## Problem of the Week-7: Signed Binary Representations of Integers

A signed binary representation of a positive integer $k$ given by $k=$ $\sum_{i=0}^{t} k_{i} 2^{i}$ where each $k_{i}$ is 0,1 or -1 . We also use the vector $\left(k_{t}, \ldots, k_{0}\right)$ to denote the representation where the right-most digit is the coefficient of the lowest order term.

1. Show that a signed binary representation of an integer is not unique.

A signed representation $\left(k_{t}, \ldots, k_{0}\right)$ of $k$ is said to be in nonadjacent form if no two consecutive $k_{i}$ 's are non-zero. Such a representation is called a NAF representation.
2. Show that the standard binary representation of an integer can be converted into a NAF representation.
3. Find the standard binary representation and NAF representation of 749 .
4. Show that a signed representation of a positive integer in NAF form is unique.

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[^0]:    Posting Date 4/13/12. Submit solutions to Noah Aydin, Mathematics Department, RBH 319 (e-mail or hard-copy, but hard copy submissions must include a time stamp) by 4 pm on 4/27/12.

