

## 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 so that `java` and `javac` executables are used from JDK version 1.7 or above, and that the `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](http://en.wikipedia.org/wiki/Conway%27s_Game_of_Life)

---

**Contact**

Advanced Micro Devices, Inc.  
One AMD Place  
P.O. Box 3453  
Sunnyvale, CA, 94088-3453  
Phone: +1.408.749.4000

**For AMD Accelerated Parallel Processing:**

URL: [developer.amd.com/appsdk](http://developer.amd.com/appsdk)  
Developing: [developer.amd.com/](http://developer.amd.com/)  
Forum: [developer.amd.com/opencclforum](http://developer.amd.com/opencclforum)



The contents of this document are provided in connection with Advanced Micro Devices, Inc. ("AMD") products. AMD makes no representations or warranties with respect to the accuracy or completeness of the contents of this publication and reserves the right to make changes to specifications and product descriptions at any time without notice. The information contained herein may be of a preliminary or advance nature and is subject to change without notice. No license, whether express, implied, arising by estoppel or otherwise, to any intellectual property rights is granted by this publication. Except as set forth in AMD's Standard Terms and Conditions of Sale, AMD assumes no liability whatsoever, and disclaims any express or implied warranty, relating to its products including, but not limited to, the implied warranty of merchantability, fitness for a particular purpose, or infringement of any intellectual property right.

AMD's products are not designed, intended, authorized or warranted for use as components in systems intended for surgical implant into the body, or in other applications intended to support or sustain life, or in any other application in which the failure of AMD's product could create a situation where personal injury, death, or severe property or environmental damage may occur. AMD reserves the right to discontinue or make changes to its products at any time without notice.

**Copyright and Trademarks**

© 2012 Advanced Micro Devices, Inc. All rights reserved. AMD, the AMD Arrow logo, ATI, the ATI logo, Radeon, FireStream, and combinations thereof are trademarks of Advanced Micro Devices, Inc. OpenCL and the OpenCL logo are trademarks of Apple Inc. used by permission by Khronos. Other names are for informational purposes only and may be trademarks of their respective owners.