CS 6343: CLOUD COMPUTING
Term Project (draft)

- Project: PaaS/SaaS exploration
  - Develop a SaaS application on a PaaS platform
- Project Steps
  - Study the PaaS platforms and summarize their APIs
    - GAE
    - Azure
    - Heroko
    - Cloud Foundry
    - Cloudify
    - Any other you are interested in
  - Design an application
    - Convert the standalone RoboCode to a web based application
    - Enhance it to become a Web based gaming system
  - Install PaaS: Cloud Foundry
  - Deploy the SaaS application on PaaS
    - The application should use supported language, DB, etc.
  - Enhance the security support in PaaS
    - To support a true role based model within each tenant
    - To support secure cross-tenant information sharing
    - To support information flow control (optional)
  - SaaS RoboCode functionalities
    - Support RoboCode editing, compilation, and playing
    - Support scoring and rewards for individual users
    - Use cloud data store to store data related to individual users, including their RoboCodes, scores and rewards they obtained, their specific configurations in the SaaS, etc.
    - Enforce access control
      - Consider system level data
      - Consider user specific data
      - Consider user groups, support group based sharing (can be considered as tenants)
    - Test your access control mechanism thoroughly to ensure the system is secure
  - Explore the impact of various load
    - Develop a client program to issue http requests to the SaaS application
      - Use multiple threads to simulate multiple clients
    - Varying the load issued by the clients and observe the behavior of the PaaS
      - Load should be dynamically changeable, and controllable through some interface
    - Deploy multiple instances of the SaaS application in different names (as different SaaS)
      - Group clients to send different loads to different SaaSs
    - Observe how the PaaS adapt to load changes
  - Study the performance of the application system on different PaaS
    - Install other PaaSs
      - At least one, more will be better
      - Compare the performance of different PaaS for this specific SaaS under different load patterns

Project logistics

- Weekly documentation
  - Document the issues during converting standalone software to SaaS
  - Document the issues during PaaS installations
  - Document the tasks assigned, performed, and accomplished by each team member
  - Your exploration and experimentation results
- Regular meetings
  - There will be weekly meetings with the TA and bi-weekly meetings with the Professor
  - Discuss the weekly work progress by each team member
  - Schedule and milestones will be defined during the meetings
- Subgoals
  - PaaS study, first PaaS installation, and sample program deployment
    - If you wish, you can further divide the task into single machine and multiple maches
  - SaaSification, improvement, deployment
  - SaaS implementation, deployment
  - Client program for load simulation
  - Performance exploration and PaaS behavior observation
  - Installation of additional PaaSs
  - Performance and PaaS feature comparisons
- Some early scheduling
  - 1st week
    - Large team formation, schedule exploration
    - Read PaaS documents, especially Cloud Foundry
    - Try to install Cloud Foundry on your personal computers
  - 2nd week
    - Email large team formation to TA before class, schedule setting in class
  - 4th week, at least
    - PaaS installation item done
    - SaaSification item done