CUDA_examples REPOSITORY TUTORIAL:

CUDA programs step by step tutorial for executing repository programs. It consist of tip dashes.

1) obtain computer with included NVidia GPU graphics (programs are written in Nvidia corporation C extensions language with some C++11 capabilities - Compute Unified Device Architecture CUDA). If you have not any, I will provide you some new-parts proposition in 2017y:

- CPU: AMD A10 7860k,
- MB: Asrock FM2A88X+ (note PCIe 3.0 x16 bandwidth ~14GBps),
- RAM: 4x GOODRAM PLAY Blue 4GB,
- pendrive 16GB with Ubuntu desktop 64bit, power supply,
- GPU: Nvidia GTX 1060 6GB
  - tip: consider operating system distribution booting to RAM (f.e. modified Ubuntu),
  - tip: consider good quality monitors, chair and keyboard (for my best knowledge mouse is unnecessary),
  - tip: for parallel cluster consider adding SSD RAID 0 (#mdadm are not so computationally expensive, as you think, especially for multicore CPU) and make redundand above configuration,
  - tip: theoretically low – price used parts Dell R710 32GB + **GTX780** 3GB + PCIe: 2p 10GbE/IB/ 4p GbE (useful link aggregations: #ifenslave, #bonding) – I did not check that configuration by myself, but should work,
  - tip: theoretical lower price – any used Personal Computer with PCIe 2.0x16 (f.e. Core2Quad + 4GB RAM + **GTX580** 1.5GB). I did not check that configuration by myself, but should work,

2) further consideration are for LINUX UBUNTU (checked for 16.04). *I have been forced to check that on Microsoft Windows 10: Visual Studio Community (2015) and alternatively on Notepad++ with command line (shell) and both were working great (with different run commands).*

3) after signing in to operating system and making essential configurations (f.e. second sudo user for recovery mode) download CUDA toolkit from:

https://developer.nvidia.com/cuda-toolkit

4)to avoid:

- problems with lightdm log in (login loop)
- problems with driver istall ("Driver Installation failed: it appears, that a X server is running...")

5) and succesfully install a NVidia CUDA Toolkit on Ubuntu 16.04 64bit I have just had to do:

- login on live session on pendrive ("Try ubuntu, before install")
- add sudo user at live session:
  #sudo adduser admin (#pass: admin1)
  #sudo usermod -aG sudo admin
- logout from live session, log in as #admin
- download CUDA Toolkit from NVidia official site (~1.5GB)
- change privileges for downloaded installer file (DO NOT INSTALL AT THIS STEP!):
  #sudo chmod +x cuda_X.X.run
- switch to console view:
  #Ctr+Alt+F1 (to switch on terminal view)
  #Ctr+Alt+F7 (to switch from terminal view to graphical server)
- at console view (Ctr+Alt+F1) log in:

#login: admin
#pass: admin1

- stop graphical running service:
#sudo service lightdm stop
- check if graphical server is off - after switching Ctr+Alt+F7 the monitor should be blank black, switch back on console view Ctr+Alt+F1
- install CUDA Toolkit, with such configuration:
#sudo ./cuda_X.X.run
#(press 'q' for license read skip)
#do not install OpenGL library (I do not know why – please do not ask)
#do not update system X configuration
#other options make yes and paths as default
- turn on graphical server:
#sudo service lightdm start
- log in as user (if you automatically log in as #ubuntu at live session log out):
#login: admin
#pass: admin1
- check if nvcc exists:
sudo find /usr/ -name 'nvcc'

6) obtain git:
#sudo apt-get install git
7) clone my repo in home directory (~):
#git clone https://github.com/PiotrLenarczykAnonim/CUDA_examples.git
8) check whatever nvcc compiler works:
#cd CUDA_examples/01_makeSimple/
9) most of folders are configured for #make via BASH scripts:
#./RUN_COMMANDS.sh
10) Thrust library is delivered with CUDA Toolkit, but I strongly recommend for cloning repo Mr Jared Hoberock with examples:
git clone https://github.com/thrust/thrust.git
11) there are another repo with C++ several useful examples:
#git clone https://github.com/PiotrLenarczykAnonim/C-_examples.git

Post Scriptum: Mostly I have been developing it on Dell Inspiron 7746 with i7 5500U, 16GB RAM 1666MHz, Nvidia GM108M GeForce 845M PCIe 3.0x4 2GB and SSD 1TB (OS: LINUX Ubuntu 16.04 64bit). Also it was check on PC: Intel i7 2660k, 16GB RAM 1333MHz, Nvidia GK110 GTX780 3GB PCIe 2.0x16, SSD 0.24TB (OS: LINUX Ubuntu 16.04 64bit).
Post Post Scriptum: Feel free to use that tutorial “as is“ without copyrights (author Piotr Lenarczyk) and of course guarantee.