

# Columbia University E6894, Homework #1

Note: pls submit your solution to Yizhou Wang ([yw2875@columbia.edu](mailto:yw2875@columbia.edu)) before the noon of Jan. 25, 2017. **No late homework submission will be accepted.**

1. Do not use computer, write the outputs of the following codes

```
import numpy as np
a0 = [1,2]
b0 = [[1,1],[1,1]]

a = np.array(a0)
b = np.array(b0)

print a * b

print a + b
```

2. Install Keras and theano (or Tensorflow), <https://keras.io/#installation>

the following questions are related to the code

[https://github.com/fchollet/keras/blob/master/examples/mnist\\_mlp.py](https://github.com/fchollet/keras/blob/master/examples/mnist_mlp.py)

- 2.1 Run the code on both CPU and GPU, and record your results in the following table (you may leave the cells open if you don't have gpu available yet)

	Test Accuracy	Training time
Running with CPU		
Running with GPU		

- 2.2 Try to add one more layer as the following, and run the code again. Report your new performance.

```
model.add(Dense(64))
model.add(Activation('relu'))
```