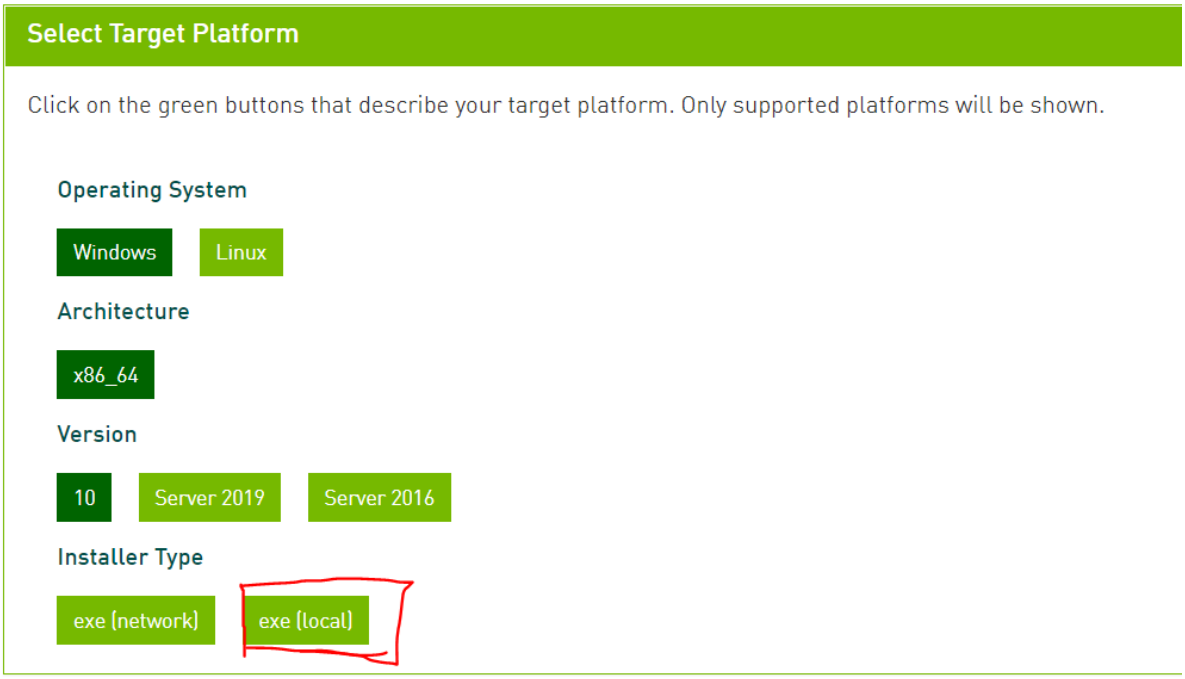
Installing CUDA Toolkit and cuDNN for Deep Learning:

Step 1:

Download Cuda toolkit 10.0



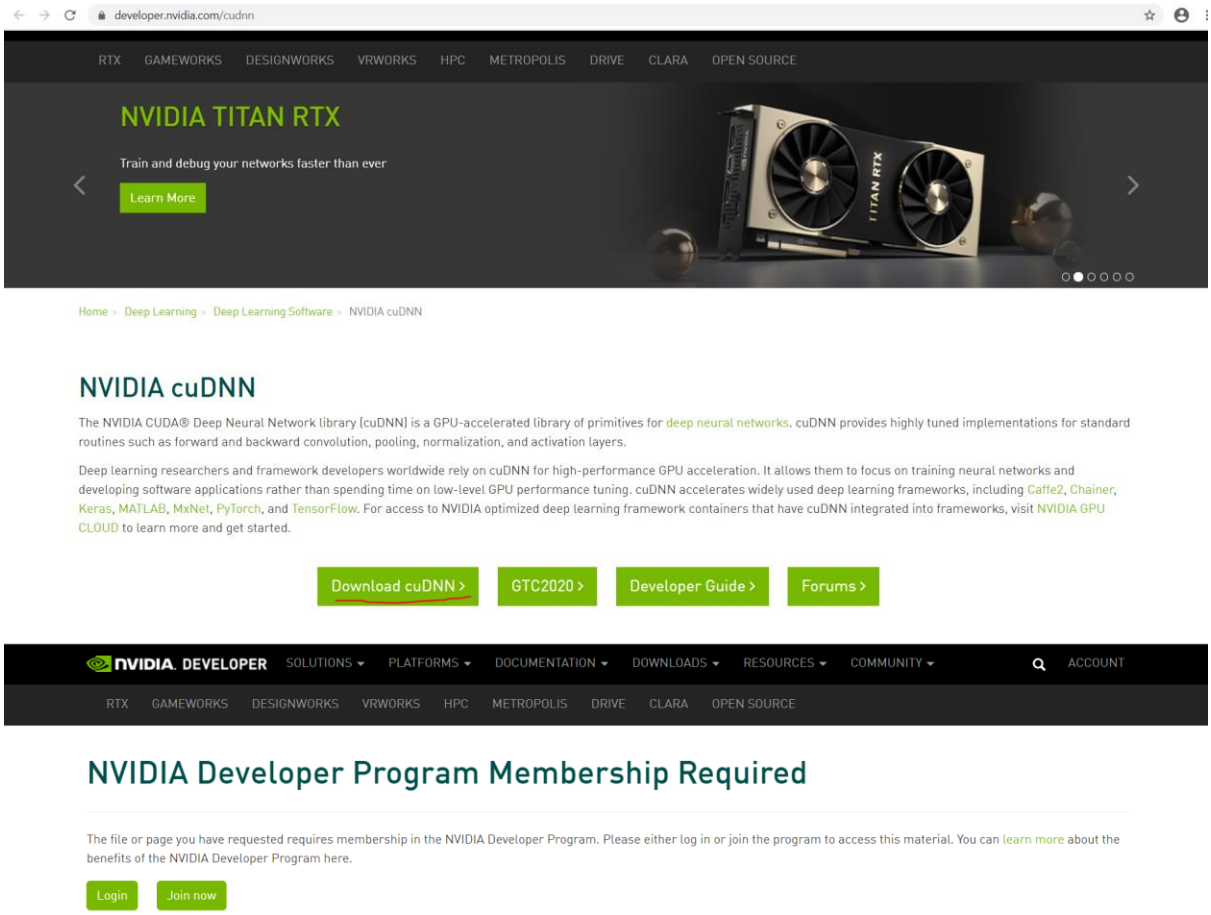
After downloaded the file look like below and the file size comes around 2.0 GB

cuda_10.0.130_411.31_win10

Install the Cuda toolkit.

Step 2:

Next we need to install Nvidia Cuda Deep neural network library (NVIDIA cuDNN)



If already an existing user login with your credentials and download the package. If you are a new user create a new account then verify the account and then download the package.

Library for Windows, Mac, Linux, Ubuntu and RedHat/Centos(x86_64architectures)

cuDNN Library for Windows 7

cuDNN Library for Windows 10

cuDNN Library for Linux

cuDNN Library for OSX

After the OS version which you have chosen and the download automatically starts and the downloaded file look like below and the size of the file around 286MB

cudnn-10.0-windows10-x64-v7.6.5.32

Now extract the file and you will be able to see the below mentioned files inside the extracted cuDNN zip file.

- bin
- include
- lib
- NVIDIA_SLA_cuDNN_Support

Now copy the three folders and paste it into the c:\

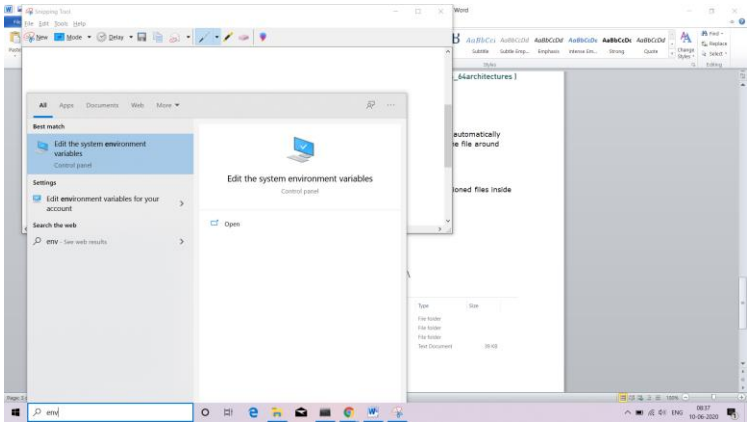
> This PC > OS (C:) > cuda

Name	Date modified	Type	Size
bin	09-06-2020 09:32	File folder	
include	09-06-2020 09:32	File folder	
lib	09-06-2020 09:32	File folder	
NVIDIA_SLA_cuDNN_Support	27-10-2019 21:37	Text Document	39 KB

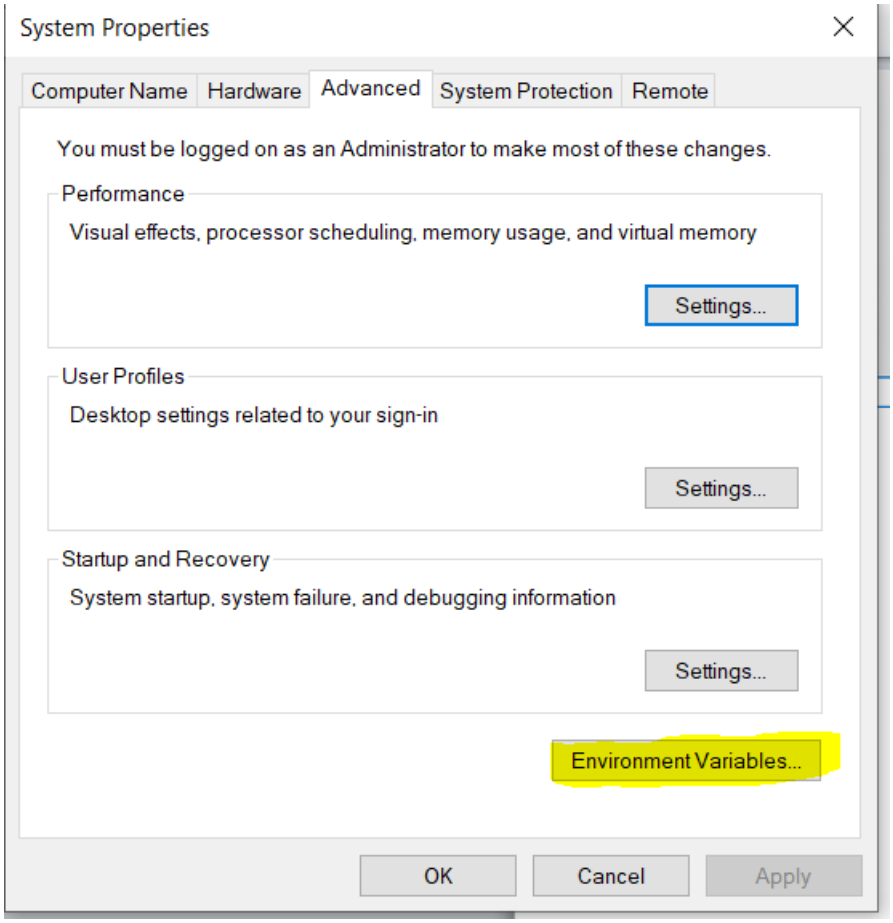
Step 3:

Setup the path variable

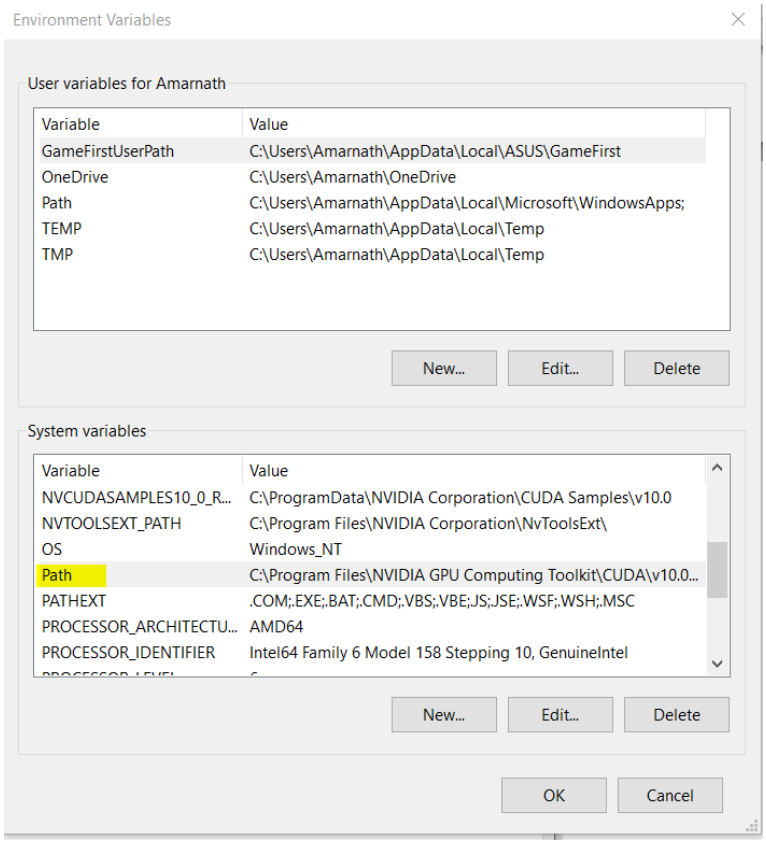
Now go to the environment variable



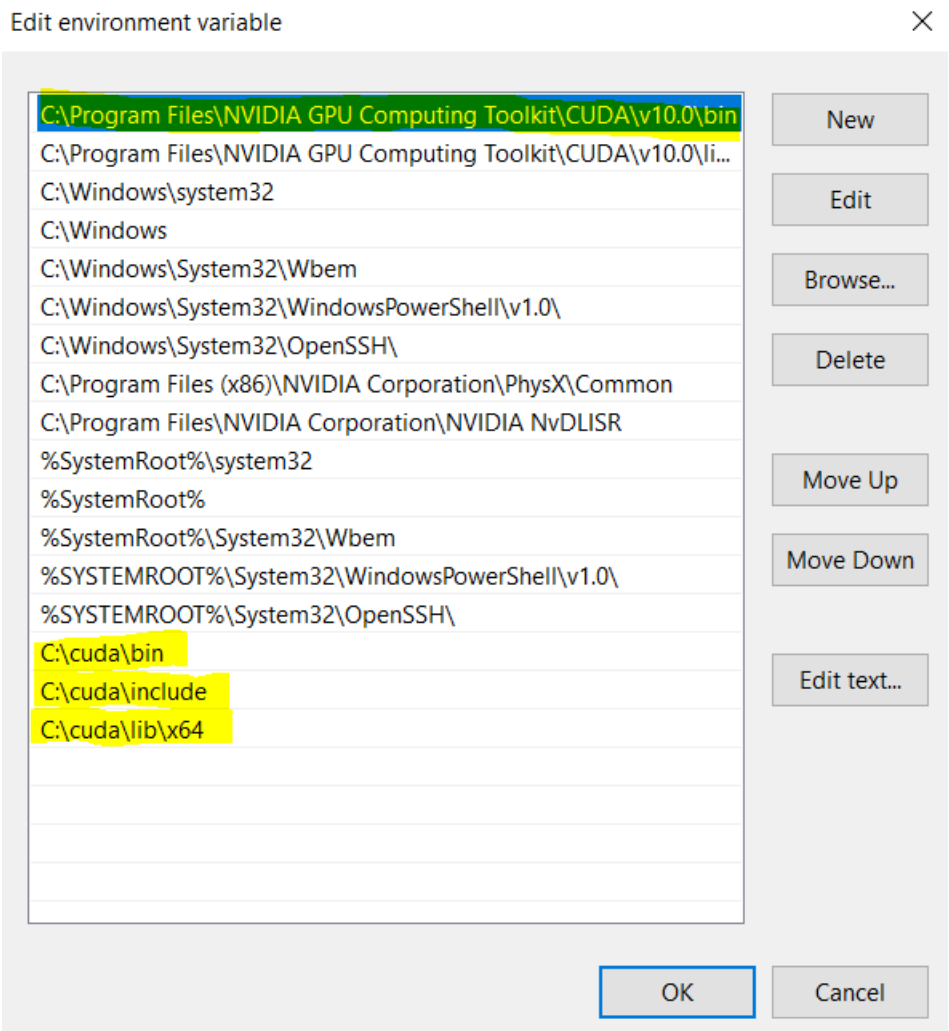
Then click Environment variable



Under system variables double click the path which displayed as below.



Make sure the NVIDIA GPU toolkit automatically updated in the environment variable and we need to add manually the three cuDNN library (Bin, Include, lib x64 path) into the environment variable

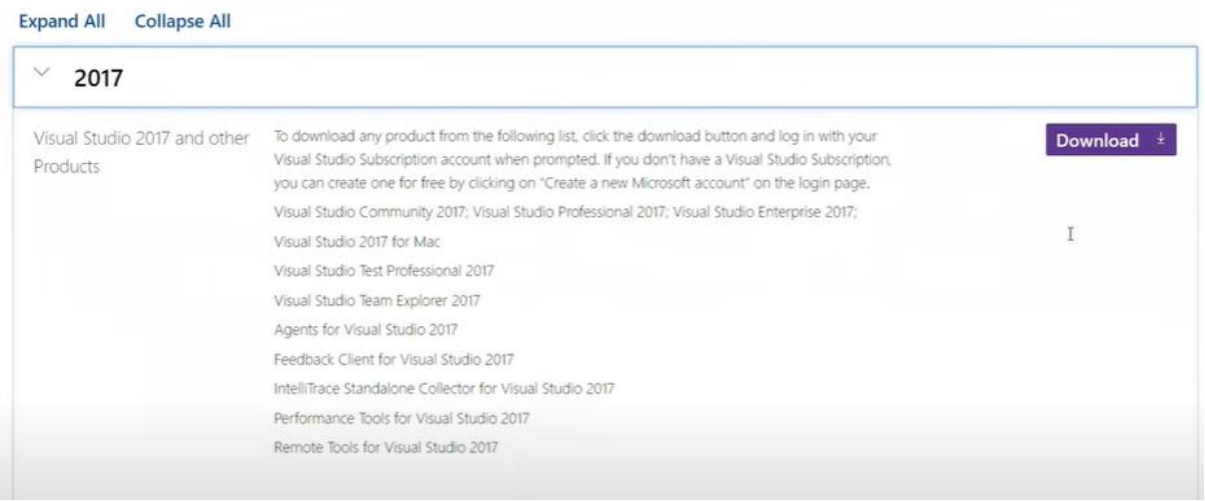


Then click ok after adding the cuDNN libraries

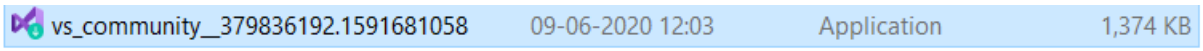
Step 4:

Install Visual studio community version.

To take all the c++ libraries

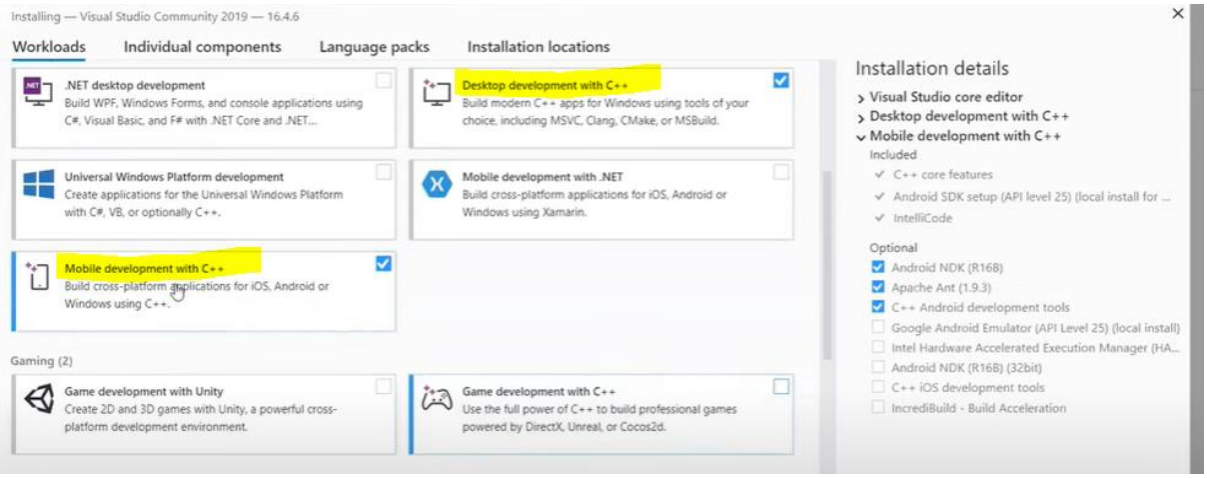


Then file looks like below

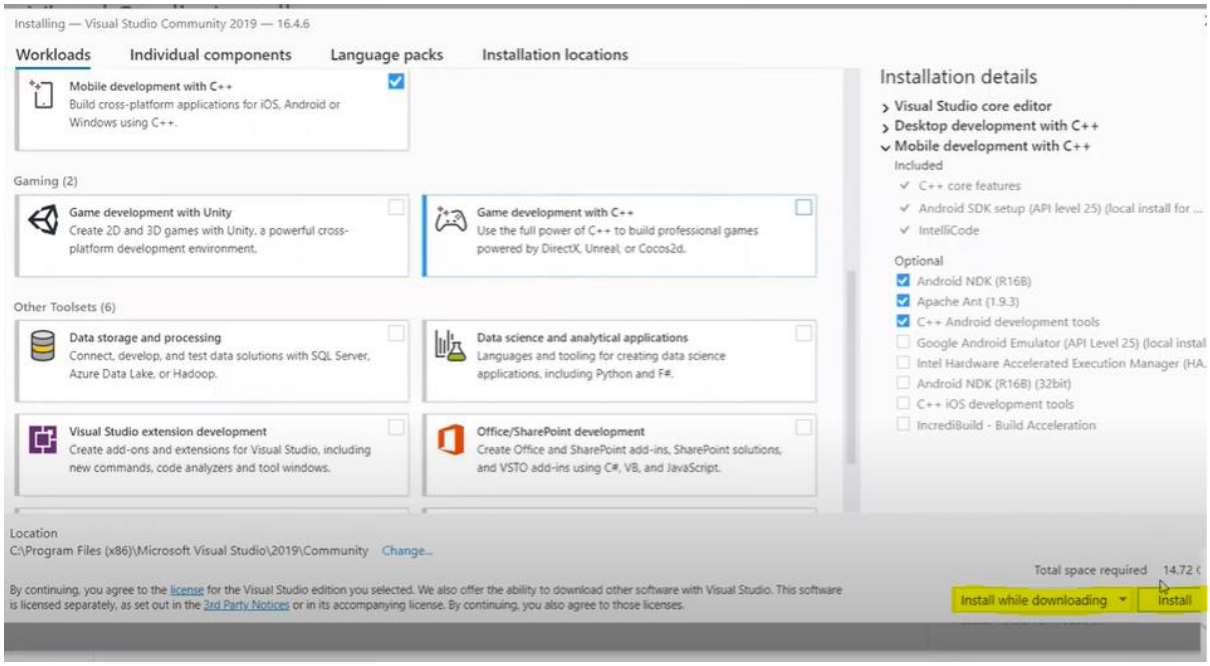


Now install

After some time then you will be able to see the screen like below and make sure our goal is to install the c++ libraries, so we need to select the desktop development c++ and mobile development with c++



To install this it requires around 14 GB space to install



Then click the desire option to install.

Step 5:

Create a new environment variable

Open Anaconda prompt

```
(base) C:\Users\Amarnath>conda create -n GPUenv python=3.6
```

Make sure the Python version should be only 3.6

```
Downloading and Extracting Packages
wheel-0.34.2          | 66 KB     | ########################################################################## | 100%
setuptools-47.1.1     | 530 KB    | ########################################################################## | 100%
python-3.6.10         | 15.9 MB   | ########################################################################## | 100%
vs2015_runtime-14.16  | 1.2 MB    | ########################################################################## | 100%
certifi-2020.4.5.1    | 156 KB    | ########################################################################## | 100%
zlib-1.2.11           | 113 KB    | ########################################################################## | 100%
wincertstore-0.2      | 14 KB     | ########################################################################## | 100%
pip-20.0.2            | 1.7 MB    | ########################################################################## | 100%
sqlite-3.31.1         | 804 KB    | ########################################################################## | 100%
Preparing transaction: done
Verifying transaction: done
Executing transaction: done
```

Environment created

Now we need to activate the environment

```
(base) C:\Users\Amarnath>conda activate GPUenv
```

After activating the environment then we need to install the tensorflow with GPU in our newly created environment

```
(GPUenv) C:\Users\Amarnath>pip install tensorflow-gpu==2.0.0
```

Here I have installed the tensorflow GPU for the version 2.0 if you want to install tensorflow for gpu version 1.15

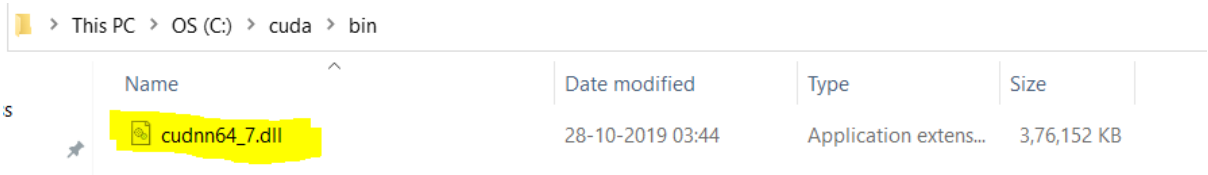
```
pip install tensorflow==1.15       # CPU
pip install tensorflow-gpu==1.15   # GPU
```

```
(GPUenv) C:\Users\Amarnath>pip install tensorflow-gpu==2.0.0
Collecting tensorflow-gpu==2.0.0
  WARNING: Retrying (Retry(total=4, connect=None, read=None, redirect=None, status=None)) after connection broken by 'Re
adTimeoutError("HTTPSConnectionPool(host='files.pythonhosted.org', port=443): Read timed out. (read timeout=15)",)': /pa
ckages/d5/cf/83a8b5aa711adcdbed5496618663ed99878b28e843593cb6b2fae6a59181/tensorflow_gpu-2.0.0-cp36-cp36m-win_amd64.whl
  Downloading tensorflow_gpu-2.0.0-cp36-cp36m-win_amd64.whl (285.3 MB)
     |████████████████████████████████| 285.3 MB 16 kB/s
Collecting absl-py>=0.7.0
  Downloading absl-py-0.9.0.tar.gz (104 kB)
     |████████████████████████████████| 104 kB 6.8 MB/s
Requirement already satisfied: wheel>=0.26 in d:\anaconda\envs\gpuenv\lib\site-packages (from tensorflow-gpu==2.0.0) (0.
34.2)
Collecting google-pasta>=0.1.6
  Downloading google_pasta-0.2.0-py3-none-any.whl (57 kB)
     |████████████████████████████████| 57 kB 128 kB/s
Collecting keras-applications>=1.0.8
  Downloading Keras_Applications-1.0.8-py3-none-any.whl (50 kB)
     |████████████████████████████████| 50 kB 355 kB/s
Collecting keras-preprocessing>=1.0.5
  Downloading Keras_Preprocessing-1.1.2-py2.py3-none-any.whl (42 kB)
     |████████████████████████████████| 42 kB 102 kB/s
Collecting tensorboard<2.1.0,>=2.0.0
  Downloading tensorboard-2.0.2-py3-none-any.whl (3.8 MB)
     |████████████████████████████████| 3.8 MB 156 kB/s
Collecting wrapt>=1.11.1
  Downloading wrapt-1.12.1.tar.gz (27 kB)
Collecting opt-einsum>=2.3.2
```

After successful installation of Tensorflow with GPU in our environment then we need to check whether it is successfully installed or not. In order to do that open python in the command prompt and then type import tensorflow

```
(GPUenv) C:\Users\Amarnath>python
Python 3.6.10 |Anaconda, Inc.| (default, May  7 2020, 19:46:08) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> import tensorflow
2020-06-10 08:05:36.084599: I tensorflow/stream_executor/platform/default/dso_loader.cc:44] Successfully opened dynamic
library cudart64_100.dll
```

Then you will be see this dll file. This is the dll file which we try to run inside the c:\ drive -- > bin which helps us to communicate with GPU cuda.



How to check whether our GPU is initialized or not in our system

In order to do

Try to execute below 3 commands

1. import tensorflow as tf

2. print(tf.test.is_gpu_available())

3. print(tf.test.is_built_with_cuda())

```
Anaconda Prompt (Anaconda) - python
(GPUenv) C:\Users\Amarnath>import tensorflow as tf
'import' is not recognized as an internal or external command,
operable program or batch file.

(GPUenv) C:\Users\Amarnath>python
Python 3.6.10 |Anaconda, Inc.| (default, May  7 2020, 19:46:08) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> import tensorflow as tf
2020-06-10 09:16:38.532306: I tensorflow/stream_executor/platform/default/dso_loader.cc:44] Successfully opened dynamic library cudart64_100.dll
>>> print(tf.test.is_gpu_available())
2020-06-10 09:17:38.498622: I tensorflow/core/platform/cpu_feature_guard.cc:142] Your CPU supports instructions that this TensorFlow binary was not compiled to use: AVX2
2020-06-10 09:17:38.530690: I tensorflow/stream_executor/platform/default/dso_loader.cc:44] Successfully opened dynamic library nvcuda.dll
2020-06-10 09:17:39.701499: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1618] Found device 0 with properties:
name: GeForce GTX 1050 major: 6 minor: 1 memoryClockRate(GHz): 1.493
pciBusID: 0000:01:00.0
2020-06-10 09:17:39.723829: I tensorflow/stream_executor/platform/default/dlopen_checker_stub.cc:25] GPU libraries are statically linked, skip dlopen check.
2020-06-10 09:17:39.739694: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1746] Adding visible gpu devices: 0
2020-06-10 09:17:41.670501: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1159] Device interconnect StreamExecutor with strength 1 edge matrix:
2020-06-10 09:17:41.686937: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1165]      0
2020-06-10 09:17:41.694879: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1178] 0:   N
2020-06-10 09:17:41.739304: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1304] Created TensorFlow device (/device:GPU:0 with 3001 MB memory) -> physical GPU (device: 0, name: GeForce GTX 1050, pci bus id:
0000:01:00.0, compute capability: 6.1)
True
>>> print(tf.test.is_built_with_cuda())
True
>>>
```

Cuda Toolkit: https://developer.nvidia.com/cuda-10....

cuDnn: https://developer.nvidia.com/rdp/cudn...