

**CSCI 283 and CSCI 172 - Computer Security - Fall 2006**  
**Quiz 8 Solutions**

Consider a set of  $n$  *Subjects* with access to a database of  $m$  *Objects*. Each object belongs to exactly one Company Data set, provided by the function  $CD(O)$ , and to one Conflict of Interest Class – a set of company data sets – provided by  $COI(O)$ .

According to the Chinese Wall Model,  $S$ , a subject, has access to  $O$ , an object, if and only if (a)  $S$  has already accessed an object in the same Company Data Set as  $O$ , and (b)  $O$  does not belong to the conflict of interest class of all previously-read objects.

A. In the diagram on the slide on the screen, suppose Tony has access to all objects in Company Data Set Mobil and no others.

a. Can he be given additional access to an object in Company Data Set Shell?

Answer: No, because the object would belong to the COI class of previously-accessed objects from the Mobil CDS.

b. In Company Data Set Citibank?

Answer: Yes, because this object would not belong to the COI of any object previously-accessed in the Mobil CDS.

SEE OVER for Part B

B. Given an  $n \times m$  matrix with the *history* of each subject  $S$ 's access to the various objects, write an algorithm to construct the  $m \times n$  access control matrix of the system using functions  $CD(O)$  and  $COI(O)$ .

Answer:

$ACM$  denotes the access control matrix, and  $H$  the history matrix.  $ACM(S, O) = 1$  means subject  $S$  has access to object  $O$ , similarly  $H(S, O) = 1$  means subject  $S$  has had access to object  $O$ .

*ChineseWall*( $ACM, H$ )

for each subject  $S$

$\Delta = \phi$  /\* Initialize the subject's set of accessed CDSs to the empty set \*/

$\Upsilon = \phi$  /\* Initialize the subjects COI set to the empty set \*/

for each object  $O$

if  $H(S, O) == 1$  /\* If object has been accessed by subject \*/

$\Delta = \text{Insert}(CDS(O), \Delta)$  /\*  $O$ 's CDS added to subject's CDS \*/

$\Upsilon = \Upsilon \cup COI(O)$  /\* Company Data Sets in  $COI(O)$  added to subject's COI set\*/

endif

end for each object

for each object  $O$

/\* Apply Chinese Wall definition above\*/

if  $(CDS(O) \in \Delta)$  AND NOT  $(CDS(O) \in \Upsilon)$   $ACM(S, O) = 1$

end for each object

end for each subject