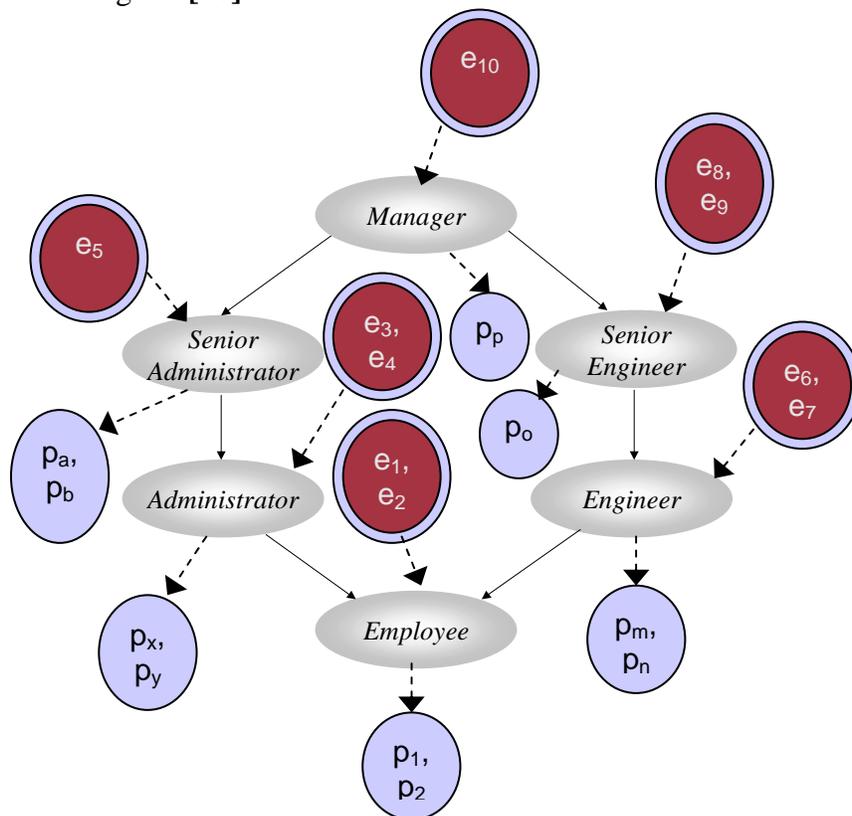


INFSCI 2935 Introduction to Computer Security
Homework 3

Due Date: October 3 (by 5pm), 2003

1. Questions on RBAC.

- a. In the figure below p_i 's represent permissions and e_i 's represent users. Their assignments to roles in the hierarchy are shown by the dotted arrows. [10]
- i. Find $assigned_users(r)$ and $authorized_users(r)$ for each r in the figure. [10]
 - ii. Find $assigned_permissions(r)$ and $authorized_permissions(r)$ for each r in the figure. [10]



b. Questions on Separation of Duty constraints [10, 10, 10]

- i. Let $(\{r_1, r_2, r_3, r_4\}, 3) \in SSD$, which of the following UA sets are valid:
 - $UA_1 = \{(u_1, r_1), (u_2, r_1), (u_3, r_1), (u_1, r_2), (u_4, r_2), (u_5, r_2), (u_1, r_3), (u_2, r_3), (u_3, r_3), (u_4, r_4)\}$
 - $UA_2 = \{(u_1, r_1), (u_3, r_1), (u_5, r_1), (u_1, r_2), (u_2, r_2), (u_3, r_2), (u_5, r_2), (u_2, r_3), (u_4, r_3), (u_4, r_3)\}$
 Provide reasons for your answer.
- ii. Differentiate between SSD and DSD. Suppose we have $(\{r_1, r_2, r_3, r_4\}, 3) \in SSD$ and $(\{r_1, r_2, r_3, r_4\}, 3) \in DSD$ – what are the implications of having

both of these separation of duty constraints present in a system at the same time.

- iii. Can the roles *Senior Administrator* and *Senior Engineer* of the role hierarchy shown above be in separation of duty? Give reasons.
 - iv. Give a transformation procedure for representing the Biba's strict integrity policy (without the third rule) using RBAC. Argue that your transformation is correct.
2. Chapter 9
- a. Do problem 9.8.2. Use MATLAB (*or any other program using any language*) to generate the table for $\phi(i)$. Submit your code for generating the $\phi(i)$ table. [20]
 - b. Do problem 9.8.3. [5]
3. Write a review/critique of the following article (at least 2 pages using 12pt, single space). [25]

S. Osborn, R. Sandhu, Q. Munawer, "Configuring Role-Based Access Control to Enforce Mandatory and Discretionary Access Control Policies", *ACM Transaction on Information and System Security*, May 2000. (The link is provided in the course website)

Here are some guidelines for what aspects of the paper to write about.

- Organization and presentation quality
 - Is the discussion coherent and well organized?
 - Can the language be improved to make concepts clearer?
- Novelty of the concepts presented in the paper,
 - Does the result presented have practical/theoretical significance?
 - Are the results presented significant enough for the journal publication?
 - Are the arguments convincing enough?
- Any other comments regarding how the paper can be made stronger
 - Is there something authors should explore further or address in depth?
 - Is there proper motivation and significance highlighted and adequate background, including related work discussed?

In case the paper is very good, say so and highlight the strong points.

I have put a sample review on the web. You can use the template of the sample review. But you are free to choose your own style.