

SVM Binary Tree Search

1 Overview

1.1 Location `$<AMDAPPSDKSamplesInstallPath>\samples\opencl\cl\2.0`

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 executable is at

`$<AMDAPPSDKSamplesInstallPath>\samples\opencl\bin\x86_64\` for 64-bit builds.

Ensure that the OpenCL 2.0 environment is installed.

Type the following command(s).

1. `SVMBinaryTreeSearch`
This runs the program with the default options.
2. `SVMBinaryTreeSearch -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 meanings.
	--device	Devices on which the program is to be run. Acceptable values are cpu or gpu.
-q	--quiet	Quiet mode. Suppresses most text output.
-e	--verify	Verify results against reference implementation.
-t	--timing	Print timing related statistics.
	--dump	Dump binary image for all devices.
	--load	Load binary image and execute on device.
	--flags	Specify compiler flags to build the kernel.
-p	platformId	Select platformId to be used (0 to N-1, where N is the number of available platforms).
-d	deviceId	Select deviceId to be used (0 to N-1, where N is the number of available devices).
-v	version	AMD APP SDK version string.
-i	iterations	Number of iterations for kernel execution.

Short Form	Long Form	Description
-k	--keys	Number of keys to be searched.
-r	--randMax	Maximum random number value.
-s	--seed	Seed to the random number generator.

2 Introduction

This sample demonstrate the use of the coarse grain Shared Virtual Memory (SVM) feature of OpenCL.2.0. SVM is an address space exposed to both the host and the device. This address space could be effectively used to share virtual pointers created in this space. Thus, data structures based on memory pointers, such as linked lists and binary trees could be shared between the host and the device using SVM. For coarse grain SVM, granularity is at OpenCL memory objects, and consistency is guaranteed at synchronization points.

3 Implementation Details

This implementation uses coarse grain SVM to share a binary search tree between the host and the OpenCL device. The host allocates an SVM buffer and creates a binary search tree (BST) in this buffer. It then passes this BST and an array of search keys to be searched in this BST. The device takes this array and does a parallel key search with one work-item performing one key search.

4 References

1. [The OpenCL Specification, version 2.0, rev 22 document](#) (page 38).
2. [The OpenCL C Programming Language \(ver 2.0, rev 22\) document](#).

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