ECE 385

Sping 2025

Final Project Proposal

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AB1/Mon & Wed @4pm
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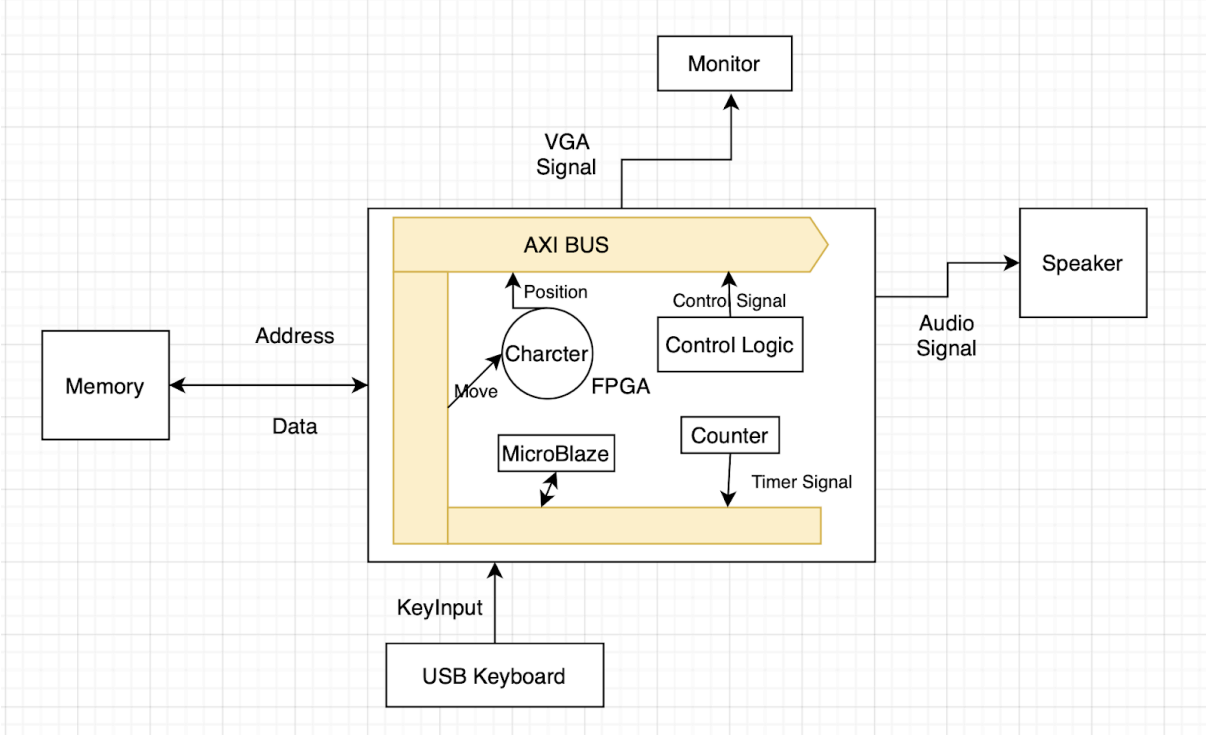
1.Idea and Overview

In this project, we plan to design a video game aiming at controlling the characters to move in a 2D background. As a player, we can use keyboard inputs to control the characters to move or attack the enemies. the HP of the enemies and the player will be shown on the VGA display. Generally, we will implement the system bus, VGA display, keyboard inputs and audio outputs with system verilog and the Microblaze.

2.Block Diagram



3.List of features

1) Expected: basic functionality

Possible Difficulty Points	Description
0.5	Basic Start interface and End interface
0.5	Basic characters on VGA display
0.5	USB keyboard input
0.5	Background color and font (Changeable)
1	Advanced moving of the bullet
0.5	Counter (HP and points earned)
1	State Machine
0.5	Frame buffer

2) Additional feature:

Additional Difficulty Points	Description
0.5	Audio Output
1	Computation unit to Calculate the damage and points earned
1	Randomly generated obstacles
0.5	Evaluation interface when ending
1	Possible multiplayers
0.5	Change on the outlook of character after getting buff

4. Expected Difficulty

We expect our difficulty points to be around 5~6 on a scale of 10. This expectation is based on the basic features we will be implementing, like the Start/End interface, Characters module with their moving and attacking logic, USB keyboard implementation, Display implementation and a state machine for navigating the whole process of the game.

For the additional features, we expect to reach an overall point of 7.5~8.5. The additional features include easy ones like Audio output and computation of the points and evaluation pages when ending. Also, we are trying to implement some challenging stuff like Multiplayers and Changing appearance of the Character after getting different buffs. If time allows, we are trying to consider race conditions related to multiplayers. For instance, how to deal with the buff belonging, when both of the players are pretty close to the buff and which player is terminating the monster when they are both attacking. These features are pretty hard to deal with, since they include the new output formats and also require a deep understanding of logic of the game.

5.Week by Week Timeline

Week 1: We will have a basic preparation of the game on the first several days and by the end of the week, we should be able to clear our mind on how many parts are divided in the hardware and software. Also, try to finish a small portion of the basic and static functionality (background color and font).

Week2: Mid checkpoint is at the end of this week. This week, we should be finishing all the baseline structure construction including all the static settings and we should have a character freely moving and attacking on the screen by the end of the week. This interface which is not that static is what we want to demo at the mid checkpoint.

Week 3: This is the critical week where we will add the rest of the functionality including the enemies or obstacles and the audio outputs and the randomly generated buffs. In the last parts

of the week, we will try to add another player to the design. By the end of the week, we should have a complete version of our design and no critical bugs detected.
Week 4: Only 4 days, we will do the final inspection and add some comments for more readability. And also get prepared for the possible demo questions.