Pacman on the FPGA

Pac-Man images Copyright Namco (1980)

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A Brief History of Pacman

- Developed by Namco
- Inspired by pizza with one slice missing
- Originally called “PUCKMAN”
- Led to many ports and sequels, such as Mrs. Pacman.
- Popularity has lasted the test of time (over 100,000 machines sold)
Gameplay

- Control Pacman via PSX controller (up, down, left and right)
- Move around the screen, eating dots while avoiding four ghosts.
- Pacman starts at the bottom of the screen and Ghosts start in the Ghost Pen (located in the middle of the screen)
- Lose a life if Pacman makes contact with a ghost.
- Game ends if all lives (default 3) are lost.
Gameplay cont.

- Players clears the board if all dots are eaten.

- Two special dots, called, ENERGIZERS make Pacman invincible for a brief period of time when eaten.

- Ghosts can be eaten while Pacman is Energized.

- If a ghost is eaten, they will return to the Ghost Pen and regenerate.
Even more Gameplay

- In two player mode, two players can play simultaneously.
- In this mode, players will race to eat as many dots (and ghosts) as possible.
- The player with the lower score after the board is cleared (or the one who loses all their lives first) loses.
- An Energized Pacman will be able to eat a non-Energized Pacman and gain a life.
Basic Block Diagram

controller interface → up, down, left, right, reset, pause → Game Controller

Regfile: Pac Man and Ghost Coordinates → read → Game Controller

write → Game Controller

Game Controller

read → Display Controller

ghost coordinates → Display Controller

pac man coordinates → Display Controller

ghost state → Display Controller

score → Display Controller

done → Display Controller

Display Controller

XVGA → pixel

read → Regfile: dot locations

write → Regfile: dot locations

write → Display Controller

read → Game Controller

Regfile: dot locations

ROM: map constraints

address → Game Controller

data → Game Controller
Project Priorities

1. Map display with dots.
2. Pac Man eating dots, and keeping score.
4. Energizer
5. Two player mode
6. Animation / sound effects
7. Intermission Animation
8. Multiple Levels
9. Interface with the PS controller
Maze and Maze Constraints ROM

- Each 32x32 block will be coded by 5 bits in the ROM.
- Bit 5: wall (1) or space (0)
- Bit 0-4: which ways lead out of the space.
  - 1: connects to next block
  - 0: does not connect