)
 - Toggle Debug Data: On/Off (5)
 - Extra Credit: Vectors displaying total force and velocity (+10)
- Good camera angles
 - Rotate/move camera with WASD and mouse look (5)
 - Centre camera on planetary bodies using numbers 1-8 and 9 for moon (5)
 - Zoom out to see everything (using 0) (5)
 - Extra Credit: smooth camera transitions (+5)
- Toggle minimum scale for planets based on zoom level (5)
- Blog Post
 - Write-up (5)
 - Video (5)
- Professionalism of Submission (10)
- Unit Testing - Demonstrate unit tests for the following systems
 - Particle Force Generation - Gravity (5)
 - Euler integration (particle position update) (5)

Submission Process:

We will use GitHub as the primary submission means for this assignment. Your work will be submitted via an email including:

- A zipped exe for your work that will run on any Windows 7/8 machine. (Make sure to test on 'naked' machines so that you do not have any surprise dependencies)
- A link to your blog post where you've described your work - learnings, challenges, relevant implementation details.
- A link to a commit on GitHub where we will code review your work.

Notes:

- There is intentionally some ambiguity in the assignment description. Use your best judgement in designing your UI and simulation experience. This is an opportunity to demonstrate thinking outside of the box - just make sure the core points above are covered.
- Please feel free to reach out to me for help, but also use your peers. You should help each other, but always make sure that the work that you submit is your own.
- Keep things simple, and focus on the physics simulation first!