

Project Proposal: Bubble Bobble

Team Members:

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Introduction:

Our project is developed using Verilog on the DE1-SoC platform, inspired by the classic game Bubble Bobble. We aimed to recreate its core gameplay and innovate on it. Specific goals include:

Character interaction: Simulate the player's interaction with a variety of enemies and set challenging game goals such as several levels.

Map design: Create rich 2D maps and smooth scrolling effects to enhance the exploration of the game.

Action Control: Realize the basic actions of the character, including movement, jumping and attacking.

Props and interaction: Design the prop acquisition mechanism and the interaction between players and props.

Collision Detection: Ensures that characters interact correctly with elements in the game world.

Game demo: https://www.youtube.com/watch?v=O49OgQ_kogw



System Overview:

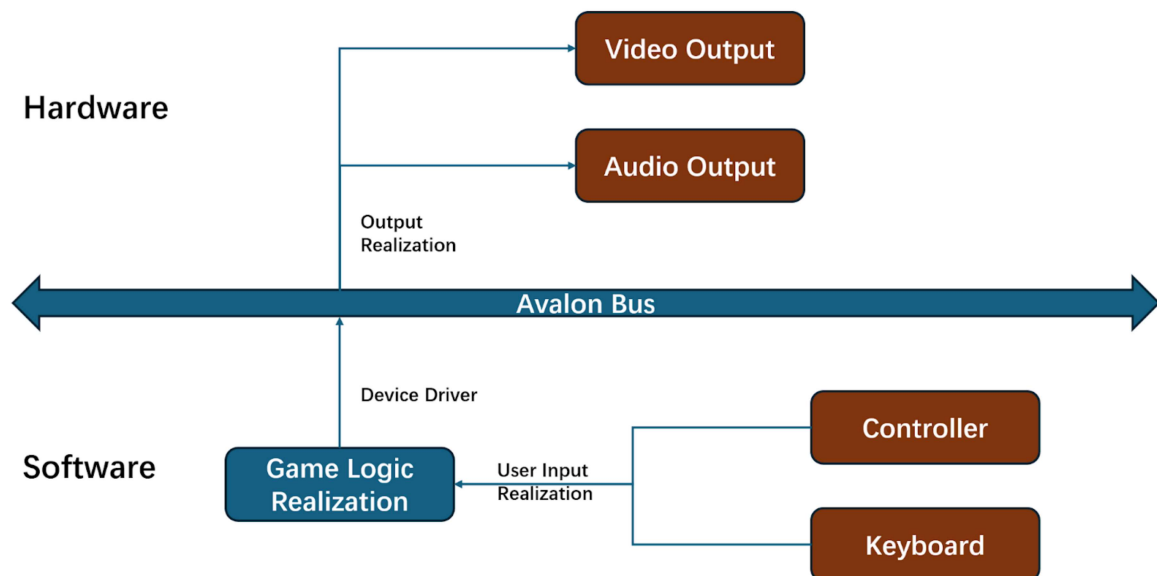
We will carry out system design from the following aspects:

Video output: Utilize VGA interface features to realize character animation and map movement.

Audio output: Integrate audio data and play background music and sound effects through speakers.

User input: Supports keyboard and controller input to provide a smooth game operation experience.

Game logic: Construct game rules and interaction logic, including animation effects and hitbox models.



User Interface:

Input: USB joystick and keyboard

Video output: VGA

Audio output: 3.5mm audio jack

Software/Hardware requirements:

The software side should implement:

1. Game logic (including character movement, enemy AI, collision detection, etc.)
2. Input handling. Use libusb to handle user input.
3. Driver to communicate with the FPGA

The hardware side should implement:

1. Sprite graphics. Receive commands from the CPU and manipulate the framebuffer.
2. Audio output. Mix background music and sound effects and send waveform information to the audio codec DAC.

Milestone:

1. Software prototyping of the game. Implementing hardware controller and the user interface, include joystick control, monitor output, player character movement in fixed map.
2. Implement gameplay arena/platform, map generation, map changing between levels, character interaction with the map.
3. Implement enemy movement, enemy AI behavior, bubble shooting and bubble interaction with enemy. (If possible): pixelated animation, audio output.