CS6600 Homework 4

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I. Chapter 3 Problems

7) Lemma 3.1 shows how through the use of a newly created object, two subjects with one having to take rights over the other can work together to take a right one of the subjects has over a third subject/object. If **X** were an object, however, the first step would not work as **X** could not create the new vertex **V**. This would not allow **X** ever to have a connection with an object it has *tg* privileges over, so **Z** would not be able to take the grant privileges from that object and share alpha right with it.
9) Because $s' = s \; or \; s'$ and $x_n = s'$ and x_i are all connected by label $t, g, bridge$ any of the three options for subject x will be able to take or pass any right from x_n. Then since there is a sequence of subjects where eventually $x_n = s'$ and s' has tg over s which in turn has α over y, x can obtain α from y.
10) If we reverse the edge direction from **d** to **e** then *can share* is still true using the following witness.
    - **c** takes (g to **e**) from **d**.
    - **c** grants (g to **b**) to **e**.
    - **e** grants (r to **z**) to **b**.
    - **b** grants (r to **z**) to **a**.
    - **x** takes (r to **z**) from **a**.
11) If you dropped *take* from the TG model you could achive a simmular result from reversing the direction of all *t* edges and giving them grant, however I feel this would less accurately reprsent the real world modeling of the system and the attack that is happening. At the same time I imagine simmular to what SPM is trying to achive would simplify the proofs a bit.
12) The acyclic creates imposes constraints on the types of subjects created but not objects because inherently, the cycle is worried about child subjects creating other subjects/objects with rights inherited from their parents making a cycle. In contrast, objects created cannot create further objects/subjects, so the cycle ends there for that branch.

Acknowledgment

The author would like to thank Professor Bruce McMillin with the Department of Computer Science, Missouri University of Science and Technology.

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