How to run:

Lots of scripts are contained in the submitted code file. Here I try to make it simple.
Environment prerequisite (make sure you installed following):

1. For all jupyter notebook script files (*.ipynb* files), run on:

Platform: *Conda + Python 3.5*
Essential required library:
ABAGAIL, matplotlib, numpy, pandas, seaborn, scipy, sklearn, tensorflow, keras and any other libraries your command line tells you to install when you try to run the code.

2. All *.py* files are run with *conda+jython +python 2.7*
   how to run it with jython? Good question! The process is shown below:
   a. Create a new conda environment with python 2.7
   b. Use conda install jython
   c. Install jave-jdk with conda if you don't have it
   d. Compile your .py files with jython, like the command below
      jython knapsack.py
   e. Congratulations! You just successfully compiled and run my knapsack problem script. Check your working directory, a new result csv file is created!

Specific instructions below:
To run code to check the neural network problem script:
Open the *neural_net.ipynb* with jupyter notebook and click "*restart kernel and run all*" on the menu bar. Or you can run cell by cell by pressing "*shift+enter"* shortcut. After letting all cells run, the next step is to go to buy a coffee and come back for the results.

To run to check the optimization problems (4-peak problem and knapsack problem are shown), you need to go to *RUN_ABAGAIL* folder to use jython to run *knapsack.py* and *fourpeaks.py*. In both scripts, you can choose to run it with genetic algorithm, randomized hill climbing or simulated annealing by comment or uncomment corresponding sections. After you run the problem with all 3 algorithms, you will get 3 output .csv file. Then use the jupyter notebook to open *visualization.ipynb* (use python 3 environment) and restart kernel and run all cells to check the visualization result.