Principles of Data Protection: Assignment 1

Deadline: 1 December 2014
How to submit the assignment: – by email (n.zannone at tue dot nl)
For any question send me an email

Questions

1. Search in the news an article about privacy violations. Describe briefly the reported incident and discuss its privacy implications (at most one page). The reference (or url) to the article should be given. **Note:** The article should be at most six months old.

2. Consider the HRU model.

   (a) Compute the access matrix that results from the following initial state

	File 1	File 2
Alice	own	
Bob	*read	own
Charlie		
David		

   by executing the sequence of commands α defined as follows:

   1 $CONFER_{*write}(Alice, David, File1)$
   2 $TRANSFER_{read}(Alice, Charlie, File1)$
   3 $CONFER_{*read}(Bob, Alice, File2)$
   4 $TRANSFER_{read}(Bob, David, File1)$
   5 $CREATE(David, File3)$
   6 $CREATE(Alice, File2)$
   7 $CONFER_{*read}(Alice, David, File2)$
   8 $TRANSFER_{read}(Alice, Bob, File3)$
   9 $TRANSFER_{read}(David, Charlie, File2)$
   10 $CONFER_{*write}(David, Alice, File3)$
   11 $REVOKE_{read}(Bob, Charlie, File2)$
   12 $CONFER_{*write}(Bob, Alice, File2)$
   13 $TRANSFER_{write}(David, Alice, File1)$
   14 $REVOKE_{read}(Bob, Alice, File2)$
   15 $TRANSFER_{read}(Alice, Bob, File3)$
   16 $TRANSFER_{write}(Alice, Charlie, File2)$
   17 $CONFER_{*write}(Bob, Alice, File2)$
   18 $REVOKE_{read}(David, Alice, File3)$

   Hint: Command $REVOKE_{read}$ is used to remove both $read$ and $*read$.

   (b) Is α leaking access privileges? (Consider only Charlie to be untrusted) Justify the answer.

3. Let SECRET, CONFIDENTIAL and UNCLASSIFIED be the security levels (ordered from highest to lowest), and Navy and Army two categories. Consider the following subjects and objects along with their secrecy classes:

Subject	**Security Class**
Colonel	(SECRET,{Army})
Major	(CONFIDENTIAL, {Army,Navy})
Soldier	(UNCLASSIFIED,{})

Object	**Security Class**
Army position	(SECRET,{Army})
Fleet position	(SECRET,{Navy})
Number of army units	(CONFIDENTIAL,{Army})
Number of navy units	(CONFIDENTIAL,{Navy})
Cost of army unit	(UNCLASSIFIED, {Army})
Cost of navy unit	(UNCLASSIFIED, {Navy})

   Answer the following questions based on the BLP model:

(a) Draw the lattice of classification.

(b) Can the colonel compute the overall number of defense units (army + navy)?

(c) Can the colonel update the cost of navy units?

(d) Can the major compute the overall defense costs (army + navy)?

(e) Can the major change the overall defense position?

(f) Can the soldier compute the overall number of defense units (army + navy)?

(g) Can the soldier change the army position?

Justify the answers.

4. Discuss the possibility of defining a Chinese Wall policy in the BLP Model.

5. Define a RBAC_3 system to regulate permissions within a bank branch. The system should implement the following requirements:

   (a) A bank employee can be a clerk, a manager, an auditor, or the head of the bank branch.

   (b) A bank branch can have only one head.

   (c) The head of the bank branch is a manager.

   (d) An auditor cannot be a clerk or a manager.

   (e) Clerks can make loan offers to customers.

   (f) Loan offers should be reviewed by a different clerk before they can be approved.

   (g) Loan offers lower than \$10K can be approved either by clerks or managers.

   (h) Loan offers equal or greater than \$10K must be approved by a manager.

   (i) A bank employee cannot approve loan offers he made or reviewed.

   (j) Approved loan offers should be analyzed by two auditors.

6. Describe the Clark-Wilson integrity model. Discuss the main differences between this model and the Biba model.