- **Each solution must be accompanied by the following honor code statement: I have not taken any help on this examination from <u>anybody</u> and have not given any help to <u>anybody</u>. Put this statement in a cover page to your solution. Sign it electronically by putting your name under it.**

- Each examination is to be solved by students individually. Students can access whatever material they choose but cannot discuss with **<u>anyone</u>**.
- It is highly unlikely that web browsing will effectively help with the solution. Anything you find on the web may well be wrong and too complicated. Spend more time and effort thinking. Don't waste all your time browsing. Some browsing is appropriate and should help craft a good answer.
- If your answer is based on material you found elsewhere, you must cite the source.

- I am not looking for a specific or "correct" answer. I am looking for demonstration that you can think through the question and answer it coherently based on my lectures and supporting material.
- Each solution must be within the length limits provided.
- Solutions are to be submitted by email in pdf to <u>ravi.cs6393@gmail.com</u> with subject title Exam 2.
- Text must be typed. Hand drawn figures are acceptable if appropriate but must be scanned and incorporated in submitted pdf. Figures must fit within the specified size limit for the entire answer.

- If you have doubts about the meaning of any of the questions, note that in your answer and explain how you understood the question.
- Discussion and mention of irrelevant issues will be penalized.
- Use of incorrect and sloppy English will be penalized.

- I have not thought through what my own answer to these questions might be. I am really interested in seeing what answers the class can come up with.

Answer any 2 questions. Questions have equal weight.
Grading will follow rubric of Exam 1
Each question has maximum 1 page allowance for answer in 11 point font single space.
You are not required to use the full page.
A significantly shorter answer is likely to be inadequate.

1. In the $ABAC_\alpha$ model users, subjects and attributes are associated with different sets of attributes. Suppose we require that users and subjects be associated with identical sets of attributes. What impact will this requirement have on ABAC? What are the pros and cons of this requirement? Would it be reasonable to extend this requirement to object attributes also? How about to contextual attributes?

2. The formulation of UCON discussed in class assumes that a single subject s performs an action requiring a single right r on a single object o. Let us focus only on the authorization component of UCON, that is on $UCON_A$. Discuss how $UCON_A$ might be extended to allow for actions on multiple target objects by a single subject.

3. The Cheng 2014 paper discussed in class adds attributes to ReBAC by bringing node attributes and edge attributes into consideration as part of path patterns. Discuss how this model might be recast as bringing attributes of three entities into consideration in an access decision: the attributes of the two end points and the attributes of the relationship (direct or indirect) between the two end points.