

# FE520 Final Project Questions list

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## Introduction

Final project is designed to practice your comprehensive python skill learning from this course. For each project, you need to clean data, explore data, fit data into model and visualize result in the end. The following question list is only provide a general topic, you still need to write a specific proposal for you project, where you need to define your own problem and project plan.

## 1 Trading Strategy

### 1.1 Pair trading

### 1.2 Design your own strategy

### 1.3 Generate signal with machine learning

## 2 predicting stock price using machine learning (regression)

1. Factor model
2. Sectional Method

## 3 Predicting credit rating using machine learning (Classification)

## 4 Build a regression package (Using Class)

1. A linear regression
2. non linear regression
3. Output statistic value for regression (p value, t-test, F-test, R square, AIC...)

## **5 Corona-Virus Research**

Looking for corona virus data for all over the world, build a model to find:

1. which country is best one to defeat the virus?
2. predict US total confirmation cases
3. when the virus will disappear?

## **6 Back-testing platform**

1. Position-based strategy platform
2. Order-driven strategy platform

## **7 Option Pricing tool based on MC simulation**

1. Implement Monte-Carlo simulation with different schemes.
2. Make this tool compatible with different option product.
3. Use multiprocessing to accelerate simulation.

## **8 Web scraping on SEC Edger**

1. Fetch textual data and numerical data from SEC.
2. Store data in SQL database and create associated API

## **9 Stock information web interface**

1. Use Flask to host a web server for stock information.
2. Store and fetch data from SQL database
3. Display stock price and volume information on web pages (Yahoo Finance).

## **10 Simple Neural Network package**

1. Implement MLP forward and back propagation.
2. MLP with L-2 Regularization term.
3. Implement Stochastic Gradient Decent.
4. Visualize comparison between different algorithms and models.