

# Sprint 1 – User Stories

Team 9

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## 1 . Introduction

This document defines this project's *user stories* – brief summaries of features of the project from the user's perspective. The purpose defining such stories is to set and work towards goals that are centred around the Client's expectations for the project, as well as completing the objectives in a way that is measurable by the Client.

The rough template for our user stories is:

*“As a [who] I want to [what] so I can [why]”*

This framework identifies who the user is, what their desired feature is as well as why they require this feature. Doing so helps build sub-objectives that are centred around the user as opposed to technical milestones. For example, *as a user I want to be able to save my password so I can login quickly*.

Our project can be seen as having two user bases; the user of the program and software-engineers who wish to build upon our final framework, henceforth referred to as *Users* and *Developers*. For this reason, the stories are split into two sections. The following stories are listed, roughly, from deliverable to the client soon in the project to deliverable later.

## 2. Stories

### 2.1 User Stories

Below are stories from a user of the simulation – for example a student wearing a VR headset, playing around in the simulated environment. This user should have no concerns about the underlying software engineering producing their experience.

**As a user I want to be able to see the particles in 3D so I can visualise the system**

The core objective of this project is for a user to be able to visualise particle interactions in a 3D environment for the purpose of education. Hence, it is the first story. It will involve designing the simulation environment and the particles in 3D.

**As a user I want to be able to create, destroy and move the particles so I can construct a custom simulation**

Furthermore, the project needs to be interactive, so the user is engaged with the simulation, enrichment the educational experience. Three ways to achieve the interactivity is to create up to 10 particles, destroy them and move them around.

**As a user I want to be able to pause, unpause and adjust the speed of the simulation, so I can observe the system in detail**

Additionally, a user should be able to study the system at their leisure, so they should have the ability to stop the simulation in place and control the speed of the simulation at will.

**As a user I want to be able to visualise the time and length scales, so I can make measurements in the simulation**

In order to relate the simulation to the real world, it should be obvious to the user what the length and time scale is, by way of a physical scale or measurement tools and viewing particle properties. This further increases the educational value.

**As a user I want to have a high and stable framerate, so I don't get motion-sickness in VR and the simulation runs smoothly**

As this simulation will eventually be used with VR headsets, it is critical that the physics calculations and frame updates are done quickly and efficiently as any inconsistent or low framerates will affect the user much more than if they were just looking at a screen, as motion sickness is common under these circumstances. Hence, we should ensure the simulation runs well under specified conditions.

**As a user I want to be able to run multiple independent simulations simultaneously so I can compare many simulations**

A user should be able to construct multiple environments that operate completely independently of each-other, so they can observe differences in two different systems. This will enhance the educational value of the simulation.

**As a user I want the simulation to look visually appealing, so the experience is more captivating**

In order to engage the user, the simulation should be visually appealing. Other than the smooth and high framerate discussed earlier this could include textures for the environment, for particles or 3D objects that the particles can collide with.

## 2.2 Developer Stories

A developer is another type of user of our project who works with the codebase we develop – for example a person who is using our framework to demonstrate a physical phenomenon that was out of the scope of our project to implement should be able to easily do so.

**As a developer I want to be able to input custom vector fields so I can expand the program to have more features**

As per the client's request we should focus our simulation of three key particle interaction fields (see the project scope for details). A developer may want to add additional, custom fields so we should aim to have it be as easy and writing the code and importing it into the simulation.

**As a developer I want to be able to input custom particle interactions so I can expand the program to have more features**

Like the custom fields feature, the developer should be able to add more complex interactions between particles, such as particles bonding, losing energy, splitting apart, etc.

**As a developer I want collision event detection so I can further implement my own features involving particle collisions**

To assist a developer in constructing their own features we should aim to incorporate a collision detection system that notifies the developer when a collision happens, as well as a description of the event. This will help a developer build their own complex physics simulation systems.

**As a developer I want an easy to understand and efficient data structures and algorithms for the physics calculations, so I can tweak it as per my desires**

Overall, the codebase is part of the deliverable so we should aim to have it be as presentable and easy to work with as possible. This involves writing code that is easy to understand, readable, commented, efficient and expandable.

## 3. Final Remarks

These stories will be used as a guideline to monitor our progress as well as design our timeline with our client's expectations and engagement in mind. The client will assign a dollar value, totally \$100, to every story in order to demonstrate the relative importance of each. Throughout the project, acceptance criteria will be used to formally assess the progress of each story. As for how we demonstrate to our client the progress of these stories we will show it through practical demonstration for the user stories, and by explanation of the developer stories.