

IS2150/TEL2810 Introduction to Security

Homework 2

Total Points: 50

Due Date: September 29, 2009

1) Exercise on Propositional/Predicate logic

[25 Points]

- (a) Prove that $A \oplus B \Leftrightarrow (\neg A \wedge B) \vee (A \wedge \neg B)$ (use the truth table)
- (b) Express the following sentences in propositional//first order logic. Be sure to define all propositional components (e.g., predicate function, constants, and variables).
- If it does not rains we will go to the Steeler's game.
 - If a subject has *Secret* clearance then he/she is allowed to *write* all *Top Secret* and *Secret* files.
 - A person can *approve* a check or *cash* it but cannot do *both*.
 - A *directory* is older than the *directories* and the *files* that it contains.
- (c) Prove by using Induction the following

$$1^3 = 2^3 + 3^3 + \dots + n^3 = \left[\frac{n(n+1)}{2} \right]^2$$

2) Do the following

[25 Points]

- Describe and differentiate between the mechanisms related to:
Setuid program in Unix and *Impersonation in Windows*
- Note that the following two resolution rules are used in Windows. Explain how given a *security descriptor* and an *access token*, these resolution techniques are used.
(1) *Positive permissions are additive*
(2) *Negative permission (deny access) takes priority*
- Assume that when a file is created and before the **umask** value has been applied, the permission bits are 0626 (in class we assumed 0777). What will be the permission setting for the new files when the following **umask** values are applied

- 032
- 031
- 051