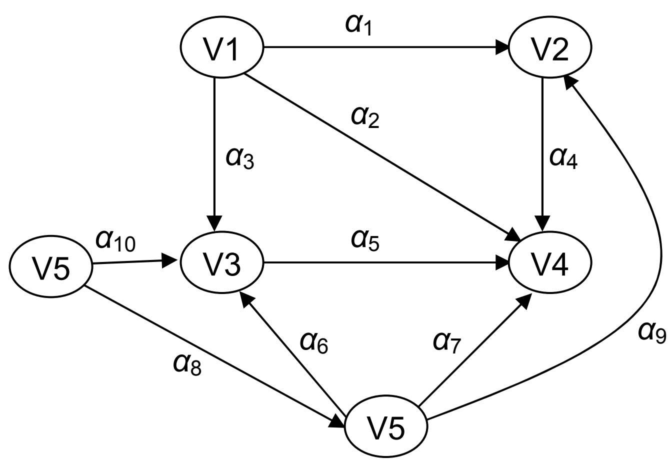
IS-2935/TEL-2810 Introduction to Computer Security

Homework 3

Due Date: By Midnight September 24, 2003

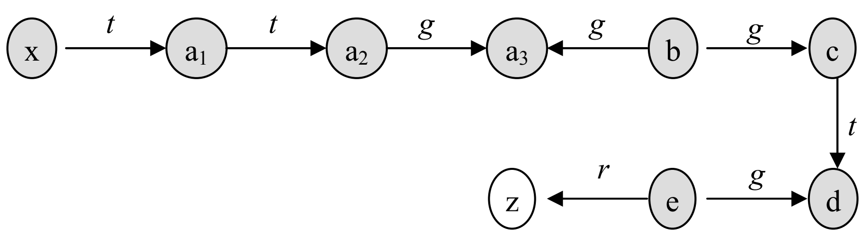
1. Reconstruct the following graph using the graph reconstruction technique used in the proof of theorem 3-11. Show transformed graphs for each of the three steps and label edges appropriately.

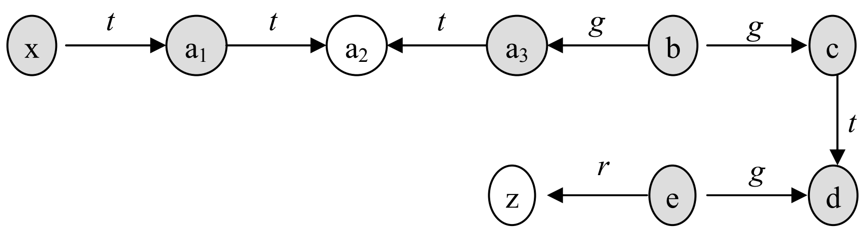


2. Consider graphs G1 and G2, which are modifications to the graph of Figure 3-4 in the book. For each graph, compute the
   1. *Access set*,
   2. *Delete set*,
   3. *Conspiracy graph*,
   4. *Conspirators set* and
   5. *Witness*

   to the theft of right r by x and a_1. If the stealing is not possible, give reasons.

G1:



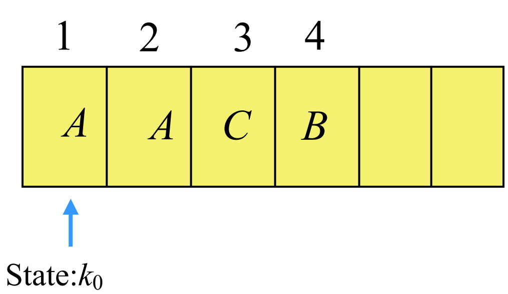
G2: 

3. Consider a Turing Machine with the following specification

   1. Set of states : $\{k_0, k_1, k_2, k_3\}$
   2. Tape symbols: $\{A, B, C\}$
   3. Final (or halting) state is k_3
   4. Transition Functions:

$$\delta(k_0, A) = (k_2, C, R)$$
$$\delta(k_1, C) = (k_2, B, R)$$
$$\delta(k_1, A) = (k_3, C, L)$$
$$\delta(k_2, A) = (k_1, C, L)$$
$$\delta(k_2, C) = (k_1, B, R)$$

Assume your TM's initial configuration is as shown below.



Show the mapping of the elements of this TM to a protection system. Show all possible transitions, indicating each new TM configuration reached (i.e., state, head position and the symbols in each cell) and its corresponding protection state (the entries in the Access Control Matrix).