CE4840 Embedded System
SNAPPERS

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SNAPPERS

- Overview and Objectives
- Design Architecture
- Timing
- Challenge and Difficulties
- Summary
SNAPPERS is a keyboard control puzzle game.

A selected snapper will explode and send four bullets on four directions.

Once a snapper is hit by the bullet, it will also explode and shoot.

Game ends when all the snappers explode within certain times of selections.
Overview and Objectives

- Images Import and Display
  - Snappers
  - Buttons
  - Explosions
  - Bullets
  - Letters

- Audio Output by Frequency Division

- Function Control by Keyboard
Design Architecture
Timing

- Frequency Division for Audio
- Clock analysis in VGA
  - CLK50 and CLK25
  - CLK50 for parameter setting and flag control
  - CLK25 for video output
Challenge and Difficulties

- Difficulties in VGA
  - Memory: store the figure in to ROM and use controller to connect it with the vga file.
  - Need many objects exist on the screen and different objects have different feature. We use a big for loop to achieve this which cost memory.
  - Time synchronize.
Challenge and Difficulties

Difficulties in Audio

- Background music is the musical setting of the ODETO JOY by Beethoven. The sheet music is recorded in hardware.
- When the player chooses one snappers, it will scream because of fear.
- When the chosen snapper explodes, it will sound like a bomb.
- Audio sample frequency is 8000Hz
Challenge and Difficulties

- Difficulties in Audio
Challenge and Difficulties

- Difficulties in Software
  - Image control with hardware.
We made Snappers Work!

- Hundreds of ROMs for VGA display
- Different sounds with different motion and background music
- Software implement all the game function