Rules

- Internet and Books are ALLOWED
- Name your file as following: StudentID_ChineseName/EnglishName_quiz#
- Extension of your file or your file type should be .py

Logistic regression

- Using logistic regression predicting on MNIST database with multiple classes.

Part I

Use the MNIST data

```
from sklearn.datasets import fetch_openml
mnist = fetch_openml(data_id=554)
```

Split into training and test with sklearn

-Training dataset(60000,784) . Test dataset(10000,784)

```
...
```

Use logistic model from sklearn.

- Set the max_iteration to 1000.
- Set n_jobs to 5.

```
...
```

Predict the model using test data. Check the accuracy by comparing the prediction with the label. **Remember to use test data, not train data!!** The result can be in **the scale of 0 to 1** or **percentage (%)**.

```
....
```

Show the confusion matrix. Check **metrics from sklearn** for confusion matrix!

```
...
```

Using seaborn to visualize the confusion matrix

```
import seaborn as sns

plt.figure(figsize=(12,12))
sns.heatmap(your_confusion_matrix, annot=True,
            linewidths=.5, square = True, cmap = 'Blues_r',
fmt='0.4g');

plt.ylabel('Actual label')
```

```
plt.xlabel('Predicted label')
all_sample_title = 'Accuracy Score: {0}'.format(score2)
plt.title(all_sample_title)
```