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Cuda C

Programming

Guide Nvidia

Programming Guide Nvidia

Professional CUDA C
Programming CUDA
by Example CUDA
Programming The
CUDA Handbook
CUDA Fortran for
Scientists and
Engineers OpenCL
Programming Guide

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Hands-On GPU
Programming with
CUDA Programming
Massively Parallel
Processors GPU
Parallel Program
Development Using
CUDA Hands-On GPU
Programming with
Python and CUDA
CUDA Application
Design and
Development GPU
Gems 2 CUDA for

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Engineers
Professional CUDA C
Programming Hands-
On GPU-Accelerated
Computer Vision with
OpenCV and CUDA
Multicore and GPU
Programming GPU-
based Parallel
Implementation of
Swarm Intelligence
Algorithms GPU
Programming in
MATLAB Ray Tracing

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Cuda C

from the Ground Up
Extreme C

~~Your First CUDA C
Program nvidia cuda
c++ programming
guide 2.1 CUDACast
#2 - Your First CUDA
C Program CUDA
Crash Course (v2):
Visual Studio 2019
Setup~~

Introduction to
programming in

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Cuda C

CUDA C Launching
computations using
an Nvidia GPU w/
CUDA in C

~~Programming~~
~~C/C++ Basics~~

An Introduction to
GPU Programming
with CUDA
From
Scratch: Matrix
Multiplication in
CUDA

Programming with
CUDA: Matrix

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Multiplication

Learn GPU Parallel
Programming -

Installing the CUDA
toolkit

What Are CUDA

Cores? What are

Tensor Cores? Mar/O

- Machine Learning

for Video Games

CUDA Neural

Networks CPU vs GPU

(What's the

Difference?) -

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Computerphile Intro
to CUDA (part 1):
High Level Concepts
How to enable CUDA
for Premiere Pro and
After Effects

Advanced GPU
computing: Efficient
CPU-GPU memory
transfers, CUDA
streams Should you
Learn C++ in 2018?
AMD Vs NVIDIA
Choosing The Right

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GPU An Introduction
to CUDA

Programming CUDA

Kernels with C++

Michael Gopshtein

CUDA In Your Python:

Effective Parallel

Programming on the

GPU Intro to CUDA

An introduction, how-

to, to NVIDIA's GPU

parallel

programming

architecture Learn to

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~~use a CUDA GPU to
dramatically speed
up code in Python.~~

NVIDIA CUDA Tutorial

5: Memory Overview

CppCon 2018:

Michael Gopshtein

“ CUDA Kernels with

C++ ” CUDA Part A:

GPU Architecture

Overview and CUDA

Basics; Peter

Messmer (NVIDIA)

Cuda C Programming

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Cuda C

Guide Nvidia

```
cudaMalloc(&d_B.elements, size); cudaMemcpy(d_B.elements, B.elements, size, cudaMemcpyHostToDevice); // Allocate C in device memory
Matrix d_C;
d_C.width =
d_C.stride = C.width;
d_C.height =
C.height; size =
C.width * C.height *
```

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```
sizeof(float); cudaMalloc(&d_C.elements, size); // Invoke kernel dim3 dimBlock(BLOCK_SIZE, BLOCK_SIZE); dim3 dimGrid(B.width / dimBlock.x, A.height / dimBlock.y); MatMulKernel <<< dimGrid, dimBlock >>> (d_A, d_B, d_C); // Read C from device memory
```

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CUDA C++

Programming Guide -
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Programming Guide
Version 4.2 Changes
from Version 4.1

Updated Chapter 4,
Chapter 5, and
Appendix F to
include information
on devices of

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Cuda C

compute capability

3.0. Replaced each reference to

“ processor core ”

with

“ multiprocessor ” in

Section 1.3. Replaced

Table A-1 by a

reference to [http://de](http://developer.nvidia.com/cuda-gpus)

[veloper.nvidia.com/c](http://developer.nvidia.com/cuda-gpus)

[uda-gpus](http://developer.nvidia.com/cuda-gpus).

NVIDIA CUDA

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4 CUDA C

Programming Guide

Version 3.1.1 solve

many complex

computational

problems in a more

efficient way than on

a CPU. CUDA comes

with a software

environment that

allows developers to

use C as a high-level

programming

language.

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Programming

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CUDA C++

Programming Guide

PG-02829-001_v11.1

| ii Changes from

Version 11.0

Added

documentation for

Compute Capability

8.x. Updated

section Arithmetic

Instructions for

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Cuda C

compute capability

8.6. Updated
section Features and
Technical

Specifications for
compute capability

8.6.

CUDA C++

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Version 4.0 Changes

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from Version 3.2

Replaced all mentions of the

deprecated

`cudaThread*`

functions by the new

`cudaDevice*` names. `c`

`udaTextureTypeUpda`

ted all mentions of

`texture<...>` to use

the new `*` macros.

Updated Sections 2.2,

B.16, and F.1 now

that three-

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Dimensional grids are supported for devices of compute capability 2.0 and above.

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NVIDIA CUDA C

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Programming Guide

Version 3.2 Changes

from Version 3.1.1

cuParamSetv()Simplif

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ied all the code samples that use to set a kernel

parameter of type CUdeviceptr since CUdeviceptr is now of same size and alignment as void*, so there is no longer any need to go through an intermediate void* variable.

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Programming Guide
CUDA C/C++

keyword `__global__`
indicates a function
that: Runs on the
device Is called from
host code `nvcc`
separates source
code into host and
device components
Device functions (e.g.
`mykernel()`)
processed by NVIDIA

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Compiler Host
functions (e.g.
main()) processed by
standard host
compiler - gcc, cl.exe

CUDA C/C++ Basics -
Nvidia

This guide presents
established
parallelization and
optimization
techniques and
explains coding

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metaphors and idioms that can greatly simplify programming for CUDA-capable GPU architectures. The intent is to provide guidelines for obtaining the best performance from NVIDIA GPUs using the CUDA Toolkit.

CUDA Toolkit

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Documentation -

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NVIDIA provides

hands-on training in

CUDA through a

collection of self-

paced and instructor-

led courses. The self-

paced online

training, powered by

GPU-accelerated

workstations in the

cloud, guides you

step-by-step through

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Programming
editing and
execution of code
along with
interaction with
visual tools.

GPU Accelerated
Computing with C
and C++ | NVIDIA
Developer

A comprehensive
guide to
understanding and
developing and

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Optimizing code in
the CUDA C++
programming
environment.

CUDA
Fortran Programming
Guide This guide
describes how to
program with CUDA
Fortran, a small set of
extensions to Fortran
that supports and is
built upon the
NVIDIA CUDA
programming model.

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Programming

NVIDIA HPC SDK

Version 20.9

Documentation

CUDA (Compute

Unified Device

Architecture) is a

parallel computing

platform and

application

programming

interface (API) model

created by Nvidia. It

allows software

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Developers and software engineers to use a CUDA-enabled graphics processing unit (GPU) for general purpose processing – an approach termed GPGPU (General-Purpose computing on Graphics Processing Units).

CUDA - Wikipedia

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viii CUDA
Programming
Guide
Version 2.1 List of
Figures Figure 1-1.
Floating-Point
Operations per
Second and Memory
Bandwidth for the
CPU and GPU 2
Figure 1-2. The GPU
Devotes More
Transistors to Data
Processing 3
Figure 1-3. CUDA is

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Designed to Support
Various Languages or
Application

NVIDIA CUDA

Programming Guide

The CUDA

programming model

is a heterogeneous

model in which both

the CPU and GPU are

used. In CUDA, the

host refers to the CPU

and its memory,

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while the device refers to the GPU and its memory. Code run on the host can manage memory on both the host and device, and also launches kernels which are functions executed on the device.

An Easy Introduction
to CUDA C and C++ -

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NVIDIA Developer

CUDA provides

C/C++ language

extension and APIs

for programming and

managing GPUs. In

CUDA programming,

both CPUs and GPUs

are used for

computing. Typically,

we refer to CPU and

GPU system as host

and device,

respectively. CPUs

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and GPUs are separated platforms with their own memory space.

Typically, we run serial workload on CPU and offload parallel computation to GPUs. A quick comparison between CUDA and C

Tutorial 01: Say Hello to CUDA - CUDA

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Cuda C

Tutorial

```
$ nvprof ./add_cuda  
==3355== NVPROF is
```

```
profiling process
```

```
3355, command:
```

```
./add_cuda Max
```

```
error: 0 ==3355==
```

```
Profiling application:
```

```
./add_cuda
```

```
==3355== Profiling
```

```
result: Time(%) Time
```

```
Calls Avg Min Max
```

```
Name 100.00%
```

```
463.25ms 1 463.25ms
```

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463.25ms 463.25ms

add(int, float*, float*)

...

An Even Easier
Introduction to CUDA
| NVIDIA Developer
Blog

CUDA C++ provides a
simple path for users
familiar with the C++
programming
language to easily
write programs for

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execution by the device. It consists of a minimal set of extensions to the C++ language and a runtime library. The core language extensions have been introduced in Programming Model. They allow programmers to define a kernel as a C++ function and use

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some new syntax to
specify the ...

Nvidia Cuda C

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09/2020

NVIDIA cuDNN The
NVIDIA CUDA® Deep
Neural Network
library (cuDNN) is a
GPU-accelerated
library of primitives
for deep neural
networks. cuDNN

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Provides highly tuned implementations for standard routines such as forward and backward convolution, pooling, normalization, and activation layers.

Deep learning researchers and framework developers worldwide rely on

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cuDNN for Programming

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NVIDIA cuDNN |

NVIDIA Developer

This means that the data structures, APIs and code described in this section are subject to change in future CUDA releases. While cuBLAS and cuDNN cover many of the potential uses for Tensor Cores, you can

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also program them directly in CUDA C++.

Tensor Cores are exposed in CUDA 9.0 via a set of functions and types in the `nvcuda::wmma` namespace. These allow you to load or initialize values into the special format required by the tensor cores, perform matrix multiply-

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accumulate (MMA)
steps...

Programming
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Programming Tensor
Cores in CUDA 9 |
NVIDIA Developer
Blog

<http://docs.nvidia.com/cuda/cuda-c-programming-guide/index.html#synchronization-functions>.

Specifically for shared
memory race

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conditions, the cuda-memcheck tool has some options to do race-condition checking. Use: cuda-memcheck --help. to learn the command line switches to use it. (-tool racecheck)
Thanks for your advice.