# CMPSCI 677: Operating Systems
## Homework 1
### Spring 2014

Due: Feb 21, 2014 (via Moodle)

## General Instructions:

- Please Format your solution in a pdf file and submit it through Moodle.
- The goal of the homework is to ensure that you keep up the readings from the textbook as well as additional readings provided to you. All of the work that you turn in must be your own – you should cite any external references including Internet sources, if any.

1. Suppose you are asked to design a game called "Angry Chicken" for mobile devices. "Angry Chicken" is a sequel of the popular "Angry Bird" game. How will you structure this client-server mobile application with regards to the user interface, application- and database layers using a multi-tier architecture. (10 pts)

2. What are the advantages and disadvantages of constructing a concurrent server by spawning processes (i.e., multiprocess servers) when compared to multithreaded servers? (10 pts)

3. Consider an unstructured overlay network in which every node randomly chooses **c** neighbors. To search for a file, a node floods a request to its neighbors and requests those to flood the request once more. How many nodes will be reached? Please justify your answer. (5 pts)

4. (a) What are the advantages of OS-level virtualization over hardware viertualization? (b) What are the two types of hypervisors discussed in class and what are their differences? (15 pts)

5. What is a lightweight process? Explain briefly the two level scheduling of threads in a system with lightweight processes. (10 pts)

6. What is code migration? Describe its benefits and provide a few real-world

examples of code migration. (10 pts)

7. Explain the advantages and disadvantages of using a centralized ready queue for multiprocessor CPU scheduling. Next, describe the advantages and disadvantages of using distributed ready queues for scheduling multiprocessors.

8. Explain why a sender-initiated distributed scheduling policy may not be the best choice when the overall system utilization is high.

9. Pick any one additional reading/paper that have been provided for Lecture 2 to 4 (see http://lass.cs.umass.edu/~shenoy/courses/677/readings.html) and write a one-paragraph summary. Your summary should be *brief* and you should describe what you learnt from the material in your own words. Do not simply cut and paste from the papers. (10 pts)

10. Pick any one additional reading/paper for Lecture 5 or 6 and write a one-paragraph summary. Your summary should be *brief* and you should describe what you learnt from the material in your own words. Do not simply cut and paste from the papers. (10 pts)

11. Bonus question. Have you registered for the 677 discussion forums in Piazza? (2 pts).