

# Software Design Document

# Project A

9 juil. 2021

Version <0.01>

Language: English

[Now]	Public Software Design Document	2021 - 2022
Project A	Engine	Version <1.00>

## Revision History

Date	Version	Description
30 juin 2021	<0.01>	<i>Initial Document Version</i>
4 juil. 2021	<1.00>	Added General Introduction of the engine.

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# Game Engine Design Document

Hope you have a good time reading.

## 1. Introduction

Project A is a **diverse and varied project engine**, cross-platform, i.e. software that allows developers to focus on the content and progress of their project rather than solving IT problems. It is **free, open source** and available under the **MIT license**, which makes it free software. It supports several languages such as **C#** and **Python**. In addition to aiming to be **community driven**, the engine allows anyone to create their own **extensions, modifications** and make **contributions**, without limits.

### a. Goal

Project A's main goal is to help developers from all over the world to bring their projects to fruition. That's why the engine will provide a number of **simple, complete, intuitive and educational features** so that new developers can learn the basics of programming, and experienced ones can create something professional and advanced. The engine focuses in particular not only on the development of video games but **all types of projects** such as **simulation and multimedia**.

The engine aims in particular to be **attentive to its community** and **100% customizable** so that everyone can feel at ease.

### b. Technical Description

Project A is an engine programmed in C++ and other programming languages such as **Python** or **C#**. It is **object-oriented**, which allows it to be extremely modular.

The particularity of the software is that it is **100% extensible** and allows anyone to **modify the source code** on their computer and adapt it to their needs. It is mainly compatible with the **Visual Studio Community** code editor **Visual Studio Code**, but can be used under several other software.

It provides a **Programming Interface**, that is, a standardized set of classes, methods, functions and constants, in two programming languages: the **Python Basics** of programming and even create something complete.

Then **C#** (Csharp), so that game developers can move more towards a strongly typed language, therefore an assembly language which has a syntax allowing certain invariants of a program to be expressed in an advanced way.

The engine has the particularity of being extremely **light** thanks to its system based on **modules** and **extensions**.

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### c. Definitions, acronyms and abbreviations

**Extension:** Package containing several different resources to enrich the interface or the engine itself. You can find them in the extensions tab.

**Extension by project:** Type of extension being located not in the video game engine itself, but directly in the user's project.

**Module:** Element containing several different extensions inside.

**Entity:** An entity is an object or substance of a random nature, contained in the world. It is capable of containing one or more other entities within it or even being a child of another. It can in particular be customizable by the user, we can add a texture, a collision box, a script, etc...

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## 2. Use cases

[Note] All the use cases mentioned below are **downloadable modules in the extensions tab**. These are the **Primordial Modules**.

All the extensions mentioned in the modules can be installed **manually** and by **singularity**.

### a. Video game development

Although Project A targets several use cases, it is initially **created to develop video games**. This is the reason why the engine **will provide a large number of tools** so that developers can focus on their projects and not on IT problems.

Content of the	<ul style="list-style-type: none"> <li>- Support module for the C# language (Csharp).</li> <li>- Programming interface (C#).</li> <li>- Support for the Python language.</li> <li>- Programming interface (Python).</li> <li>- Extensions for physics.</li> <li>- Support for Github.</li> <li>- Advanced documentation for video game development.</li> <li>- Specialized interface for the development of video games.</li> </ul>
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### b. Software (Application)

Project A will provide **comprehensive tools** for software development. This will take into account a **complete** graphics rendering to avoid unnecessarily consuming performance, as well as a **large number of resources** so that developers can move forward on their project with **great ease and efficiency**.

Content of the Rendering module	<ul style="list-style-type: none"> <li>- specific for desktop applications. [Name not yet specified]</li> <li>- Support for C# and Python language.</li> <li>- Programming interface (C# &amp; Python).</li> <li>- Advanced documentation for software development.</li> <li>- Specialized interface for developing software applications.</li> </ul>
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### c. Multimedia

Engine will provide **full support** for animation development and video editing. It will provide **advanced rendering support** so that the quality is at its peak, as well as tools to make montage creation **accessible to everyone**.

Content of the	<ul style="list-style-type: none"> <li>- Support module for the C# and Python language.</li> <li>- Programming interface (C# &amp; Python).</li> <li>- Video recording tools.</li> <li>- Advanced graphics rendering.</li> <li>- Advanced documentation for developing animations.</li> <li>- Specialized interface for developing animations.</li> </ul>
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### d. Simulation (Physics, theory)

In addition to the modules listed below, Project A will provide a module specified for real-time simulation, this could be useful to be able to concretize a scientific vision. This will take into account an extension of the graphic rendering in order to show any event in real time, as well as an advanced system of statistics.

Content of the	<ul style="list-style-type: none"> <li>- Support module for the C# and Python language.</li> <li>- Programming interface (C# &amp; Python).</li> <li>- Real-time graphics rendering.</li> <li>- Advanced statistics system.</li> <li>- Advanced documentation for the simulation.</li> <li>- Specialized interface for simulation.</li> </ul>
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### e. Generalist

Specialized module for other projects not mentioned above. Or for anyone wanting to discover the engine.

Contents of the	<ul style="list-style-type: none"> <li>- Support module for the C# and Python language.</li> <li>- General purpose programming interface. (C# &amp; Python) .</li> <li>- Extensions for physics.</li> <li>- Extension for virtual reality.</li> <li>- Support for Github.</li> <li>- Main engine documentation.</li> <li>- Specialized interface for new users (Generalist).</li> </ul>
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