IS2150/TEL2810 Information Security & Privacy
Homework 1
Total Points: 100

- 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 rains we will not go to the Steeler's game.
      - If a subject has Secret clearance then he/she is allowed to write to Secret and Top 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

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

- Do the following   **[25 Points]**

    i) Describe and differentiate between the mechanisms related to:
        Setuid program in Unix and *Impersonation in Windows*

    ii) 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

    iii) Exercise 9 from exercises 1.11 (page 23 of the green book; note that the brown book will have a different exercise number)

- Do exercise 1 from Section 2.6   **[25 Points]**

- Do exercise 2c from Section 2.6   **[25 Points]**