Cloud Computing and Big Data Analytics
Fall, 2022
Homework #4
Deadline: 9 am, December 27th, 2022

1. [10 pts] What are main three categories of cloud service models? Please briefly introduce them (**6 pts**). Suppose the electricity is very expensive in Taiwan. Which category is not suitable for providing this service in Taiwan? Justify your answer **(4 pts)**.

2. [25 pts] Google offers both Software as a Service (SaaS) and Platform as a Service (PaaS) Solutions in Cloud Computing. Assume you plan to build a startup company with flower image classification by a machine learning approach. Discuss how your company can use Google App Engine (**12 pts** with some detailed steps) and the company potential cost (**6 pts**). Discuss the advantages and disadvantages by comparing with other popular cloud service providers such as Amazon and Azure Cloud Service (**7 pts**).

3. [10 pts] Virtualization plays an important role in cloud computing. Please state the difference between Docker and Virtual Machine (**6 pts**). Provide an application that is suitable for using Docker but is not suitable for using Virtual Machine (**4 pts**).

4. **[10 pts]** Exercise 1
(Please submit your screenshot for codes and checkpoint)

5. **[10 pts]** Exercise 2
(Please submit your screenshot for codes and checkpoint)

6. **[10 pts]** Exercise 3
(Please submit your screenshot for codes and checkpoint)

7. [25 pts] Based on data used in 4-6, now write a MapReduce code to find the *variance* of monetary value for each separate store.
(Please submit your screenshot for codes and checkpoint)