

1 Overview

1.1 Location \$(AMDAPPSDKSAMPLESROOT)\samples\aparapi\examples

1.2 How to Run See the *Getting Started* guide for how to build samples. You first must compile the sample.

Use the command line to change to the directory where the executable is located. The pre-compiled sample jar is at \$(AMDAPPSDKSAMPLESROOT)\samples\aparapi\examples\Life

Under Windows, type the following command(s).

1. `life.bat`
Runs the Game of Life algorithm.
2. `life.bat -h`
This prints the help file.

Under Linux, type the following command(s).

1. `./life.sh`
Performs convolution on the default image `testcard.jpg`.
2. `./life.sh -h`
This prints the help file.

1.3 Command Line Options Table 1 lists, and briefly describes, the command line options.

Table 1 Command Line Options

Short Form	Long Form	Description
-h	--help	Shows all command options and their respective meaning.
	--device	Devices on which the program is to be run. Acceptable values are <code>cpu</code> or <code>gpu</code> .
-q	--quiet	Quiet mode. Suppresses all text output.
-e	--verify	Verify results against reference implementation.
-t	--timing	Print timing.
-v	--version	AMD APP SDK version string.
-i	--iterations	Number of iterations for kernel execution.

2 Introduction

Conway's "Game of Life" is a zero player "game" that results in interesting image patterns, depending on the initial state and number of iterations over which the "game" is played. Every cell interacts with its adjacent neighbors, horizontally, vertically, and diagonally. The following rules apply to the cells:

- Any live cell with fewer than two live neighbors dies, as if caused by under-population.
- Any live cell with two or three live neighbors lives on to the next generation.
- Any live cell with more than three live neighbors dies, as if by overcrowding.
- Any dead cell with exactly three live neighbors becomes a live cell, as if by reproduction.

The sample is implemented on Aparapi to parallelize the processing and accelerate the execution.

3 Implementation Details

In this example, the `com.amd.aparapi.Kernel` is extended in `LifeKernel.java`. The public `void Kernel.run()` method is overridden in this source file, and the Life algorithm is implemented in this method. The image that shows the evolution of life is allocated to twice the size of the actual image. This allows for swapping the evolution from the top half of the image to the bottom half of the image. A call to the `Kernel.execute(range)` method is made in this class, which is used to initiate the execution of `Kernel.run()` over the range `0...n`. This class also implements the reference implementation, which is used for verifying that the Aparapi-calculated, Life-evolved images match that of the reference. `Life.java` implements the control code and displays the image as it evolves over the iterations

4 Recommended Input Option Settings

For best performance, enter the following on the command line: `-i 1000 -q -t`

5 Requirements

To build/run the Aparapi example requires the following environment:

- Set `JAVA_HOME` to the directory containing JRE/JDK, version 1.7 or above.
- Set `ANT_HOME` to the directory containing ANT, version 1.8 or above.
- Set `LIBAPARAPI` to the directory where [aparapi-2012-11-14.zip](#) (or [above](#)) is unzipped.
- Ensure that `PATH` is set such that `java` & `javac` executables are used from JDK version 1.7 or above and `ant` executable is used from `ANT_HOME`.
- In Linux, set `LD_LIBRARY_PATH` to the directory where [aparapi-2012-11-14.zip](#) (or [above](#)) is unzipped.

6 References

1. <http://code.google.com/p/aparapi/>
2. http://en.wikipedia.org/wiki/Conway%27s_Game_of_Life

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