Fall 2024
Instructor: Jean Guo

Lab 3 Pong on Game Boy Advance

Objectives

Understanding I/O interrupts, simulation and object-oriented programming on embedded systems.

Task 1 Setting up GBA Development Environment (30pts)

This task helps you set up GBA game development environment on your computer. You will install a dev toolkit and a GBA emulator.

1. Butano: modern C++ high-level engine for the Game Boy Advance.
   Install Butano using following the documentation below:
   https://gvaliente.github.io/butano/getting_started.html
   DevkitARM needs to be installed and configured on your computer before installing Butano. You can find installation instructions here:
   https://devkitpro.org/
   Note: for Mac users, download the DevkitPro installer from GitHub and right-click to open the package installer.

2. GBA Emulators
   There are various commonly used GBA emulators. Here are a few recommended for lab purposes:
   - Visual Boy Advance (https://visualboyadvance.org/)
   - mGBA (https://mgba.io/)
   - Nano Boy Advance (https://github.com/nba-emu/NanoBoyAdvance)

   Only one of the above emulators is required.

Once you have successfully installed everything above, build and load an example from Butano using this guideline: (https://gvaliente.github.io/butano/getting_started.html#getting_started_examples)

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Task 2 Pong on GBA (70pts)

Pong is one of the first computer games ever made. You can find an online version to try it out here: https://www.ponggame.org/

For this lab, you are tasked to create a simplified Pong game that compiles and runs on GBA emulators. Here are the design specifications:

- The Pong game consists of one bal, one paddle, and one scoreboard
- Size of the ball: fitting 8x8 sprite
- Size of the paddle: fitting 16x8 sprite
- The paddle will be located at the bottom of the screen. The paddle can be moved around the screen with <- and -> buttons.
- The ball can bounce around the screen's left, right, and top edges. However, the game will end if it touches the bottom edge of the screen.
- The scoreboard will start from 0, and add 1 every time the paddle hits the ball.

An example layout of the Pong game is shown below. The red dotted line shows the potential travel path of the ball.