# Programming Assignment #1

CS 561, Spring 2020

*Due Thursday, February 6*

**Description.** For this assignment, you are to write a program that demonstrates a particle based–system. The system can either be non–interacting *or* interacting (agent–based).

I will provide you with a simple framework. You may use and modify this code as you see fit. Or you may wish write your own code from scratch. In the latter case, you are free to use any standard computer language and any standard library, as long as your project is able to compile and run on DigiPen computers.

If you use non–interacting particles, at least three particle operations must be used. One of the operations must be solved numerically using an integration scheme discussed in class, and one operation must be solved analytically. The remaining operation(s) may be implemented as you see fit. Operator splitting must be used to combine the particle operations.

On the other hand if you use agent–based modeling, you must include some form of environmental interaction. E.g., wind, obstacles, a velocity field (you will need to use operator splitting for this). While efficient neighbor determination would be desirable, it is not required.

**Grading criteria.** You will be graded primarily on correctness of the implementation, plausibility of the simulation, as well as stability. That is, the behavior of the system should be reasonably stable under moderate CPU loads. I will not grade on visual appeal, although I will award a bonus point if it looks nice.

**What to turn in.** In addition to the code for your simulation, you should also provide a short document that briefly describes the relevant techniques that were used: the particle operations used, and the numerical methods involved. The document may be written in any standard electronic format (plain text, PDF, MS document, RTF).

Your assignment submission should consist of (1) your particle system source code, and (2) the project description document. All files should be archived a single zip–file and uploaded to the CS 561 Distance Education page.