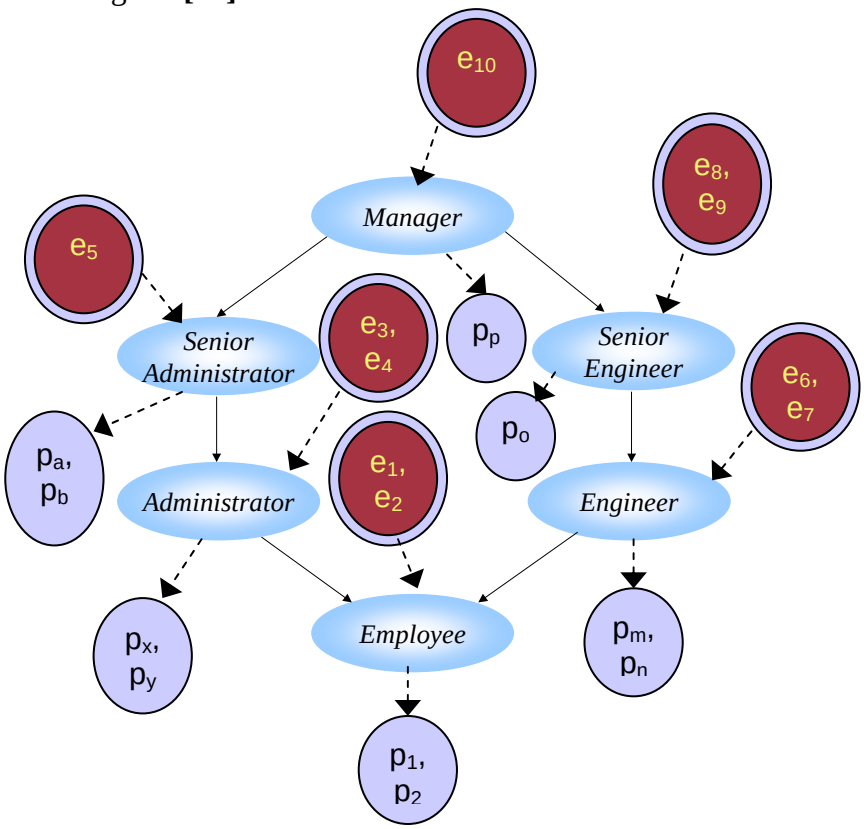
IS2150/Tel2810 Introduction to Computer Security
Homework 5
Due Date: October 26 (by 5pm), 2005
Points: 50

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.
   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, 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.