EECS710: Information Security and Assurance

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Assignment 4: Access Control
Points: 20
Due: 9/27/2014

PART 1: For the DAC model discussed in Chapter 4 (section 3), an alternative representation of the protection state is a directed graph. Each subject and each object in the protection state is represented by a node (a single node is used for an entity that is both subject and object). A directed line from a subject to an object indicates an access right, and the label on the link defines the access right.

A. Draw a directed graph that corresponds to the access matrix of Figure 4.2a.

B. Draw directed graph that corresponds to the access matrix of Figure 4.3

C. Is there a 1-1 correspondence between the directed graph representation and the access matrix representation? Explain.

PART 2: Unix treats file directories in the same fashion as files; that is, both is defined by the same type of data structure, call an inode. As with files, directories include a non-bit protection string. If care is not taken, this can create access control problems. For example, consider a file with protection mode 644 (`rw- r-- r--`) contained in a directory with protection mode 730 (`rwx -wx ---`). How might the file be compromised in this case?