Math 350
Spring, 2000

HOMEWORK #8

Do 50 points of the following problems (due 4/4/00).

25 pts. **1** Use the decoding scheme described by Jenny Key to decode the codeword 122011022 (show all work). You should use the definition of the code she gave in class.

$\star$ 50 pts. **2** Describe how you would use the affine plane over $GF(p)$ to the general majority logic decoding algorithm similar to Jenny Key's description. What properties of the affine plane are useful here?

25 pts. **3** Let $1 + x + x^4$ generate the binary Hamming code of length 15. Use the decoding algorithm discussed in class to decode $x+x^3+x^5+x^7+x^9+x^{11}$.

25 pts. **4** Use the MacWilliams identities to find the weight enumerator for the orthogonal code to the first order Reed Muller code of length 16 (which has 30 codewords of weight 8, 1 codeword of weight 16, and 1 codeword of weight 0).

25 pts. **5** Use the MacWilliams identities to find the weight enumerator for the orthogonal code to the Nordstrom-Robinson code (which has 30 words of weight 8, 112 words of weight 6, 112 words of weight 10, 1 word of weight 16 and 1 word of weight 0).