Final Project Proposal EDA385

Martin Gunnarsson, dat11mgu@student.lu.se
Rickard Johansson, dat11rjo@student.lu.se
Thomas Strahl, dat11tst@student.lu.se

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1 Description

This project is based around a skateboarding game. The skateboard will have a gyroscope mounted at the rear. Tilting the board to the left or right will maneuver the skater on the screen. The map view will be from above and in 2D which is illustrated in the picture below. The object of the game is to avoid the obstacles to reach the finish line. Hitting an obstacle will result in loosing the game. The skater will move horizontally and the map it self will move vertically at a constant pace.

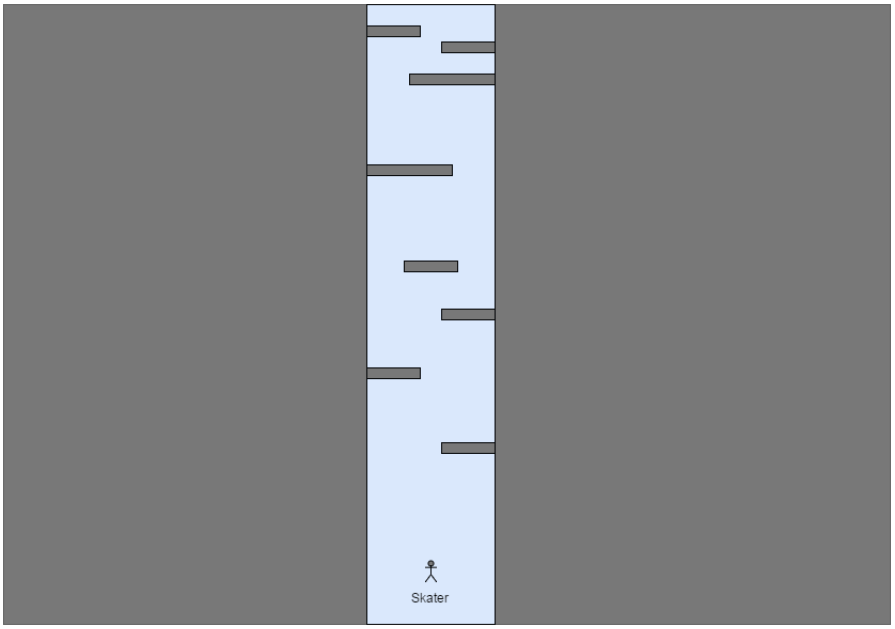

Figure 1: A graphical proposal of the game design.

2 Architecture

The system will be running on a Xilinx Nexys3 board with a Spartan6 FPGA, the processor will be an existing IP from Xilinx. The already familiar Microblaze. The Microbleze will run the software, communicate with the custom hardware and control the system.

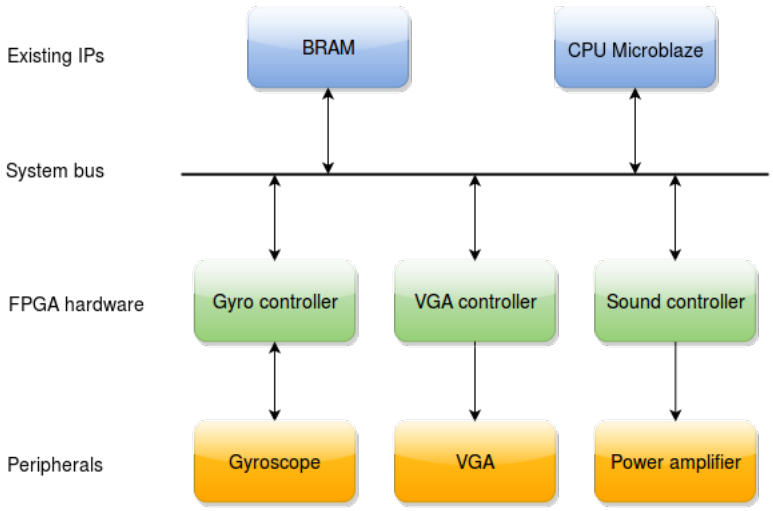

Figure 2: The hardware setup of the system.

2.0.1 BRAM

Here we will buffer video data, graphical objects and maybe sounds.

2.0.2 CPU Microblaze

On the processor we will run the main game-loop, and controll what is shown on the display.

2.0.3 Gyro controller

Interfaces the gyro with the AXI-bus. The Gyro controller interfaces the Gyroscope via I2C, and keeps the value untill it is polled by the controller.

2.0.4 VGA controller

Handles the output to the VGA-screen. We have decided to have a resolution of 640 x 480, @60Hz, and 8-bit graphics. The game is not graphically demanding so this will be sufficient. We will probably use a sprite based solution with either a static or randomly generated background. If possible we will use an existing IP for the VGA controller or a modified to better suit our needs.

2.0.5 Sound controller

Will control the sound from the game. We will use the PmodAMP1 module from Xilinx if we decide to implement sound.

3 Specification

The Specification is yet to be finalized, the most important thing to decide is how the video-output will be handled. Will we implement a GPU or use the

existing Xilinx IPs. This impacts how much will have to be buffered and affect BRAM usage.

4 Improvements

- Add a skateboard to stand on when playing
- Add sound
- More advanced maps with obstacles
- Acceleration and break

5 Time plan

Figure 3: Preleminary time plan.