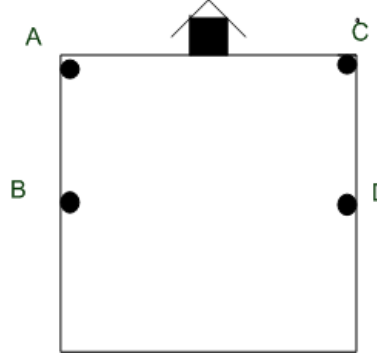


## CS 6100 Homework 6

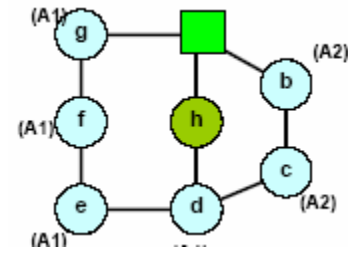
In all cases, assume the letter carriers must return to the post office.

1. List and informally define five desirable properties of the negotiation protocol.

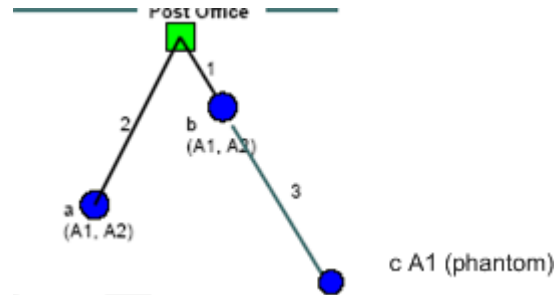
2. Consider the letter carrier domain. For the situation below, in which currently agent 1 and agent 2 deliver to cities (A,B,C,D), show the negotiation set (individually rational and pareto optimal deals). Assume the distances are drawn to scale



3. Consider the diagram to the right. Suppose A1 delivers to g,f,e,d and A2 delivers to b,c. If h is a decoy task of A1, show how A1 wins in all or nothing deals. Specifically, show how much the utility of A1 is improved by lying. Assume each line segment is one in length.

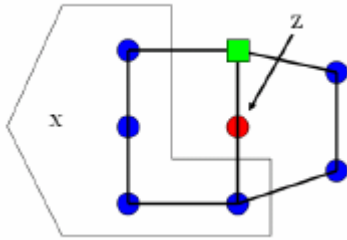


4. Consider the diagram to the right over pure deals (each person is assigned a specific set of tasks to try to equalize the utility, but no probability is involved).



- a. Why is the domain concave?
- b. Explain how the phantom letter c of A1 helps increase the utility of A1. How much does utility increase because of the lie? In other words, (a) what is the utility of A1 if it tells the truth? (b) What is the apparent utility under the lie? (The apparent utility is important as it decides how the tasks will be divided.) (c) What is the actual utility under the lie? (In general, if you hide a task, you will have to deliver it. If you use a phantom or decoy task, you will not have to deliver it.) (d) What is the difference in utilities computed in parts (a) and (c)?
- c. Is there any danger of the lie being found out?

5. This diagram below is used to show that post carriers domain is not concave. Explain.



6. For the situation below, answer the following questions
- Explain why hiding the letter at b is beneficial for A1 under pure deals. Show an example to indicate that lying is beneficial.
  - Under mixed deals and Modular TOD, are hide lies beneficial? (If your answer is “yes”, give an example to justify your answer. If your answer is “no”, give a convincing argument.)
  - Under all or nothing deals and Modular TOD, are hide lies beneficial? (If your answer is “yes”, give an example to justify your answer. If your answer is “no”, give a convincing argument.)

