PA1 – Playing with OptiX

- **NVIDIA OptiX Ray Tracing Engine**
  - **NVIDIA's ray tracing engine based on CUDA**
  - **Requires NVIDIA GPU to work**

NVIDIA's commercial renderer, Iray, is built upon OptiX Technology

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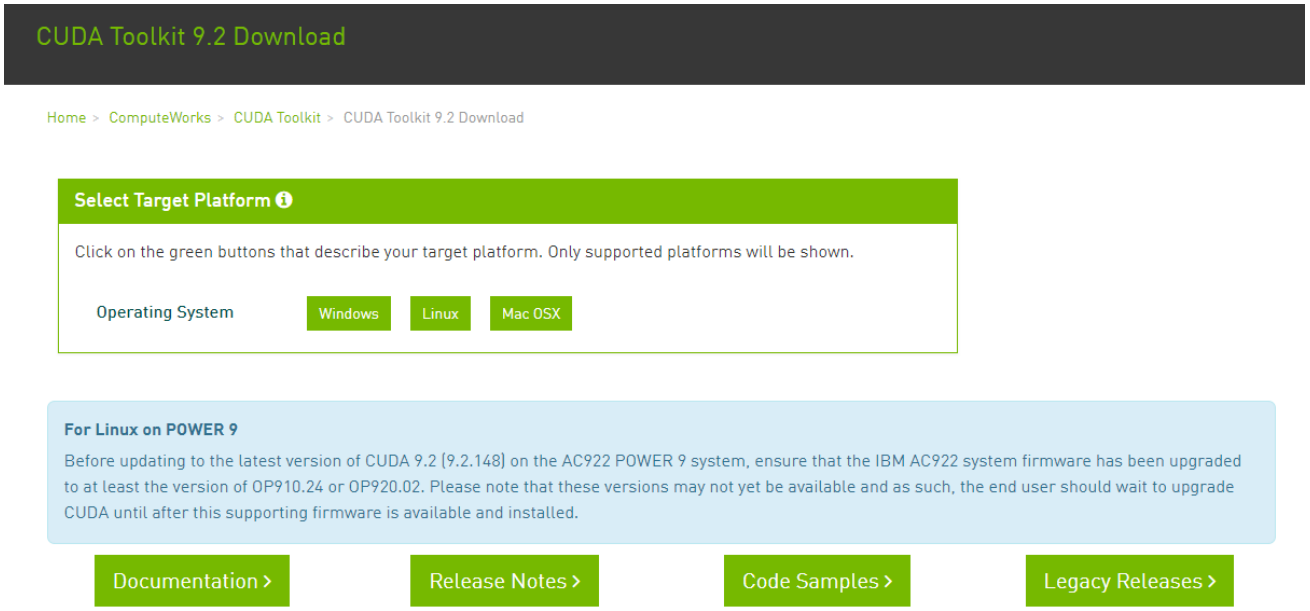
- **Prerequisite - CUDA Toolkit**
  - **NVIDIA's GPGPU interface**
  - **Download latest version at: https://developer.nvidia.com/cuda-downloads**



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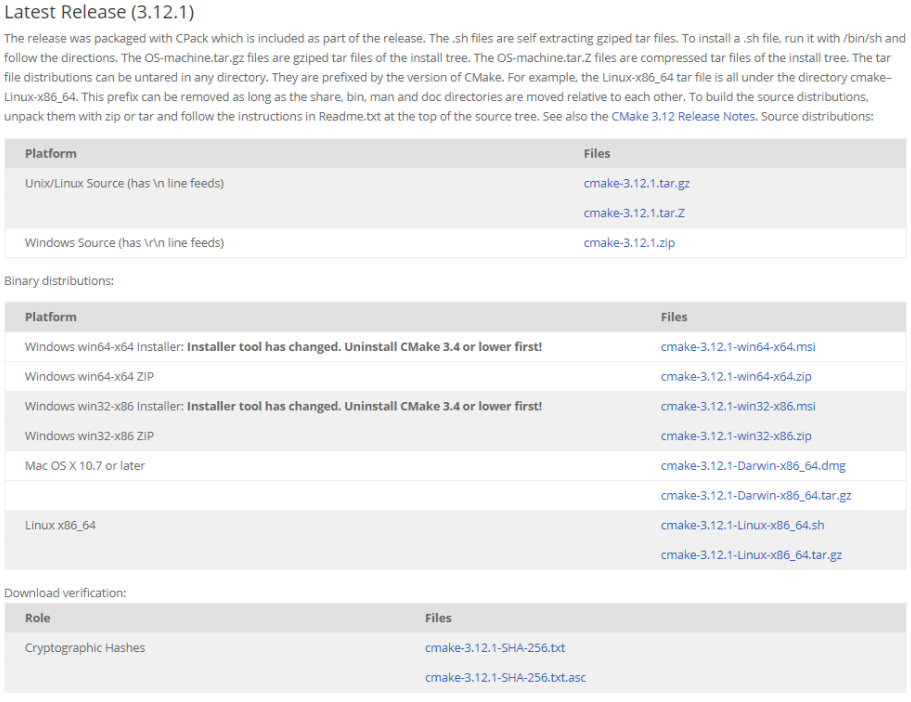
- **Prerequisite - CMake**
  - **Used for generate various open-source build environments, including OptiX samples**
  - **Download latest version at: http://www.cmake.org/download/**



Latest Release (3.12.1)

The release was packaged with CPack which is included as part of the release. The .sh files are self extracting gziped tar files. To install a .sh file, run it with /bin/sh and follow the directions. The OS-machine.tar.gz files are gziped tar files of the install tree. The OS-machine.tar.Z files are compressed tar files of the install tree. The tar file distributions can be untared in any directory. They are prefixed by the version of CMake. For example, the Linux-x86_64 tar file is all under the directory cmake-Linux-x86_64. This prefix can be removed as long as the share, bin, man and doc directories are moved relative to each other. To build the source distributions, unpack them with zip or tar and follow the instructions in Readme.txt at the top of the source tree. See also the CMake 3.12 Release Notes. Source distributions:

Platform	Files
Unix/Linux Source (has \n line feeds)	cmake-3.12.1.tar.gz
	cmake-3.12.1.tar.Z
Windows Source (has \r\n line feeds)	cmake-3.12.1.zip

Binary distributions:

Platform	Files
Windows win64-x64 Installer: **Installer tool has changed. Uninstall CMake 3.4 or lower first!**	cmake-3.12.1-win64-x64.msi
Windows win64-x64 ZIP	cmake-3.12.1-win64-x64.zip
Windows win32-x86 Installer: **Installer tool has changed. Uninstall CMake 3.4 or lower first!**	cmake-3.12.1-win32-x86.msi
Windows win32-x86 ZIP	cmake-3.12.1-win32-x86.zip
Mac OS X 10.7 or later	cmake-3.12.1-Darwin-x86_64.dmg
	cmake-3.12.1-Darwin-x86_64.tar.gz
Linux x86_64	cmake-3.12.1-Linux-x86_64.sh
	cmake-3.12.1-Linux-x86_64.tar.gz

Download verification:

Role	Files
Cryptographic Hashes	cmake-3.12.1-SHA-256.txt
	cmake-3.12.1-SHA-256.txt.asc

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- **Once both prerequisites are installed, grab OptiX from following location:**
  - **https://developer.nvidia.com/designworks/optix/download**

- **Computer environment of TA:**
  - **Windows 10, 64 bit**
  - **Visual Studio 2015**
  - **CUDA 9.2 version**
  - **Cmake 3.12.1 version**
  - **Optix 5.1.0**

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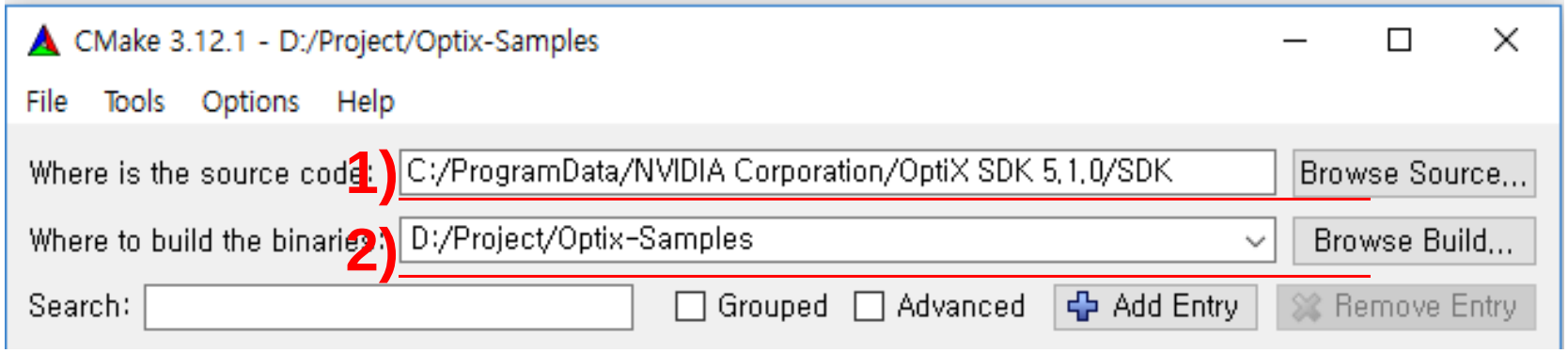
- Let's make project files for OptiX samples!
  - Run cmake-gui
  - 1) Set source code to OptiX SDK location
    - In Windows, default location is following:
      - %ProgramData%\ NVIDIA Corporation\ OptiX SDK {version}\ SDK
  - 2) Set destination to a new folder
    - Don't set it to the same folder of SDK itself



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- **Let's make project files for OptiX samples!**
  - **3) recommend that entities are set as follow:**

Name	Value
CMAKE_BUILD_TYPE	Release
CMAKE_CONFIGURATION_TYPES	Debug;Release;MinSizeRel;RelWithDebInfo
CMAKE_INSTALL_PREFIX	C:/Program Files/OptiX-Samples
CUDA_64_BIT_DEVICE_CODE	☑
CUDA_CHECK_DEPENDENCIES_DURING_COMPILE	☑
CUDA_ENABLE_BATCHING	☐
CUDA_GENERATE_DEPENDENCIES_DURING_CONFIGURE	☐
CUDA_HOST_COMPILER	$(VCInstallDir)bin
CUDA_NVRTC_ENABLED	☑
CUDA_REMOVE_GLOBAL_MEMORY_SPACE_WARNING	☑
CUDA_SDK_ROOT_DIR	CUDA_SDK_ROOT_DIR-NOTFOUND
CUDA_TOOLKIT_ROOT_DIR	C:/Program Files/NVIDIA GPU Computing Toolkit/CUDA/v9.2
CUDA_USE_STATIC_CUDA_RUNTIME	☑
OptiX_INCLUDE	C:/ProgramData/NVIDIA Corporation/OptiX SDK 5.1.0/include
OptiX_INSTALL_DIR	C:/ProgramData/NVIDIA Corporation/OptiX SDK 5.1.0/SDK/..
mdl_wrapper_INCLUDE_DIR	C:/ProgramData/NVIDIA Corporation/OptiX SDK 5.1.0/SDK/support/mdl_wrapper/include
mdl_wrapper_LIBRARY	C:/ProgramData/NVIDIA Corporation/OptiX SDK 5.1.0/SDK/support/mdl_wrapper/lib/mdl_wrapper.lib
optix_DLL	C:/ProgramData/NVIDIA Corporation/OptiX SDK 5.1.0/bin64/optix.51.dll
optix_LIBRARY	C:/ProgramData/NVIDIA Corporation/OptiX SDK 5.1.0/lib64/optix.51.lib
optix_prime_DLL	C:/ProgramData/NVIDIA Corporation/OptiX SDK 5.1.0/bin64/optix_prime.1.dll
optix_prime_LIBRARY	C:/ProgramData/NVIDIA Corporation/OptiX SDK 5.1.0/lib64/optix_prime.1.lib
optixu_DLL	C:/ProgramData/NVIDIA Corporation/OptiX SDK 5.1.0/bin64/optixu.1.dll
optixu_LIBRARY	C:/ProgramData/NVIDIA Corporation/OptiX SDK 5.1.0/lib64/optixu.1.lib

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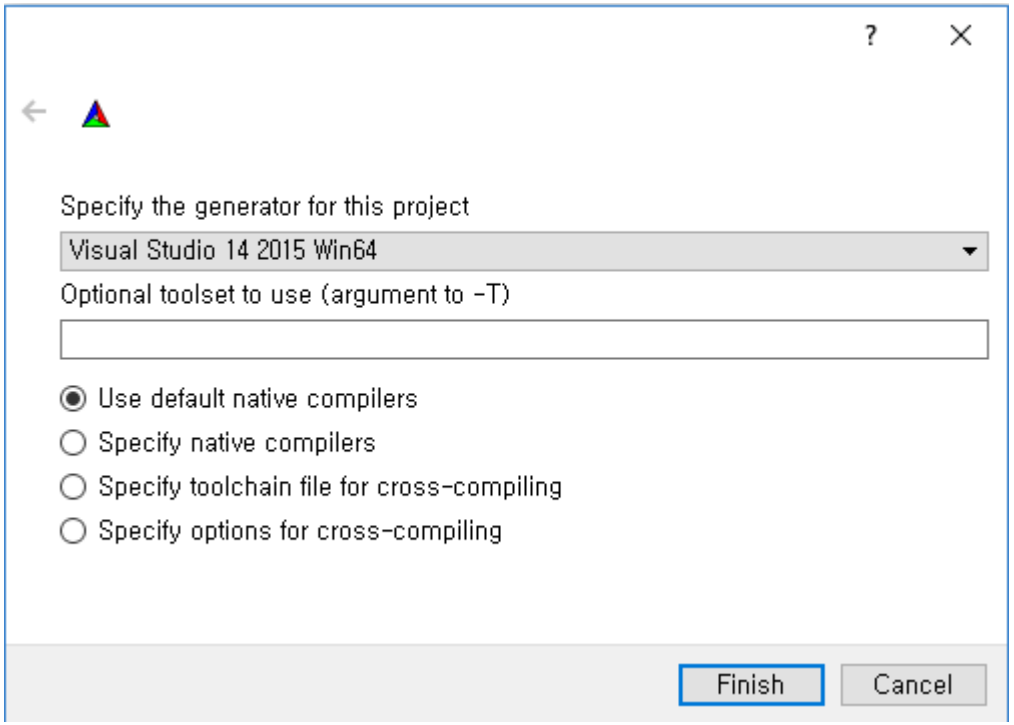
- **Let's make project files for OptiX samples!**
  - **4) Click "Generate" button below**
  - **5) Set appropriate build environment**
  - **Now you have your build environment!**



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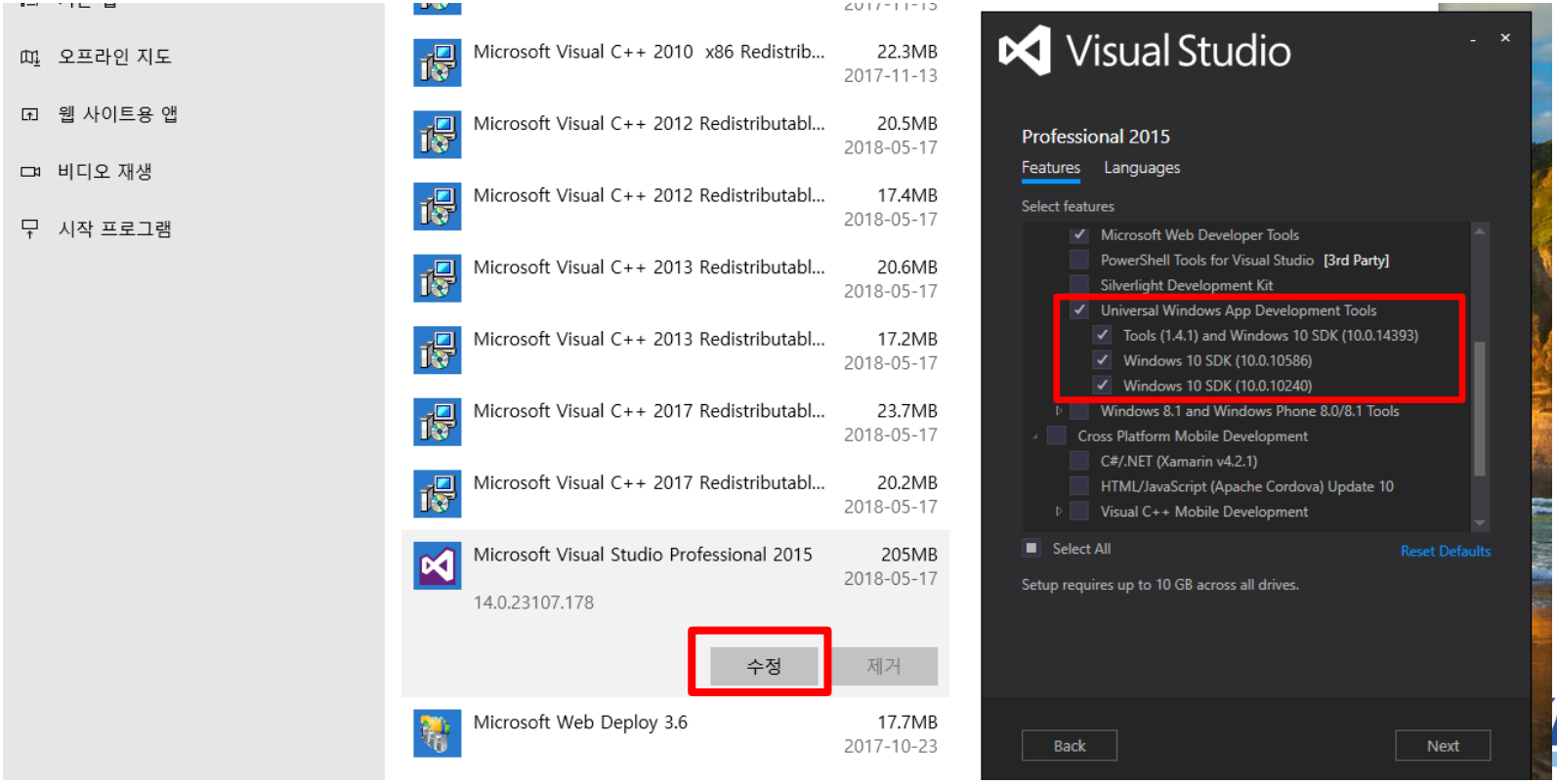
- **Let's make project files for OptiX samples!**
  - **If Cmake does not find the compiler, you should modify Visual Studio (Setting→Applications→Modify) to install "Universal Windows App Development Tools".**



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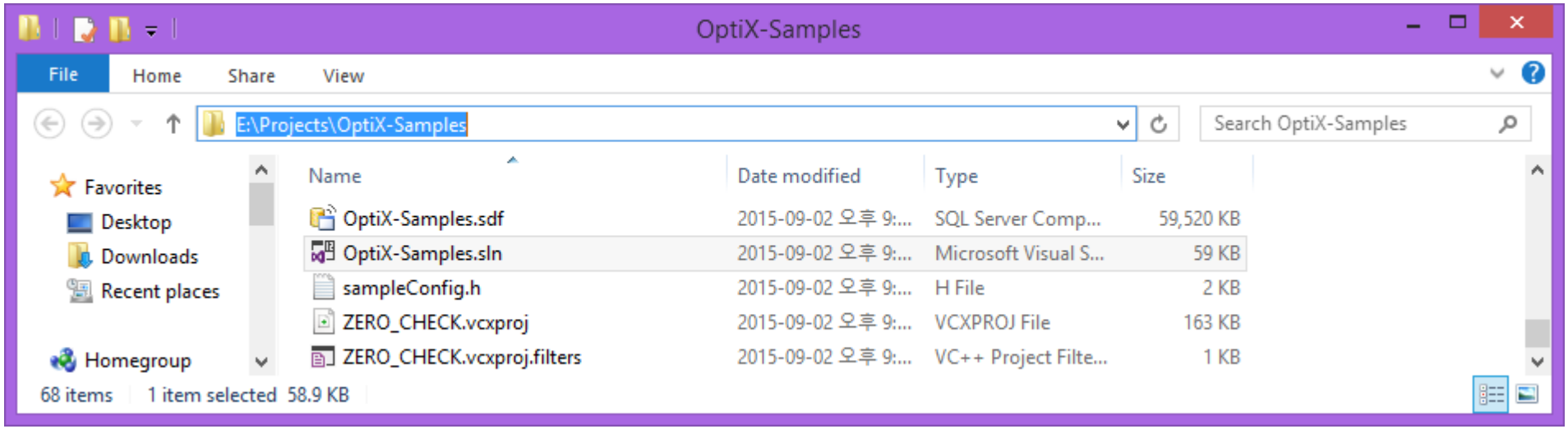
- Compile with your environments
  - In Unix-like OS, default is Makefile
    - Just compile it with “make all”
  - In Windows, use Visual Studio solutions
    - Build “ALL_BUILD” project to compile everything



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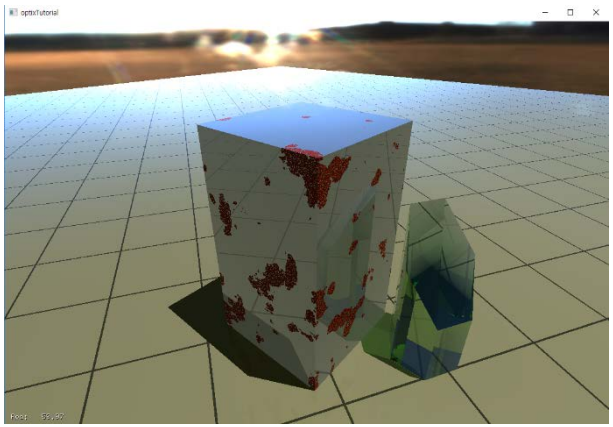
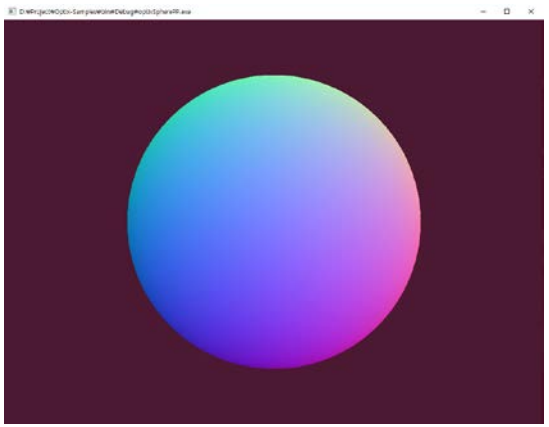
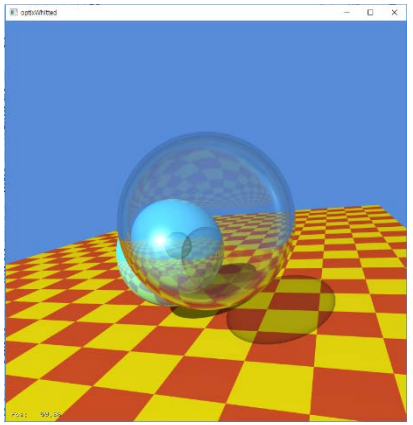
- **PA1 (OptiX)**
  submit screenshots of following projects:
  - **optixPathTracer, optixMotionBlur, optixMDLDisplacement**
- **Also, take a look at codes for simple projects to learn how they works**
  - **optixTutorial, optixSpherePP, whitted, ...**







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