Homework 5: EE 252 Digital Electronics

4.2 Show how the function $f(w_1, w_2, w_3) = \sum m(1, 2, 3, 5, 6)$ can be implemented using a 3-to-8 binary decoder and an OR gate.

4.4. Consider the function

$$f = \overline{w}_1\overline{w}_3 + w_2\overline{w}_3 + \overline{w}_1 w_2.$$

Use the truth table to derive a circuit for f that uses a 2-to-1 multiplexer.

4.16 Consider the multiplexer-based circuit illustrated in Figure P4.1. Show how the function

$f = w_2\overline{w}_3 + w_1 w_3 + \overline{w}_2 w_3$ can be implemented using only one instance of this circuit.

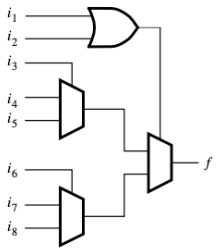

Figure P4.1 A multiplexer-based circuit.

4.22 Figure P4.3 shows a modified version of the code for a 2-to-4 decoder in Figure 4.37. This code is almost correct but contains one error. What is the error?

```
module dec2to4 (W, En, Y);
    input [1:0] W;
    input En;
    output reg [0:3] Y;
    integer k;

    always @(W, En)
        for (k = 0; k < = 3; k = k+1)
            if (W == k)
                Y[k] = En;

endmodule
```

Figure P4.3 Code for Problem 4.22.