Vaya Rujca Game: *Technical Documentation*

Vaya Rujca Game is a computer videogame developped for Linux. It is written in C++ using pure OpenGL functions and compiled with g++. SDL is used to create a window with an OpenGL context.

Graphics: 3D Volumes and textures are displayed with personally created functions using basic OpenGL directives. DevIL library is used to load the photo images and read them into a format usable by OpenGL. Photos can be taken with any standard gadget and many different formats are allowed (jpg, png…).

Audio: irrKlang library is used to load and play the audio clips for the ball collisions with every other object. Free of copyright clips are used.

Controls: some game elements are controlled with the keyboard. This has been set using SDL input management.

Collisions: since no external game engine or physics simulation API is used, all collisions and the ball movement have been specificly programmed using a refined *a posteriori* algorithm. The bound of the ball against every surface has also be specificly coded. To encapsulate the mathematical operations computed, we have designed our own mathematics library and used it in the calculations.

Optimization: to reduce the CPU impact of the use of this application and make it faster, some very hardware demanding parts of it have been pararellized to improve the performance. Also some simplified spatial partitioning has been implemented to reduce the computations for the collisions (avoid to check innecesary collisions when the ball is far from the object).

Time: the measurement of the time, important for the translation of the ball in real time, has been calculated using the *chrono* library.

Photo selection: part of the appealing of this game is the possibility of adding your own characters and their photos. If more than one photo of each character is introduced, a photo random selector takes a random image from the respective folder. This photo selector has been coded using the *dirent.h* library, available both in Linux and Windows, that allows you to search in the files within a directory using some simple functions and types inside the code.

Compilation: compilation process has been automated using the Makefile technology.

Design: in order to think about the general design and the mathematics used to make the game, only pen and paper have been used.