In [1]: ```python
#Omkar R. Jadhav
#B511050
```

In [2]: ```python
import numpy as np
```

In [3]:
```
!pip install tensorflow
```

```
Collecting tensorflow
  Downloading tensorflow-2.14.0-cp310-cp310-win_amd64.whl (2.1 kB)
Collecting tensorflow-intel==2.14.0
  Downloading tensorflow_intel-2.14.0-cp310-cp310-win_amd64.whl (284.1 M
B)
     -------------------------------- 284.1/284.1 MB 646.4 kB/s eta
0:00:00
Collecting ml-dtypes==0.2.0
  Downloading ml_dtypes-0.2.0-cp310-cp310-win_amd64.whl (938 kB)
     -------------------------------- 938.6/938.6 kB 376.0 kB/s eta
0:00:00
Collecting tensorflow-io-gcs-filesystem>=0.23.1
  Downloading tensorflow_io_gcs_filesystem-0.31.0-cp310-cp310-win_amd64.w
hl (1.5 MB)
     ------------------------------------ 1.5/1.5 MB 1.2 MB/s eta 0:0
0:00
Collecting google-pasta>=0.1.1
  Downloading google_pasta-0.2.0-py3-none-any.whl (57 kB)
     ------------------------------------ 57.5/57.5 kB 1.5 MB/s eta
0:00:00
Collecting libclang>=13.0.0
  Downloading libclang-16.0.6-py2.py3-none-win_amd64.whl (24.4 MB)
     -------------------------------- 24.4/24.4 MB 765.1 kB/s eta
0:00:00
Requirement already satisfied: wrapt<1.15,>=1.11.0 in c:\users\admin\anac
onda3\lib\site-packages (from tensorflow-intel==2.14.0->tensorflow) (1.1
4.1)
Requirement already satisfied: six>=1.12.0 in c:\users\admin\anaconda3\li
b\site-packages (from tensorflow-intel==2.14.0->tensorflow) (1.16.0)
Collecting keras<2.15,>=2.14.0
  Downloading keras-2.14.0-py3-none-any.whl (1.7 MB)
     ------------------------------------ 1.7/1.7 MB 1.5 MB/s eta 0:0
0:00
Collecting opt-einsum>=2.3.2
  Downloading opt_einsum-3.3.0-py3-none-any.whl (65 kB)
     ------------------------------------ 65.5/65.5 kB 3.5 MB/s eta
0:00:00
Requirement already satisfied: setuptools in c:\users\admin\anaconda3\lib
\site-packages (from tensorflow-intel==2.14.0->tensorflow) (65.6.3)
Requirement already satisfied: numpy>=1.23.5 in c:\users\admin\anaconda3
\lib\site-packages (from tensorflow-intel==2.14.0->tensorflow) (1.23.5)
Collecting tensorflow-estimator<2.15,>=2.14.0
  Downloading tensorflow_estimator-2.14.0-py2.py3-none-any.whl (440 kB)
     -------------------------------- 440.7/440.7 kB 1.2 MB/s eta
0:00:00
Collecting gast!=0.5.0,!=0.5.1,!=0.5.2,>=0.2.1
  Downloading gast-0.5.4-py3-none-any.whl (19 kB)
Requirement already satisfied: typing-extensions>=3.6.6 in c:\users\admin
\anaconda3\lib\site-packages (from tensorflow-intel==2.14.0->tensorflow)
(4.4.0)
Collecting protobuf!=4.21.0,!=4.21.1,!=4.21.2,!=4.21.3,!=4.21.4,!=4.21.5,
<5.0.0dev,>=3.20.3
  Downloading protobuf-4.24.4-cp310-abi3-win_amd64.whl (430 kB)
     -------------------------------- 430.5/430.5 kB 995.9 kB/s eta
0:00:00
Collecting absl-py>=1.0.0
  Downloading absl_py-2.0.0-py3-none-any.whl (130 kB)
     -------------------------------- 130.2/130.2 kB 1.5 MB/s eta
0:00:00
Requirement already satisfied: h5py>=2.9.0 in c:\users\admin\anaconda3\li
b\site-packages (from tensorflow-intel==2.14.0->tensorflow) (3.7.0)
```

```
Collecting flatbuffers>=23.5.26
  Downloading flatbuffers-23.5.26-py2.py3-none-any.whl (26 kB)
Collecting astunparse>=1.6.0
  Downloading astunparse-1.6.3-py2.py3-none-any.whl (12 kB)
Collecting termcolor>=1.1.0
  Downloading termcolor-2.3.0-py3-none-any.whl (6.9 kB)
Requirement already satisfied: packaging in c:\users\admin\anaconda3\lib
\site-packages (from tensorflow-intel==2.14.0->tensorflow) (22.0)
Collecting tensorboard<2.15,>=2.14
  Downloading tensorboard-2.14.1-py3-none-any.whl (5.5 MB)
     ------------------------------------- 5.5/5.5 MB 1.1 MB/s eta 0:0
0:00
Collecting grpcio<2.0,>=1.24.3
  Downloading grpcio-1.59.0-cp310-cp310-win_amd64.whl (3.7 MB)
     ------------------------------------- 3.7/3.7 MB 616.4 kB/s eta
0:00:00
Requirement already satisfied: wheel<1.0,>=0.23.0 in c:\users\admin\anaco
nda3\lib\site-packages (from astunparse>=1.6.0->tensorflow-intel==2.14.0-
>tensorflow) (0.38.4)
Collecting google-auth-oauthlib<1.1,>=0.5
  Downloading google_auth_oauthlib-1.0.0-py2.py3-none-any.whl (18 kB)
Requirement already satisfied: markdown>=2.6.8 in c:\users\admin\anaconda
3\lib\site-packages (from tensorboard<2.15,>=2.14->tensorflow-intel==2.1
4.0->tensorflow) (3.4.1)
Requirement already satisfied: requests<3,>=2.21.0 in c:\users\admin\anac
onda3\lib\site-packages (from tensorboard<2.15,>=2.14->tensorflow-intel==
2.14.0->tensorflow) (2.28.1)
Collecting google-auth<3,>=1.6.3
  Downloading google_auth-2.23.3-py2.py3-none-any.whl (182 kB)
     --------------------------------- 182.3/182.3 kB 549.8 kB/s eta
0:00:00
Collecting tensorboard-data-server<0.8.0,>=0.7.0
  Downloading tensorboard_data_server-0.7.1-py3-none-any.whl (2.4 kB)
Requirement already satisfied: werkzeug>=1.0.1 in c:\users\admin\anaconda
3\lib\site-packages (from tensorboard<2.15,>=2.14->tensorflow-intel==2.1
4.0->tensorflow) (2.2.2)
Collecting rsa<5,>=3.1.4
  Downloading rsa-4.9-py3-none-any.whl (34 kB)
Requirement already satisfied: pyasn1-modules>=0.2.1 in c:\users\admin\an
aconda3\lib\site-packages (from google-auth<3,>=1.6.3->tensorboard<2.15,>
=2.14->tensorflow-intel==2.14.0->tensorflow) (0.2.8)
Collecting cachetools<6.0,>=2.0.0
  Downloading cachetools-5.3.1-py3-none-any.whl (9.3 kB)
Collecting requests-oauthlib>=0.7.0
  Downloading requests_oauthlib-1.3.1-py2.py3-none-any.whl (23 kB)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in c:\users\admin\an
aconda3\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.15,>=
2.14->tensorflow-intel==2.14.0->tensorflow) (1.26.14)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\admin\anaco
nda3\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.15,>=2.14
->tensorflow-intel==2.14.0->tensorflow) (2023.7.22)
Requirement already satisfied: idna<4,>=2.5 in c:\users\admin\anaconda3\l
ib\site-packages (from requests<3,>=2.21.0->tensorboard<2.15,>=2.14->tens
orflow-intel==2.14.0->tensorflow) (3.4)
Requirement already satisfied: charset-normalizer<3,>=2 in c:\users\admin
\anaconda3\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.15,
>=2.14->tensorflow-intel==2.14.0->tensorflow) (2.0.4)
Requirement already satisfied: MarkupSafe>=2.1.1 in c:\users\admin\anacon
da3\lib\site-packages (from werkzeug>=1.0.1->tensorboard<2.15,>=2.14->ten
sorflow-intel==2.14.0->tensorflow) (2.1.1)
Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in c:\users\admin\ana
```

```
conda3\lib\site-packages (from pyasn1-modules>=0.2.1->google-auth<3,>=1.
6.3->tensorboard<2.15,>=2.14->tensorflow-intel==2.14.0->tensorflow) (0.4.
8)
Collecting oauthlib>=3.0.0
  Downloading oauthlib-3.2.2-py3-none-any.whl (151 kB)
     ---------------------------------- 151.7/151.7 kB 1.0 MB/s eta
0:00:00
Installing collected packages: libclang, flatbuffers, termcolor, tensorfl
ow-io-gcs-filesystem, tensorflow-estimator, tensorboard-data-server, rsa,
protobuf, opt-einsum, oauthlib, ml-dtypes, keras, grpcio, google-pasta, g
ast, cachetools, astunparse, absl-py, requests-oauthlib, google-auth, goo
gle-auth-oauthlib, tensorboard, tensorflow-intel, tensorflow
Successfully installed absl-py-2.0.0 astunparse-1.6.3 cachetools-5.3.1 fl
atbuffers-23.5.26 gast-0.5.4 google-auth-2.23.3 google-auth-oauthlib-1.0.
0 google-pasta-0.2.0 grpcio-1.59.0 keras-2.14.0 libclang-16.0.6 ml-dtypes
-0.2.0 oauthlib-3.2.2 opt-einsum-3.3.0 protobuf-4.24.4 requests-oauthlib-
1.3.1 rsa-4.9 tensorboard-2.14.1 tensorboard-data-server-0.7.1 tensorflow
-2.14.0 tensorflow-estimator-2.14.0 tensorflow-intel-2.14.0 tensorflow-io
-gcs-filesystem-0.31.0 termcolor-2.3.0
```

In [4]: **import** tensorflow **as** tf

In [5]: print(tf.__version__)

```
2.14.0
```

In [6]: **from** keras **import** datasets
        #Load Mnist datasets from keras
        (train_images, train_labels), (test_images, test_labels) **=** datasets.mnist.l

In [7]: train_images.shape

Out[7]: (60000, 28, 28)

In [8]: test_images.shape

Out[8]: (10000, 28, 28)

In [9]: **!**pip install Theano

```
Requirement already satisfied: Theano in c:\users\admin\anaconda3\lib\sit
e-packages (1.0.5)
Requirement already satisfied: six>=1.9.0 in c:\users\admin\anaconda3\lib
\site-packages (from Theano) (1.16.0)
Requirement already satisfied: numpy>=1.9.1 in c:\users\admin\anaconda3\l
ib\site-packages (from Theano) (1.23.5)
Requirement already satisfied: scipy>=0.14 in c:\users\admin\anaconda3\li
b\site-packages (from Theano) (1.10.0)
```

In [10]:
```python
import theano.tensor as T
from theano import function
```

```
WARNING (theano.configdefaults): g++ not available, if using conda: `cond
a install m2w64-toolchain`
C:\Users\Admin\anaconda3\lib\site-packages\theano\configdefaults.py:560:
UserWarning: DeprecationWarning: there is no c++ compiler.This is depreca
ted and with Theano 0.11 a c++ compiler will be mandatory
  warnings.warn("DeprecationWarning: there is no c++ compiler."
WARNING (theano.configdefaults): g++ not detected ! Theano will be unable
to execute optimized C-implementations (for both CPU and GPU) and will de
fault to Python implementations. Performance will be severely degraded. T
o remove this warning, set Theano flags cxx to an empty string.
WARNING (theano.tensor.blas): Using NumPy C-API based implementation for
BLAS functions.
```

In [11]:
```python
#Declaring 2 variables
x = T.dscalar('x')
y = T.dscalar('y')
```

In [12]:
```python
#summering up the 2 numbers
z = x + y
```

In [13]:
```python
#converting it to a callable object so that it takes matrix as parameters
f = function([x,y], z)
```

In [14]:
```python
!pip3 install torch torchvision torchaudio
```

```
Requirement already satisfied: torch in c:\users\admin\anaconda3\lib\site
-packages (2.1.0)
Requirement already satisfied: torchvision in c:\users\admin\anaconda3\li
b\site-packages (0.16.0)
Requirement already satisfied: torchaudio in c:\users\admin\anaconda3\lib
\site-packages (2.1.0)
Requirement already satisfied: sympy in c:\users\admin\anaconda3\lib\site
-packages (from torch) (1.11.1)
Requirement already satisfied: filelock in c:\users\admin\anaconda3\lib\s
ite-packages (from torch) (3.9.0)
Requirement already satisfied: fsspec in c:\users\admin\anaconda3\lib\sit
e-packages (from torch) (2022.11.0)
Requirement already satisfied: networkx in c:\users\admin\anaconda3\lib\s
ite-packages (from torch) (2.8.4)
Requirement already satisfied: typing-extensions in c:\users\admin\anacon
da3\lib\site-packages (from torch) (4.4.0)
Requirement already satisfied: jinja2 in c:\users\admin\anaconda3\lib\sit
e-packages (from torch) (3.1.2)
Requirement already satisfied: requests in c:\users\admin\anaconda3\lib\s
ite-packages (from torchvision) (2.28.1)
Requirement already satisfied: numpy in c:\users\admin\anaconda3\lib\site
-packages (from torchvision) (1.23.5)
Requirement already satisfied: pillow!=8.3.*,>=5.3.0 in c:\users\admin\an
aconda3\lib\site-packages (from torchvision) (9.4.0)
Requirement already satisfied: MarkupSafe>=2.0 in c:\users\admin\anaconda
3\lib\site-packages (from jinja2->torch) (2.1.1)
Requirement already satisfied: idna<4,>=2.5 in c:\users\admin\anaconda3\l
ib\site-packages (from requests->torchvision) (3.4)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\admin\anaco
nda3\lib\site-packages (from requests->torchvision) (2023.7.22)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in c:\users\admin\an
aconda3\lib\site-packages (from requests->torchvision) (1.26.14)
Requirement already satisfied: charset-normalizer<3,>=2 in c:\users\admin
\anaconda3\lib\site-packages (from requests->torchvision) (2.0.4)
Requirement already satisfied: mpmath>=0.19 in c:\users\admin\anaconda3\l
ib\site-packages (from sympy->torch) (1.2.1)
```

In [15]:
```python
import torch
import torch.nn as nn
```

In [16]:
```python
print(torch.__version__)
```

```
2.1.0+cpu
```

In [17]:
```python
torch.cuda.is_available()
```

Out[17]:
```
False
```