CMSC 250 – Jerry Alan Fails
Due: Friday, July 6, 2007

HW #9

Student: ____________________
ID #: ____________________

You must work alone on your homework, and homework must be **written legibly**, single-sided on your own lined paper, **or typed**, with the answers clearly labeled and in the sequential order as assigned. You must write your name and university ID number in the upper right-hand corner of your homework. Staple all pages together and be sure that your name appears on every sheet.

1. (-10 points if wrong) Write your name clearly on each page. Write the time and place of Exam 2.

2. (15 points) Suppose $a_1, a_2, a_3, \ldots$ is a sequence defined as follows:

$$\begin{cases} a_1 = 1, a_2 = 2, a_3 = 3 \\ a_k = a_{k-1} + a_{k-2} + a_{k-3} & \text{for all integers } k \geq 4 \end{cases}$$

   Show that: $\forall k \in \mathrm{Z}^+,\ a_k \leq 2^{k-1}$.

3. (10 points) Prove that Prove $\varnothing \subseteq A$ for any set A.

4. (75 points) For each of the following say whether it is true or false. If true, prove it. If false, give a specific counterexample.

   (a) $B - (A \cap C) = (B - A) \cup (B - C)$

   (b) $(A \subseteq B) \rightarrow ((A \cup B) \subseteq B)$.

   (c) $(A \cap B) \cap C \subseteq (A \cup B) \cup C$.

   (d) $A \cap (B \cap C) \rightarrow (A \cap B) \cup (A \cap C)$.

   (e) $[(B \cap C) \subseteq A] \rightarrow [(C - A) \cap (B - A) = \varnothing]$.

5. **(No points will be awarded for this assignment unless this is done)** Sign your name to the following honor code statement: “I pledge on my honor that I have not given or received any unauthorized assistance on this assignment”.