10/12/09

5. Homework

Due **10/21/09** before class

Please refer to the corresponding exercise sections in the textbook (Rosen, 6th edition). Annotate all your proofs with comments/text in order to receive full credit.

4.1 (page 279)

    (a) (5 points) Let $P(n)$ be the statement given in exercise 6, for a positive integer n. For this proposition, answer the same questions as in 4a-e which guide you through a proof by (weak) induction.

    (b) (4 points) Prove 14 by (weak) induction.

    (c) (3 points) Prove 20 by (weak) induction.

    (d) (4 points) Prove 40 by (weak) induction for all $n \in \mathbb{Z}^+$.

4.2 (page 291)

    (a) (4 points) Use strong induction to prove 38. *(Hint: Draw an example first and try to indentify recursive/inductive subcases.)*

    (b) (4 points) Assume you want to prove the claim: "It is possible to express any amount of at least \$8 or above using \$3-bills and \$5-bills."

        Formally, this claim is expressed as: $\forall n \geq 8 : P(n)$, where
$P(n) = \exists x \in \mathbb{N}\ \exists y \in \mathbb{N} : n = 3x + 5y$.

        Use strong induction to prove this claim. *(Hint: Prove $P(8)$, $P(9)$, $P(10)$ for the base case. For the inductive step, try to use either a \$3-bill or a \$5-bill.)*